

Easy Setup of IP Based CAPsMAN with link failover & CAPs monitor



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MUM Philippines (Manila)

2nd December 2014

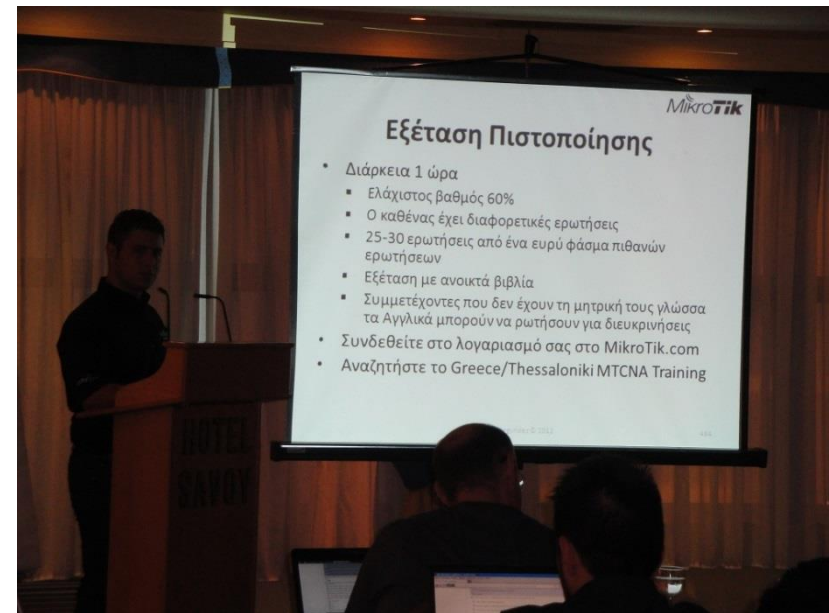
About Me

My Name:

Georgios Argyrides

➤ You can call me “George”
(its easier)

➤ I came from South Europe



About Me

- Born in Cyprus
(Europe, Near Greece)
 - Can Speak English & Greek



- Have been working in Industry since 2006
 - ITSP Consultant / Voice Engineer
 - Systems / Network Administrator
 - Internet Security Consultant
 - ISP / WISP Consultant

About Me

- 1st MikroTik Certified Consultant in Greece since 2011 [MTCRE,MTCWE,MTCTCE]
- MikroTik Certified Trainer in Greece since 2012
- Cyberoam Certified Network & Security Professional (CCNSP)
- BSc (Hon) Applied Computing , Sheffield Hallam University(UK)
- Providing MikroTik Training (On-Site) & Consultancy (On-site or remote)
 - in Greece & Cyprus(EU Region)
 - Worldwide as well

kroTik Training events and institutions around the world:



This Presentation Objective

- Introduce the IP Based CAPsMAN even for new users of MikroTik products
 - Through an Easy SetUP
- Small Routed Network
 - CAPs communicating with CAPsMAN by redundant connections (routing protocol will take care of this)
- Monitor CAPs
 - Get notified when one goes down

CAPsMAN Features

- Centralized management of RouterOS APs
- Dual Band AP support
- Provisioning of APs
- MAC and IP Layer communication with APs
- Certificate support for AP communication
- Full and Local data forwarding mode
- RADIUS MAC authentication
- Custom configuration support

Definitions

?CAP?? CAPs? CAPsMAN? AP? Router?

CAPsMAN

- Controlled **A**ccess **P**oint
system **M**anager

➤ **CAPsMAN** = a MikroTik router

CAP

- Controlled **A**ccess **P**oint

➤ **CAP** = a MikroTik router

➤ **CAPs** = many Mikrotik routers

Requirements

CAPsMAN

1. x86 or RouterBOARD based device
2. RouterOS v6.11+ version (Use Latest!)
3. Wireless-fp package installed and enabled

