

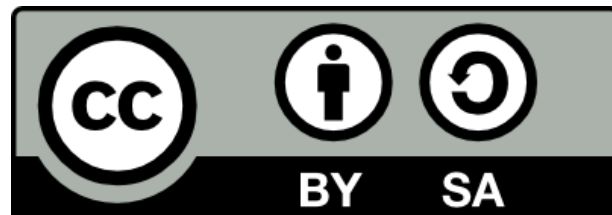


CAPsMAN

Implementation

(Overview & Simple Configuration)

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Perkenalan



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(Technical Support)
MTCNA, MTCRE, MTCTCE

CAPsMAN itu apa?

- **CAPsMAN** → **Controlled Access Point system Manager**
- Merupakan sebuah fitur wireless controller yang memudahkan kita untuk mengatur semua perangkat wireless access point MikroTik yang ada di jaringan secara terpusat

CAPsMAN

- Dalam penggunaan CAPsMAN, perangkat yang digunakan ada 2 istilah:
 - **System Manager** (*CAPsMAN*), yaitu perangkat yang digunakan untuk mengatur CAP.
 - **CAP** (*Controlled Access Point*), yaitu perangkat wireless access point yang akan dikonfigurasi.

Fitur CAPsMAN

- Manajemen secara terpusat Wireless AP MikroTik
- Mendukung komunikasi MAC & IP Layer dengan AP
- Autentikasi menggunakan certificate
- Autentikasi RADIUS berdasarkan MAC Address
- Autentikasi menggunakan WPA/WPA2
- Full & Local Data Forwarding Mode
- Dual Band AP Support

Yang dibutuhkan

CAPsMAN	CAPs
Router Mikrotik x86 atau RB (tidak harus mempunyai wireless)	Perangkat routerboard yang mempunyai interface wireless
RouterOS versi 6.11 keatas (disarankan versi terbaru)	
	Minimal lisensi level 4
Package wireless sudah terinstall	

Versi CAPsMAN

1. CAPsMAN v1

- Menggunakan package Wireless-fp
- Rilis 2014 → RouterOS v6.11

2. CAPsMAN v2

- Menggunakan package Wireless-cm2
- Rilis 2015 → RouterOS v6.23












Versi CAPsMAN

Beberapa fitur baru di CAPsMAN v2:

- CAPsMAN upgrade otomatis untuk semua CAP Client. (Optional)
- Ditambahkan parameter “*Name Format, Name Prefix, Identity/CommonName Regexp, IP Address range*” pada Provisioning Rule
- Ditambahkan logging ketika ada “roaming client” antara perangkat CAPs.
- L2 Path MTU Discovery
- Peningkatan CAP <-> CAPsMAN Data Connection Protocol

Tips dan Trik

1. CAPsMAN versi 1 tidak support dengan versi 2, begitu juga sebaliknya
2. Pastikan perangkat CAPsMAN dan CAP harus menggunakan wireless package yang sama
3. Bisa menggunakan CAPsMAN v2 yang lebih stabil & umum digunakan
4. Direkomendasikan untuk CAPsMAN menggunakan routerOS versi 6.37 keatas

 routeros-mipsbe	6.38	Dec/30/2016 11:33:56
 advanced-t...	6.38	Dec/30/2016 11:33:56
 dhcp	6.38	Dec/30/2016 11:33:56
 hotspot	6.38	Dec/30/2016 11:33:56
 ipv6	6.38	Dec/30/2016 11:33:56
 mpls	6.38	Dec/30/2016 11:33:56
 ppp	6.38	Dec/30/2016 11:33:56
 routing	6.38	Dec/30/2016 11:33:56
 security	6.38	Dec/30/2016 11:33:56
 custom	6.38	Dec/30/2016 11:33:56
 wireless	6.38	Dec/30/2016 11:33:56

Koneksi CAP ↔ CAPsMAN

MAC Layer2

Tanpa konfigurasi IP.

CAP & CAPsMAN harus dalam broadcast domain (layer 2) yang sama (baik fisik maupun layer 2 tunnel).