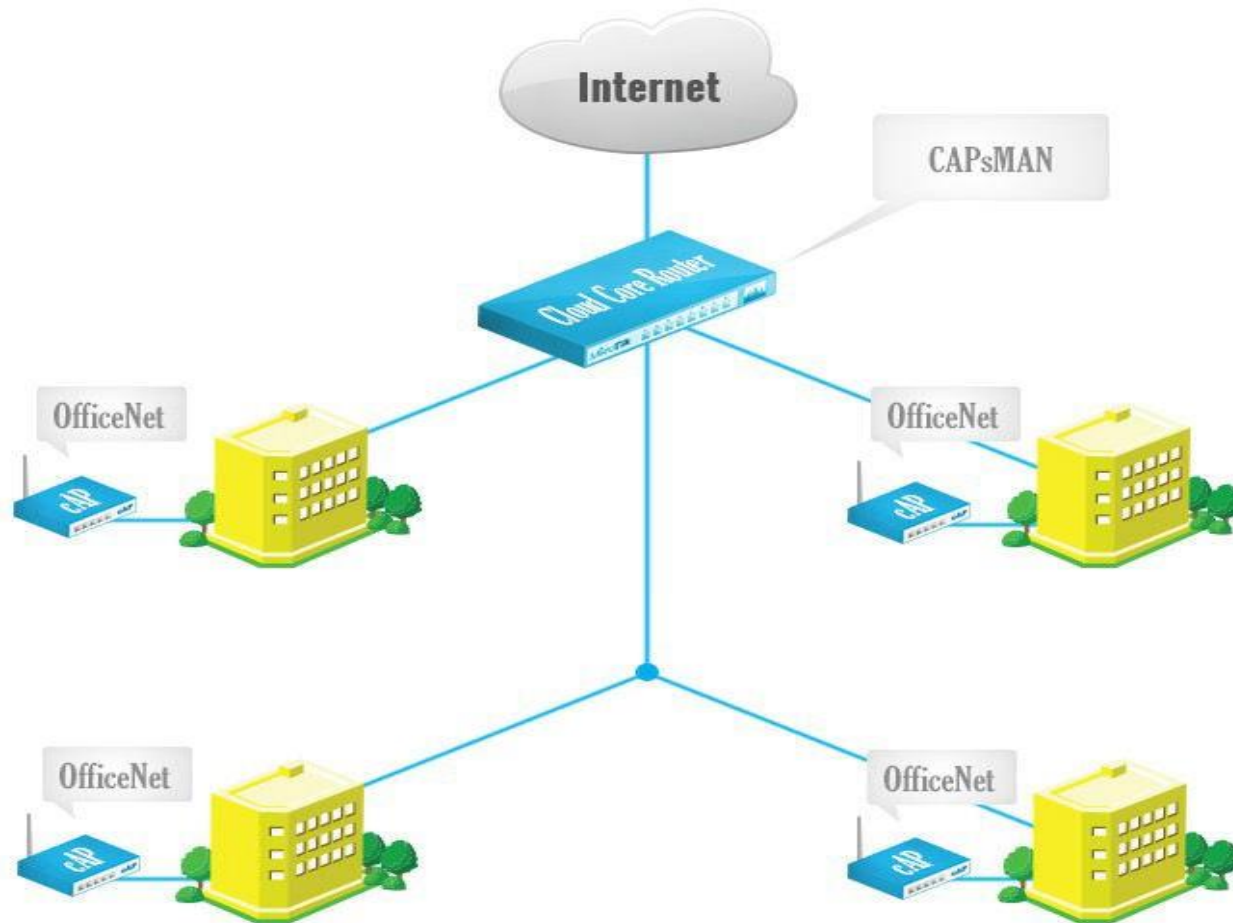
CAPs

1. X86 or RouterBOARD based device
2. RouterOS v6.11+ version(Use Latest!)
3. Atheros chipset (a/b/g/n/ac) wireless card
4. Wireless-fp package installed and enabled
5. At least Level4 RouterOS license

CAPsMAN v1 & v2(New)

- ❖ CAPsMAN v.6.23+ introduces CAPsMAN v2
 - Improvements
 - Some new features
- ❖ CAPsMAN v1 is already stable and can be used for production
- ⊗ Warning: CAPsMAN/CAP v1 is not compatible with v2!
 - Upgrade or downgrade everything in the network
- ❖ Try CAPsMAN v2 initially on non-production environment
 - ❖ Help us make it better by reporting any possible issues appeared in v2

CAPsMAN Simple Setup

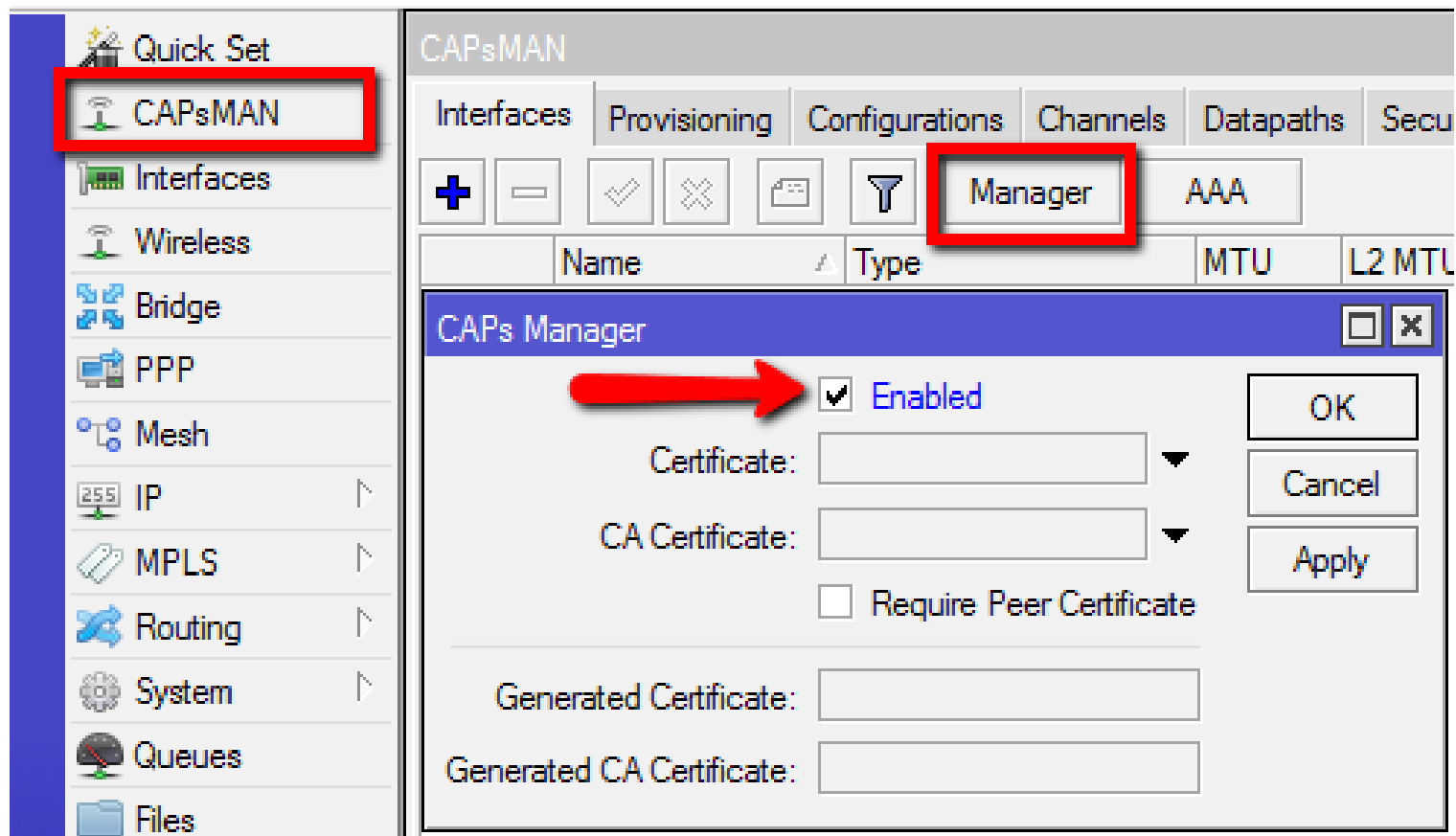


CAPsMAN Simple Setup

- Enable CAPsMAN service
- Create Bridge interface
- Add IP configuration to Bridge interface
- Create CAPsMAN Configuration
- Create Provisioning rule
- Enable CAP mode on the APs