IP (UDP) Layer3

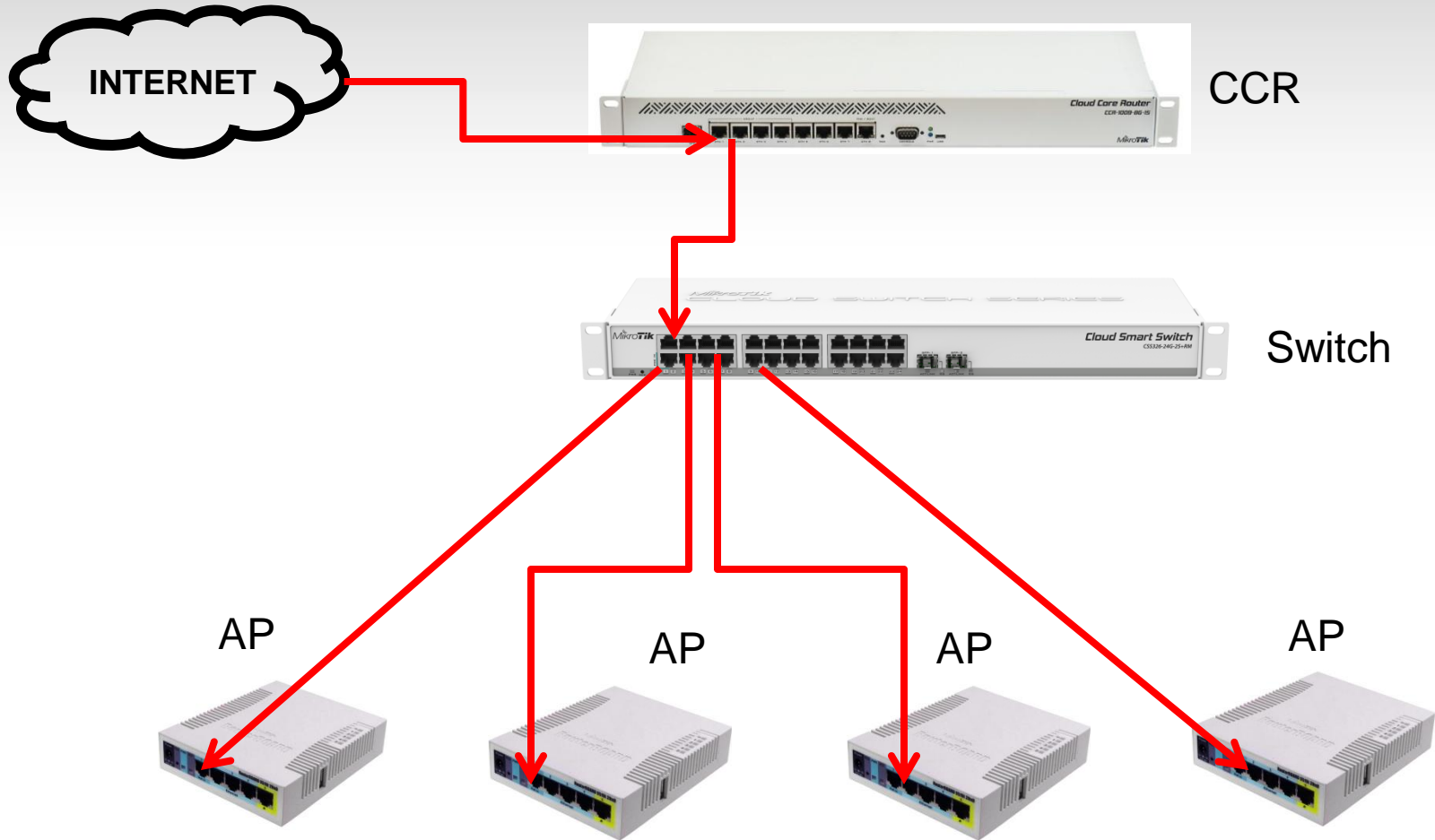
CAP harus bisa komunikasi dengan CAPsMAN melalui IP Protocol.

Dengan metode ini CAP & CAPsMAN tidak harus berada dalam layer2 yang sama, bahkan bisa berbeda lokasi geografis.

Mendukung penggunaan NAT

- Koneksi antara CAP & CAPsMAN menggunakan keamanan berupa DTLS Certificate.
- Apabila dibutuhkan enkripsi untuk mengamankan trafik data bisa menggunakan IPSec atau dengan jalur tunnel+encryption system. (*Optional*)

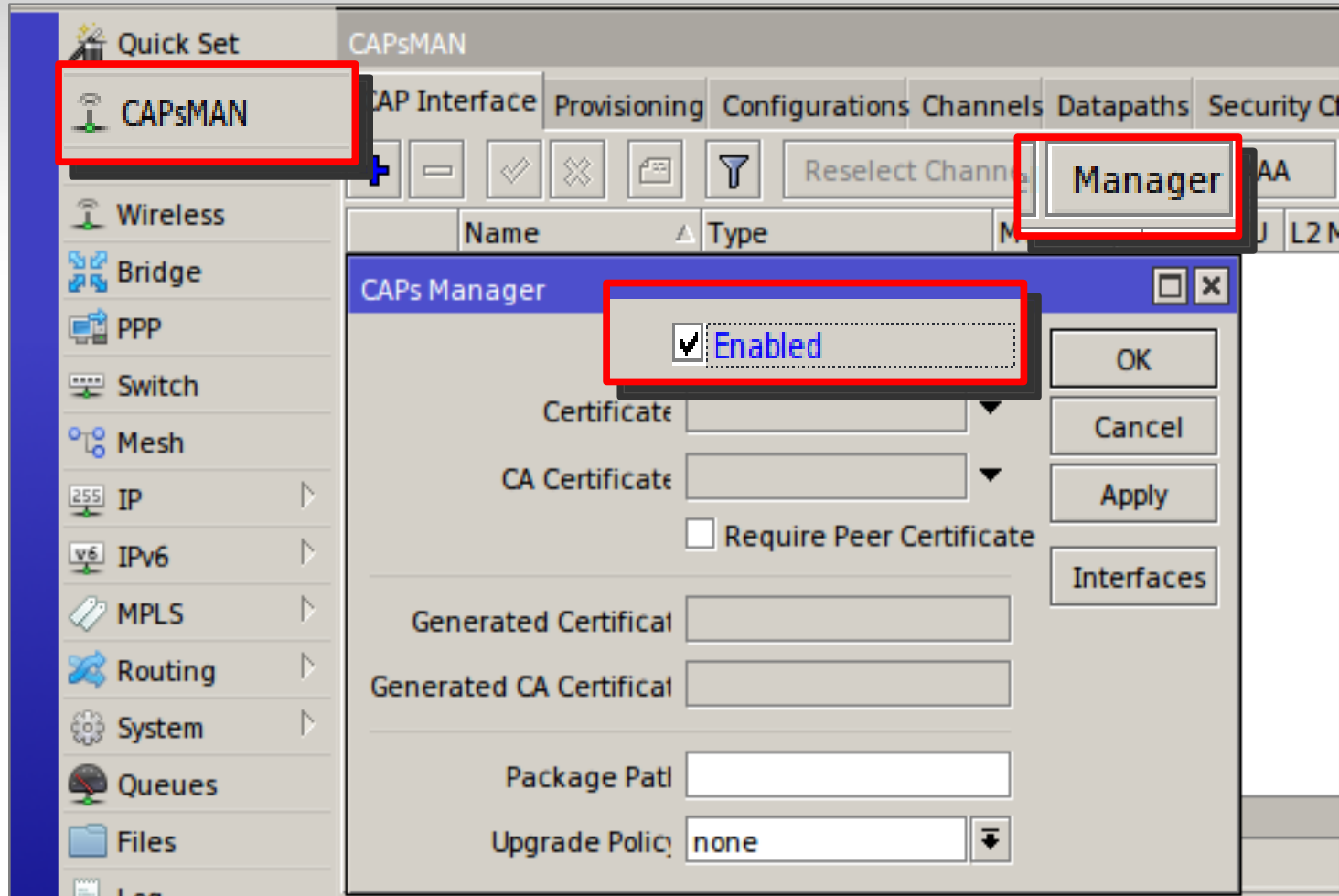
CAPsMAN Simple Topologi



CAPsMAN Simple Setup

- Mengaktifkan CAPsMAN Service
- Membuat Bridge Interface
- Konfigurasi IP Address pada Bridge Interface
- Konfigurasi DHCP Server dan NAT
- Konfigurasi CAPsMAN
- Konfigurasi Provisioning Rule
- Mengaktifkan CAP mode pada Access Point
- Roaming Client menggunakan Access List