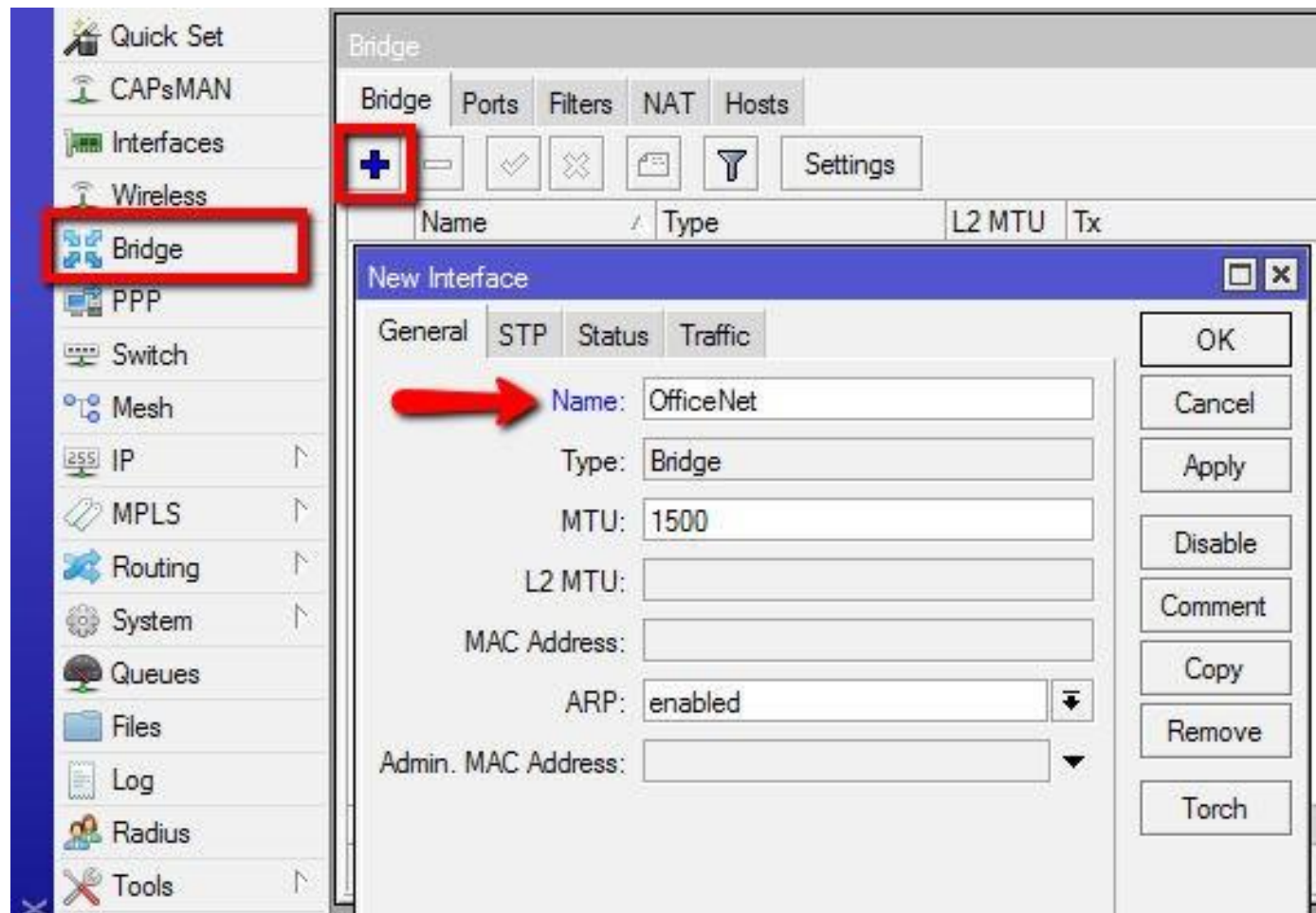
CAPsMAN Simple Setup

- Enable the CAPsMAN service



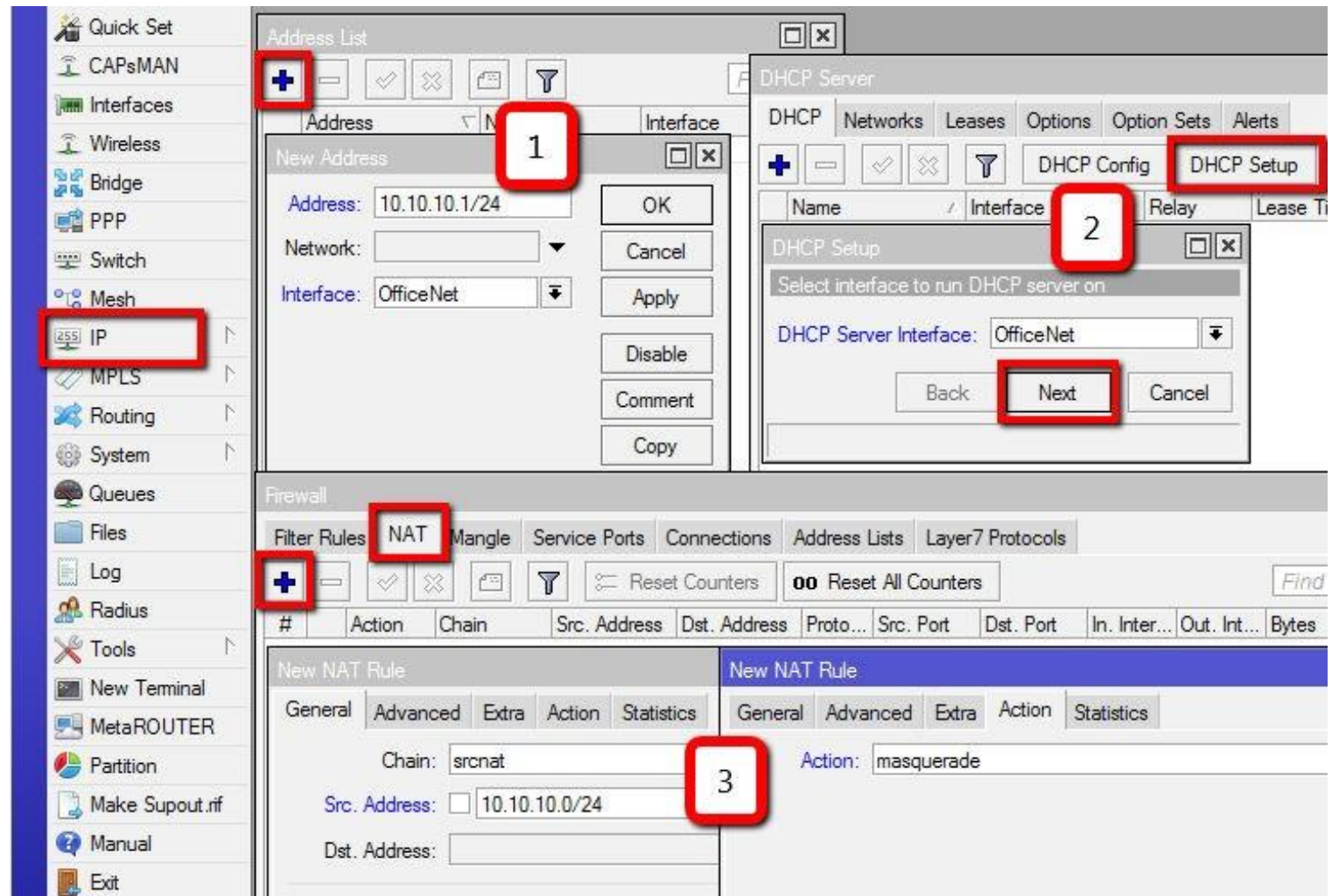
CAPsMAN Simple Setup

- Create Bridge Interface



CAPsMAN Simple Setup

1. Add IP address
2. Add DHCP Server
3. Add NAT rule



CAPsMAN Simple Setup

- Add new CAPsMAN Configuration

The screenshot displays the CAPsMAN web interface. At the top, the 'Configurations' tab is selected and highlighted with a red box. Below the main menu, a toolbar contains a '+' icon, which is also highlighted with a red box. The main content area shows three panels for 'New CAPs Configuration'. The first panel has the 'Wireless' tab selected and highlighted with a red box. The second panel has the 'Datapath' tab selected and highlighted with a red box. The third panel has the 'Security' tab selected and highlighted with a red box. The 'Wireless' tab contains fields for Name (OfficeNet), Mode, SSID (Office), Hide SSID, Load Balancing Group, Country (united states), Max Station Count, Multicast Helper, HT Tx Chains, HT Rx Chains, and HT Guard Interval. The 'Datapath' tab contains fields for Datapath, Bridge (OfficeNet), Bridge Cost, Bridge Horizon, Local Forwarding, Client To Client Forwarding, VLAN Mode, and VLAN ID. The 'Security' tab contains a Security dropdown, Authentication Type (WPA PSK, WPA2 PSK, WPA EAP, WPA2 EAP), Encryption (aes ccm, tkip), Group Encryption (aes ccm), Passphrase (OfficeNet), and EAP Methods.

CAP to CAPsMAN IP Based Connection

IP (UDP) Layer3

- CAP communicates CAPsMAN using IP protocol
- ✓ Can traverse NAT when required
- Management connection between CAP and CAPsMAN is secured using DTLS
- CAP client data traffic is not secured
 - If encryption is required IPsec or encrypted tunnels can be used