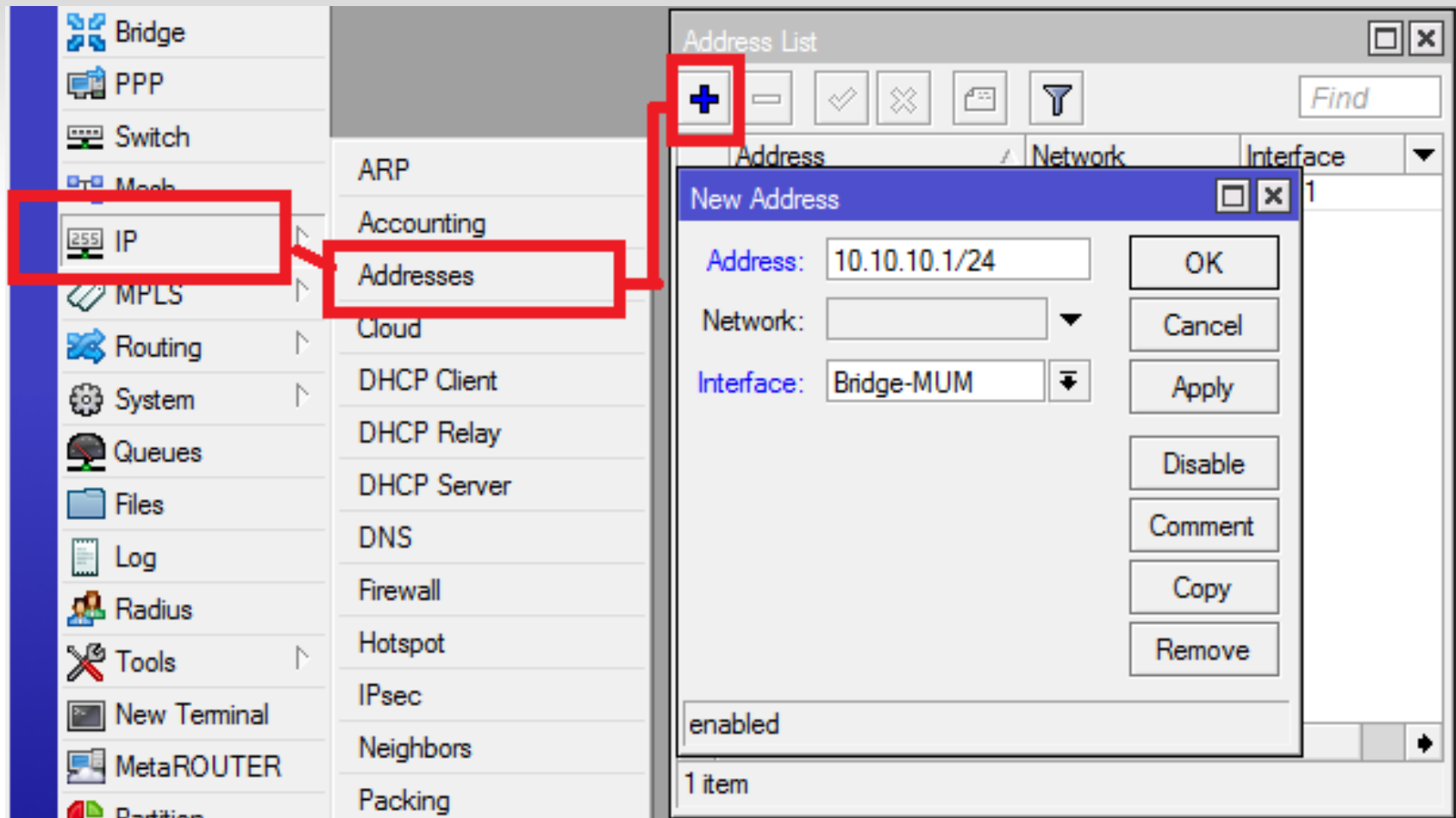
CAPsMAN Simple Setup



CAPsMAN Simple Setup

The screenshot displays the MikroTik WinBox interface for configuring a bridge. On the left sidebar, the 'Bridge' menu item is highlighted with a red box. The main window shows the 'Bridge' configuration page with tabs for 'Bridge', 'Ports', 'Filters', 'NAT', and 'Hosts'. A red box highlights the '+' icon in the toolbar, with a red arrow pointing to the 'New Interface' dialog box. In this dialog, the 'Name' field is set to 'Bridge-MUM' and is highlighted with a red box. Other fields include 'Type: Bridge', 'MTU', 'Actual MTU', 'L2 MTU', 'MAC Address', 'ARP: enabled', 'ARP Timeout', and 'Admin. MAC Address'. Buttons for 'OK', 'Cancel', 'Apply', 'Disable', 'Comment', 'Copy', 'Remove', and 'Torch' are visible on the right.

CAPsMAN Simple Setup



CAPsMAN Simple Setup

The image shows the MikroTik WinBox interface. On the left, the 'IP' menu is highlighted with a red box, and a red arrow points to the 'DHCP Server' option, which is also highlighted with a red box. On the right, the 'DHCP Server' configuration window is open, with the 'DHCP Setup' tab selected and highlighted with a red box. Below this, a 'DHCP Setup' dialog box is displayed, showing the 'DHCP Server Interface' set to 'Bridge-MUM'.