Specify IP on The CAP

Wireless Tables

Interfaces	Nstreme Dual	Access List	Registration	Connect List	Security Profiles	C
+	-	✓	✗	📁	🔍	CAP
					Scanner	Freq. Usage
						Alignmer

Name	Type	L2 MTU	Tx	Rx
X wlan1	Wireless (Atheros AR9...	1600		0 bps

CAP

☒ Enabled

Interfaces: wlan1

Certificate: none

Discovery Interfaces:

☐ Lock To CAPsMAN

CAPsMAN Addresses: 10.5.125.1

CAPsMAN Names:

CAPsMAN Certificate Common Names:

Bridge: none

Requested Certificate:

Locked CAPsMAN Common Name:

OK Cancel Apply

CAPsMAN and CAP in one board

- Does your CAPsMAN router has a wireless interface too?
- ✓ Enable CAP & Connect it to it self (127.0.0.1) for central management



Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Sec

+ - ✓ ✕ [CAP] Scanner Freq. Usa

Name	Type	L2 MTU	Tx
CAP			
<input checked="" type="checkbox"/> Enabled			
Interfaces: wlan1			
Certificate: none			
Discovery Interfaces:			
<input type="checkbox"/> Lock To CAPsMAN			
CAPsMAN Addresses: 127.0.0.1			
CAPsMAN Names:			
CAPsMAN Certificate Common Names:			
Bridge: none			
Requested Certificate:			
Locked CAPsMAN Common Name:			

CAPsMAN Simple Setup

- Add new Provisioning rule

The screenshot shows the CAPsMAN application window with the 'Provisioning' tab selected. A red box highlights the '+' icon in the toolbar, which is used to add new provisioning rules. Another red box highlights the 'Provisioning' tab itself. Below the toolbar, a table lists existing provisioning rules. A 'New CAPs Provisioning' dialog box is open, allowing the user to configure a new rule. The dialog includes fields for Radio MAC, Action, Master Configuration, Slave Configuration, and Name Prefix, along with buttons for OK, Cancel, Apply, Disable, Comment, Copy, and Remove. The 'enabled' checkbox is checked.

#	Radio MAC	Action	Master Configurati...	Slave C

New CAPs Provisioning

Radio MAC: 00:00:00:00:00:00

Action: create dynamic enabled

Master Configuration: OfficeNet

Slave Configuration:

Name Prefix: OfficeAP

enabled

Buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove

CAPsMAN Simple Setup

- Check the “Interface” status on:

CAPsMAN

CAPsMAN

Interfaces Provisioning Configurations Channels Datapaths Security

+ - ✓ ✗ [Icon] [Icon] Manager AAA

	Name	Type	MTU	L2 MTU
DSMB	OfficeAP1	Interfaces	1500	1600

Interface <OfficeAP1>

General Wireless Channel Datapath Security Status Traffic

Current State: running-ap

Current Channel: 2427/20-Ce/gn(30dBm)

Current Rate Set: CCK:1-11 OFDM:6-54 BW:1x-2x HT:0-7

Current Basic Rate Set: OFDM:6 BW:1x HT:0-7

CAP

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security

+ - ✓ ✗ [Icon] [Icon] CAP Scanner Freq. Usage

	Name	Type	L2 MTU	Tx
	--- managed by CAPsMAN			
	--- channel: 2427/20-Ce/gn(30dBm), SSID: Office, CAPsMAN forwarding			
X	wlan1	Wireless (Atheros AR9...	1600	

CAPsMAN Registration table

CAPsMAN

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

1 item

Interface	MAC Address	Tx Rate	Rx Rate	Tx Signal	Rx Signal	Uptime	Tx/Rx Packets	Tx/Rx Bytes
OfficeAP3	18:34:51:41:75:CD	65Mbps-...	65Mbps-...	0	-44	00:03:17...	31 395/33 212	29.8 MiB/29.5 MiB

CAPs AP Client <18:34:51:41:75:CD>

Interface: OfficeAP3

MAC Address: 18:34:51:41:75:CD

Tx Rate: 65Mbps-20MHz/1S

Rx Rate: 65Mbps-20MHz/1S

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

Tx Signal: 0

Rx Signal: -44

Uptime: 00:03:17.70

Tx/Rx Packets: 31 395/33 212

Tx/Rx Bytes: 29.8 MiB/29.5 MiB

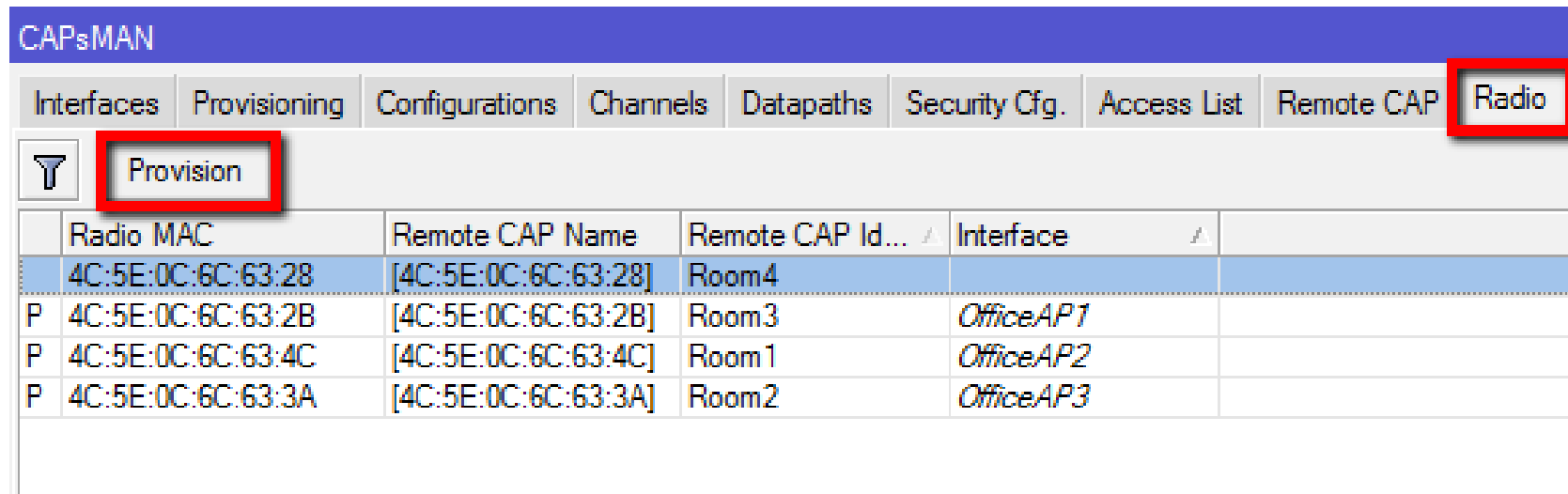
OK

Remove

Copy to Access List

Manual Provisioning

- Changing Provisioning rules doesn't effect already configured CAPs, manual Provisioning required:
 - Remove CAP interface
 - Initiate Provision command on the CAP



The screenshot shows the CAPsMAN web interface. At the top, there is a blue header bar with the text "CAPsMAN". Below the header, there is a navigation menu with several tabs: "Interfaces", "Provisioning", "Configurations", "Channels", "Datapaths", "Security Cfg.", "Access List", "Remote CAP", and "Radio". The "Radio" tab is highlighted with a red box. Below the navigation menu, there is a sub-menu with a filter icon and a "Provision" button, which is also highlighted with a red box. Below the sub-menu, there is a table with the following columns: "Radio MAC", "Remote CAP Name", "Remote CAP Id...", "Interface", and an empty column. The table contains four rows of data. The first row is highlighted in blue. The second row has a "P" in the first column. The third and fourth rows also have "P" in the first column.