IP

- Switch
- Mesh
- IP**
- MPLS
- Routing
- System
- Queues
- Files
- Log
- Radius
- Tools
- New Terminal
- MetaROUTER
- Partition
- Make Supout.tif
- Manual

ARP
Accounting
Addresses
Cloud
DHCP Client
DHCP Relay
DHCP Server
DNS
Firewall
Hotspot
IPsec
Neighbors
Packing
Pool
Routes

DHCP Server

DHCP Networks Leases Options Option Sets Alerts

+ - ✓ ✗ ⌵ DHCP Config **DHCP Setup**

Name	Interface	Relay	Lease Time
DHCP Setup			
Select interface to run DHCP server on			
DHCP Server Interface: Bridge-MUM			
Back Next Cancel			

CAPsMAN Simple Setup

The screenshot shows the Mikrotik WinBox Firewall configuration interface. The 'NAT' tab is selected and highlighted with a red box. Below it, the '+', '-', and checkmark icons are also highlighted with red boxes. The main configuration area is divided into two panes for 'New NAT Rule'. The left pane shows the 'General' tab with the following fields: Chain: srcnat, Src. Address: 10.10.10.0/24, Dst. Address: (empty), Protocol: (empty), Src. Port: (empty), and Dst. Port: (empty). The right pane shows the 'Action' tab with the following fields: Action: masquerade, Log, and Log Prefix: (empty).