	Radio MAC	Remote CAP Name	Remote CAP Id...	Interface	
	4C:5E:0C:6C:63:28	[4C:5E:0C:6C:63:28]	Room4		
P	4C:5E:0C:6C:63:2B	[4C:5E:0C:6C:63:2B]	Room3	OfficeAP1	
P	4C:5E:0C:6C:63:4C	[4C:5E:0C:6C:63:4C]	Room1	OfficeAP2	
P	4C:5E:0C:6C:63:3A	[4C:5E:0C:6C:63:3A]	Room2	OfficeAP3	

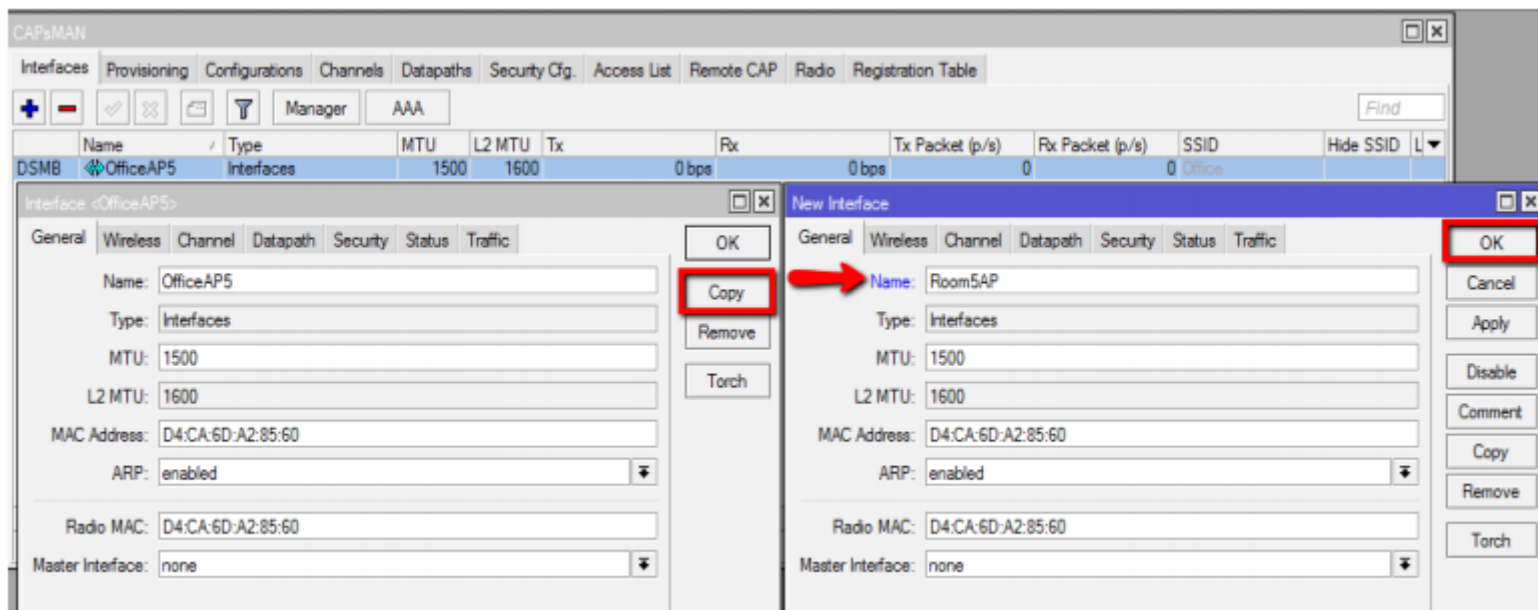
CAP Identification

- MAC/IP address
- RouterBoard model
- Serial Number of the Board
- RouterOS version
- System Identity
- Main wireless MAC
- State of the CAP
- Radio count