CAPsMAN Simple Setup

CAPsMAN

Interfaces Provisioning Configuration: **Channels** **Datapaths** **Security Cfg.** Access List Rates Remote CAP Radio Registration Table

+ - [] []

Name	Authentication Type	Encryption	Group Encryption	Passphrase	EAP Methods
CAPs Channel <channel>			CAPs Datapath Configuration <mum>		
Name: channel 11			Name: mum		
Frequency: 2462 MHz ▲			MTU: [] ▼		
Width: 20 MHz ▲			L2 MTU: [] ▼		
Band: 2ghz-b/g/n ▼ ▲			ARP: [] ▼		
Extension Channel: [] ▼			Bridge: Bridge-MUM ▼ ▲		
Tx. Power: [] ▼			Bridge Cost: [] ▼		
			Bridge Horizon: [] ▼		
			Local Forwarding: <input checked="" type="checkbox"/>		
			Client To Client Forwarding: <input checked="" type="checkbox"/>		
			VLAN Mode: [] ▼		
			VLAN ID: [] ▼		
CAPs Security Configuration <security>					
Name: security 1					
Authentication Type: <input checked="" type="checkbox"/> WPA PSK <input checked="" type="checkbox"/> WPA2 PSK <input type="checkbox"/> WP					
Encryption: <input checked="" type="checkbox"/> aes ccm <input type="checkbox"/> tkip					
Group Encryption: aes ccm					
Passphrase: mumindonesia					
EAP Methods: []					
EAP Radius Accounting: []					
TLS Mode: []					
TLS Certificate: []					

1 item (1 selected)

CAPsMAN Simple Setup

The screenshot displays the Mikrotik CAPsMAN configuration interface. The 'Configurations' tab is selected and highlighted with a red box. Below the navigation tabs, a toolbar contains a '+' icon (highlighted with a red box), a '-' icon, a refresh icon, and a filter icon. The main area shows a table of configurations with columns: Name, SSID, Hide SSID, Load Bal..., Country, Channel, Frequency, Band, Rate, Datapath, and Bric. Below the table, four 'New CAPs Configuration' panels are visible, each with a different tab selected:

- Panel 1 (Wireless tab):** Name: MUM, Mode: ap, SSID: MUM2017, Hide SSID: , Load Balancing Group: , Distance: , Hw. Retries: , Hw. Protection Mode: , Frame Lifetime: , Disconnect Timeout: , Country: indonesia, Max Station Count: .
- Panel 2 (Channel tab):** Channel: channel 11, Frequency: , Width: , Band: , Extension Channel: , Tx. Power: .
- Panel 3 (Datapath tab):** Datapath: mum, MTU: , L2 MTU: , ARP: , Bridge: , Bridge Cost: , Bridge Horizon: , Local Forwarding: , Client To Client Forwarding: , VLAN Mode: , VLAN ID: .
- Panel 4 (Security tab):** Security: security 1, Authentication Type: , Encryption: , Group Encryption: , Passphrase: , EAP Methods: , EAP Radius Accounting: , TLS Mode: , TLS Certificate: .

CAPsMAN Simple Setup

CAPsMAN

Interface **Provisioning** Configurations Channels Datapaths Security Cfg. Access List Rates Remote CA

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#	Radio MAC	Identity Regexp	Common Nam...	Action	Master Configurati...	Slave Configurati...
CAPs Provisioning <4C:5E:0C:AA:16:3B>		CAPs Provisioning <00:00:00:00:00:00>				
	Radio MAC: 4C:5E:0C:AA:16:3B					Radio MAC: 00:00:00:00:00:00
	Hw. Supported Modes: []					Hw. Supported Modes: []
	Identity Regexp: []					Identity Regexp: []
	Common Name Regexp: []					Common Name Regexp: []
	IP Address Ranges: []					IP Address Ranges: []
	Action: create enabled					Action: create dynamic enabled
	Master Configuration: MUM					Master Configuration: MUM
	Slave Configuration: []					Slave Configuration: []
	Name Format: prefix identity					Name Format: prefix identity
	Name Prefix: cap					Name Prefix: cap

CAPsMAN Simple Setup

- Pilihan pada paramater 'Action' di Provisioning Rule :
 - **Create-disabled** → Sistem akan membuat secara otomatis sebuah CAP Interface ketika ada AP/Radio yang terkoneksi (Bounding). Interface bersifat static & tidak aktif (disabled). Harus mengaktifkan (*enabled*) secara manual supaya CAP Interface dapat berjalan.
 - **Create-enabled** → Sistem akan membuat secara otomatis sebuah CAP Interface ketika ada AP/Radio yang terkoneksi (Bounding). Interface bersifat static & aktif (enabled).
 - **Create-dynamic-enabled** → Sistem akan membuat secara otomatis sebuah CAP Interface ketika ada AP/Radio yang terkoneksi (Bounding). Interface bersifat dinamis & aktif (enabled).
 - **None** → Sistem *tidak* akan membuat secara otomatis sebuah CAP Interface, jadi harus dilakukan provisioning secara manual.

CAPsMAN Simple Setup

SISI CAP

Wireless Tables

Interfaces | Nstreme Dual | Access List | Registration | Connect List | Security Pro

+ - ✓ ✗ [CAP] WPS Client Setup Repeat

Name	Type	Actual MTU	Tx
wlan1	Wireless (Atheros AR9...	1500	

CAP

Enabled

Interfaces: wlan1

Certificate: none

Discovery Interfaces: bridge1

Lock To CAPsMAN

CAPsMAN Addresses: []

CAPsMAN Names: []

CAPsMAN Certificate Common Names: []

Bridge: none

Static Virtual

Requested Certificate: []

Locked CAPsMAN Common Name: []

OK
Cancel
Apply

CAP Status

Wireless Tables

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

+ - ✓ ✗ [icon] [icon] CAP WPS Client Setup Repeater Scanner Freq. Usage Ali

Name	Type	Actual MTU	Tx	Rx	Tx Pa
-- managed by CAPsMAN					
-- channel: 2412/20-Ce/gn(20dBm), SSID: MUMID2017, local forwarding					
RS wlan1	Wireless (Atheros AR9...	1500	0 bps	0 bps	

Wireless Tables

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

+ - ✓ ✗ [icon] [icon] CAP WPS Client Setup Repeater Scanner Freq. Usage Ali

Name	Type	Actual MTU	Tx	Rx	Tx
-- managed by CAPsMAN					
-- channel: 2462/20-eC/gn(20dBm), SSID: MUM2017, local forwarding					
RS wlan1	Wireless (Atheros AR9...	1500	0 bps	0 bps	

CAPsMAN Status

CAPsMAN

Interfaces Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Register

+ - ✓ ✗ [Icon] [Icon] Manager AAA

	Name	Type	MTU	Actual MTU	L2 MTU	Tx	Rx
MB	cap-AP 1-1	Interfaces	1500	1500	1600		0 bps
DMB	cap-AP 2-1	Interfaces	1500	1500	1600		0 bps

Interface <cap-AP 1-1>

General Wireless Channel Rates Datapath

Name: cap-AP 1-1

Type: Interfaces

MTU: 1500

Actual MTU: 1500

L2 MTU: 1600

MAC Address: 4C:5E:0C:AA:16:3B

ARP: enabled

ARP Timeout:

Radio MAC: 4C:5E:0C:AA:16:3B

Master Interface: none

Interface <cap-AP 2-1>

General Wireless Channel Rates Datapath Security Status Traffic

Name: cap-AP 2-1

Type: Interfaces

MTU: 1500

Actual MTU: 1500

L2 MTU: 1600

MAC Address: D4:CA:6D:E5:66:81

ARP: enabled

ARP Timeout:

Radio MAC: D4:CA:6D:E5:66:81

Master Interface: none

CAPsMAN Status

CAPsMAN										
Interfaces	Provisioning	Configurations	Channels	Datapaths	Security Cfg.	Access List	Rates	Remote CAP	Radio	Registration Table
		Provision	Upgrade	Set Identity						
Address	Name	Board	Serial	Version	Identity	Base MAC	State			
4C:5E:0C:AA:16:37	[4C:5E:0C:AA:16:36]	RB951Ui-2HnD	558104A9D811	6.40.4	AP 1	4C:5E:0C:AA:16:36	Run			
D4:CA:6D:E5:66:7D	[D4:CA:6D:E5:66:7C]	RB951Ui-2HnD	469D02E83205	6.40.4	AP 2	D4:CA:6D:E5:66:7C	Run			