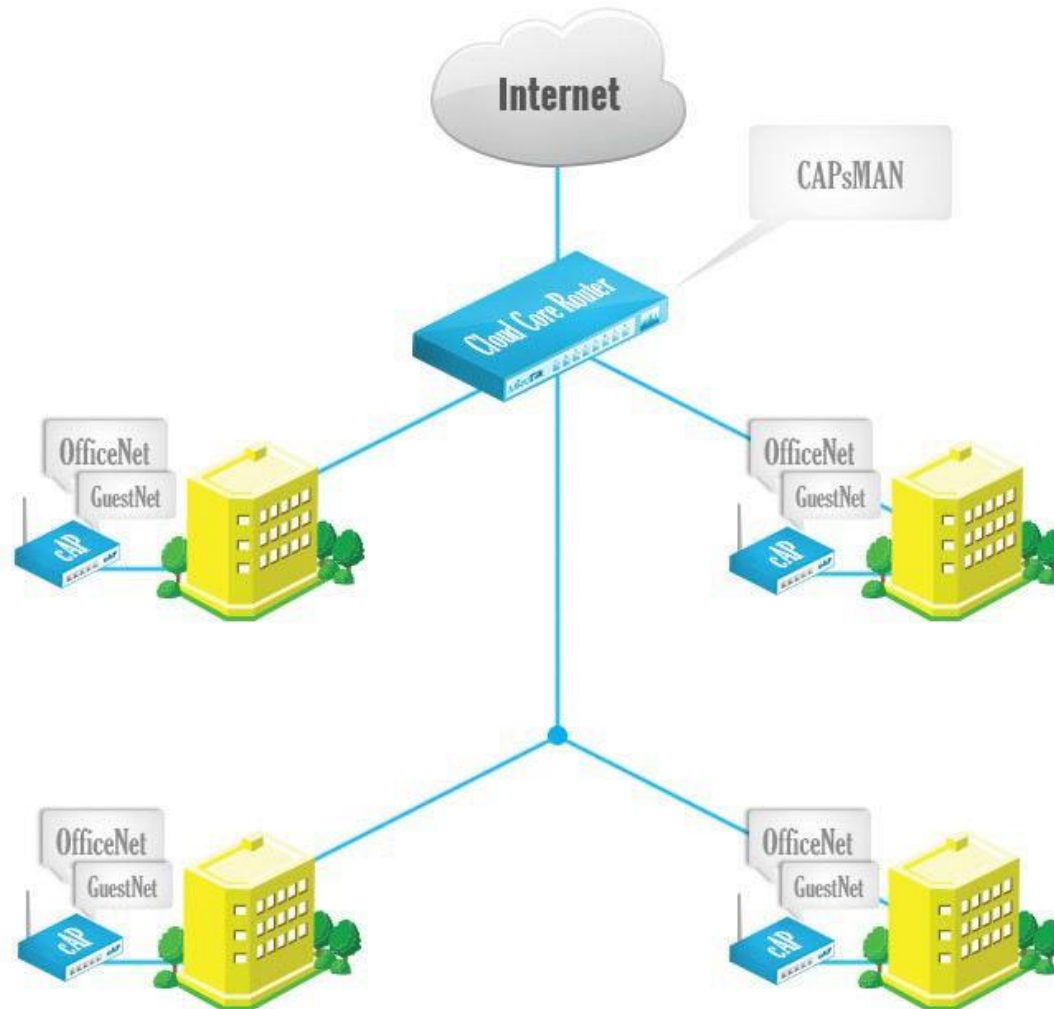
CAPsMAN									
Interfaces	Provisioning	Configurations	Channels	Datapaths	Security Cfg.	Access List	Remote CAP	Radio	Registration Table
		Provision							
Address	Name	Board	Serial	Version	Identity	Base MAC	State	Radios	
4C:5E:0C:6C:63:26	[4C:5E:0C:6C:63:28]	RBmAP2n	52760434DCE4	6.19	Room4	4C:5E:0C:6C:63:28	Run	1	
4C:5E:0C:6C:63:29	[4C:5E:0C:6C:63:2B]	RBmAP2n	5276046C9DA3	6.19	Room3	4C:5E:0C:6C:63:2B	Run	1	
4C:5E:0C:6C:63:38	[4C:5E:0C:6C:63:3A]	RBmAP2n	527604845E6A	6.19	Room2	4C:5E:0C:6C:63:3A	Run	1	
4C:5E:0C:6C:63:4A	[4C:5E:0C:6C:63:4C]	RBmAP2n	527604D1D5D4	6.19	Room1	4C:5E:0C:6C:63:4C	Run	1	
:ffff:10.5.125.172	[D4:CA:6D:A2:85:60]	RBmAP2n	527602095F22	6.19	Room5	D4:CA:6D:A2:85:60	Run	1	

CAPsMAN static CAP interface

- Interface name or setting does not change after a reboot
- Additional manual setting override
- Copy dynamic interface to make static interface



CAPsMAN Virtual AP



CAPsMAN VirtualAP Configuration

- Create new Bridge interface and IP configuration for the VirtualAP
 - Or use the same bridge interface used for Master AP
- Create a new configuration for the VirtualAP
- Specify the new configuration in Provisioning rule as Slave Configuration
- Remove all CAP interfaces
- Initiate Manual Provisioning on all the CAPs

CAPsMAN VirtualAP Setup

CAPsMAN

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

+

Name	SSID	Hide SSID	Load Bal...	Country	Channel	Frequency	Band	D
OfficeNet	Office			united sta...				

New CAPs Configuration

Wireless Channel Datapath Security

Name: GuestNet

Mode:

SSID: Guest

Hide SSID:

Load Balancing Group:

Country:

Max Station Count:

Multicast Helper:

HT Tx Chains:

HT Rx Chains:

HT Guard Interval:

New CAPs Configuration

Wireless Channel **Datapath** Security

Datapath:

Bridge: GuestNet

Bridge Cost:

Bridge Horizon:

Local Forwarding:

Client To Client Forwarding:

VLAN Mode:

VLAN ID:

CAPsMAN VirtualAP Setup

CAPsMAN

Interfaces **Provisioning** Configurations Channels Datapaths Sec

+ - ✓ ✗ 📁 🔍

#	Radio MAC	Action	Master Configurati...	Slave
0	00:00:00:00:00:00	create dy...	OfficeNet	

CAPs Provisioning <00:00:00:00:00:00>

Radio MAC: 00:00:00:00:00:00 OK

Action: create dynamic enabled ↓ Cancel

Master Configuration: OfficeNet ↓ Apply

Slave Configuration: GuestNet ↓ Disable

Name Prefix: OfficeAP ▲ Comment

Copy Remove

enabled

CAPsMAN

Interfaces Provisioning Configurations Channels Datapaths

+ - ✓ ✗ 📁 🔍 Manager AAA

	Name	Type	MTU	L
DSMB	OfficeAP1	Interfaces	1500	
DSB	OfficeAP1-1	Interfaces	1500	
DSMB	OfficeAP2	Interfaces	1500	
DSB	OfficeAP2-1	Interfaces	1500	
DSMB	OfficeAP3	Interfaces	1500	
DSB	OfficeAP3-1	Interfaces	1500	
DSMB	OfficeAP4	Interfaces	1500	
DSB	OfficeAP4-1	Interfaces	1500	
SMB	Room5AP	Interfaces	1500	

CAPsMAN

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

🔍 **Provision**

	Radio MAC	Remote CAP Name	Remote CAP Identi...	Interface
P	4C:5E:0C:6C:63:28	[4C:5E:0C:6C:63:...	Room4	OfficeAP1
P	4C:5E:0C:6C:63:2B	[4C:5E:0C:6C:63:...	Room3	OfficeAP3
P	4C:5E:0C:6C:63:3A	[4C:5E:0C:6C:63:...	Room2	OfficeAP5
P	4C:5E:0C:6C:63:4C	[4C:5E:0C:6C:63:...	Room1	OfficeAP2
P	D4:CA:6D:A2:85:6D	[D4:CA:6D:A2:85:...	Room5	Room5AP