- MAC/IP Address
- Model/Jenis RouterBoard
- Serial Number CAP
- Versi RouterOS
- System Identity
- MAC Wireless
- Status CAP
- Jumlah Radio/Wlan di CAP

CAPsMAN Status

CAPsMAN

Interfaces Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Rad... **Registration Table**

Interface	SSID	MAC Address	Tx Rate	Rx Rate	Tx Signal	Rx Signal	Uptime	Tx/Rx Packets
cap-AP 1-1	MUM2017	20:5E:F7:58:3C:80	65Mbps-...	1Mbps	0	-56	00:00:40...	269/276
cap-AP 2-1	MUMID2017	C8:FF:28:61:5C:77	11Mbps	39Mbps-...	0	-45	00:00:11...	92/178

CAPs AP Client <C8:FF:28:61:5C:77>

Interface: cap-AP 2-1

SSID: MUMID2017

MAC Address: C8:FF:28:61:5C:77

Tx Rate: 11Mbps

Rx Rate: 39Mbps-20MHz/1S

Tx Rate Set: CCK:1-11 OFDM:6-54 BW:1x-2x HT:...

Tx Signal: 0

Rx Signal: -45

Uptime: 00:00:11.66

Tx/Rx Packets: 92/178

Tx/Rx Bytes: 22.0 KiB/36.4 KiB

CAPs AP Client <20:5E:F7:58:3C:80>

Interface: cap-AP 1-1

SSID: MUM2017

MAC Address: 20:5E:F7:58:3C:80

Tx Rate: 65Mbps-20MHz/1S

Rx Rate: 1Mbps

Tx Rate Set: CCK:1-11 OFDM:6-54 BW:1x HT:0-7

Tx Signal: 0

Rx Signal: -56

Uptime: 00:00:40.29

Tx/Rx Packets: 269/276

Tx/Rx Bytes: 65.0 KiB/47.6 KiB

OK

Remove

Copy to Access List

CAPsMAN Access List

- Mempunyai fungsi yang sama dengan 'Access List' pada menu wireless, yaitu untuk melakukan filtering koneksi client berdasarkan MAC Address dan juga parameter yang lain.
- Parameter di CAPsMAN Access List:
 - MAC Authentication
 - RADIUS Query
 - SSID Regexp
 - Signal Range
 - Time
 - Private Passphrase
 - VLAN ID Assignment

Client Roaming Tips

CAPsMAN

Interfaces Provisioning Configurations Channels Datapaths Security Cfg. **Access List** Rates Remote CAI

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#	MAC Address	MAC Mask	Interface	Signal Ra...	Action	Client To Clie...
---	-------------	----------	-----------	--------------	--------	-------------------

CAPs Access Rule <>

MAC Address:

MAC Mask:

Interface: all

SSID Regexp:

Signal Range: -60..120

Time

Action: accept

AP Tx Limit:

Client Tx Limit:

Private Passphrase:

Client To Client Forwarding:

RADIUS Accounting:

New CAPs Access Rule

MAC Address:

MAC Mask:

Interface: all

SSID Regexp:

Signal Range: -120..-60

Time

Action: reject

AP Tx Limit:

Client Tx Limit:

Private Passphrase:

Client To Client Forwarding:

RADIUS Accounting:

Client Roaming Tips

Pastikan juga anda konfigurasi beberapa point berikut di sisi CAPsMAN :

1. Tentukan Max Station Count
2. Turunkan Tx Power
3. Data rates

Terima Kasih

Dijinkan menggunakan sebagian atau seluruh materi pada modul ini, baik berupa ide, foto, tulisan, konfigurasi dan diagram selama untuk kepentingan pengajaran, dan memberikan kredit kepada penulis serta link ke www.mikrotik.co.id