CAPsMAN static VirtualAP

CAPsMAN

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

+ **-** Manager AAA

	Name	Type	MTU	L2 MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)
DSMB	OfficeAP1	Interfaces	1500	1600		0 bps	0 bps	0
DSB	OfficeAP1-1	Interfaces	1500	1600		0 bps	0 bps	0
DSMB	OfficeAP2	Interfaces	1500	1600		0 bps	0 bps	0
DSB	OfficeAP2-1	Interfaces	1500	1600		0 bps	0 bps	0
DSMB	OfficeAP3	Interfaces	1500	1600		0 bps	0 bps	0
DSB	OfficeAP3-1	Interfaces	1500	1600		0 bps	0 bps	0
DSMB	OfficeAP4	Interfaces	1500	1600		0 bps	0 bps	0
DSB	OfficeAP4-1	Interfaces	1500	1600		0 bps	0 bps	0
SMB	Room5AP	Interfaces	1500	1600		0 bps	0 bps	0

New Interface

General Wireless Channel Datapath Security

Name: Room5VAP

Type: Interfaces

MTU: 1500

L2 MTU:

MAC Address: 00:00:00:00:00:00

ARP: enabled

Radio MAC: 00:00:00:00:00:00

Master Interface: Room5AP

New Interface

General **Wireless** Channel Datapath Security Status Traffic

Configuration: GuestNet

Mode:

SSID: GuestAP

Hide SSID:

Load Balancing Group:

Country:

Max Station Count:

OK Cancel Apply Disable Comment Copy Remove Torch

CAPsMAN Access List Features

- MAC Authentication
- Radius Query support
- MAC Mask support
- Signal Range
- Time
- Private Passphrase
- VLAN ID assignment

CAPsMAN Access List

- Allow Apple devices to connect
- Let RADIUS server decide for the rest of devices

The screenshot displays the CAPsMAN configuration window with the 'Access List' tab selected. A red box highlights the '+' button in the toolbar, indicating the action to add a new rule. Below the toolbar, a table lists existing access rules. Two 'New CAPs Access Rule' dialog boxes are open, showing the configuration for a new rule. The left dialog box has the MAC Address set to '18:34:51:00:00:00' and the Action set to 'accept'. The right dialog box has the MAC Address field empty and the Action set to 'query radius'. Both dialog boxes include fields for MAC Mask, Interface, Signal Range, Time, AP Tx Limit, Client Tx Limit, Private Passphrase, Client To Client Forwarding, RADIUS Accounting, VLAN Mode, and VLAN ID. The 'enabled' checkbox is checked at the bottom of each dialog box.

#	MAC Address	MAC Mask	Interface	Signal Ra...	Action	Client To Clie...	VLAN Mo...	VLAN ID
1	18:34:51:00:00:00	FF:FF:FF:00:00:00			accept			

New CAPs Access Rule (Left Dialog)


MAC Address: 18:34:51:00:00:00
MAC Mask: FF:FF:FF:00:00:00
Interface:
Signal Range:
Time:
Action: accept
AP Tx Limit:
Client Tx Limit:
Private Passphrase:
Client To Client Forwarding:
RADIUS Accounting:
VLAN Mode:
VLAN ID:
enabled

New CAPs Access Rule (Right Dialog)

MAC Address:
MAC Mask:
Interface:
Signal Range:
Time:
Action: query radius
AP Tx Limit:
Client Tx Limit:
Private Passphrase:
Client To Client Forwarding:
RADIUS Accounting:
VLAN Mode:
VLAN ID:
enabled

CAPsMAN Configuration override

- Configuration overrides Channel setting
- Interface overrides Channel and Configuration setting

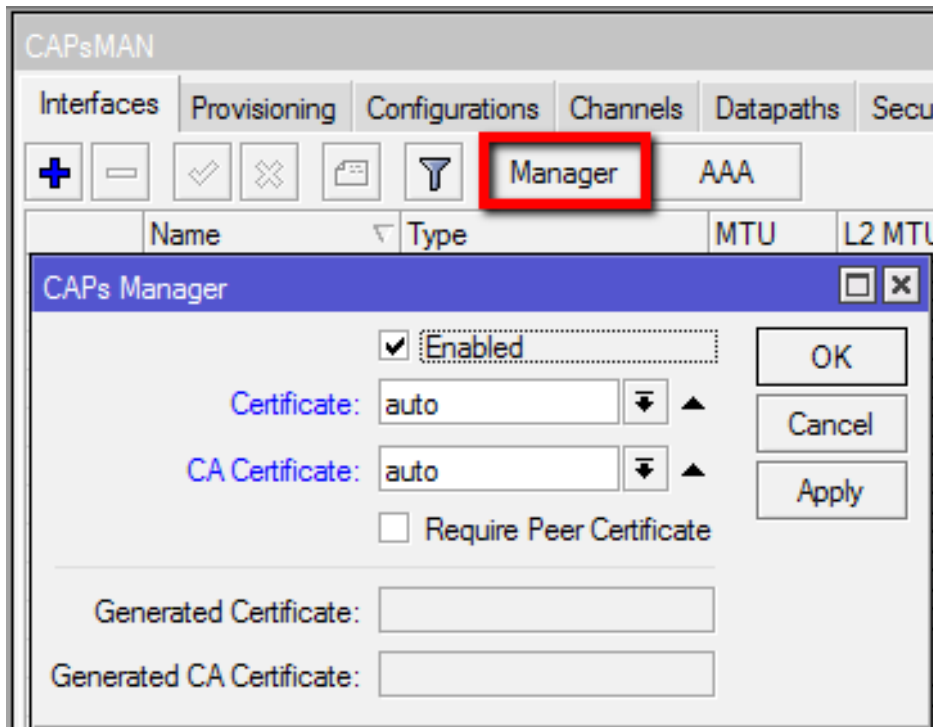


The image displays four screenshots of CAPsMAN configuration windows, illustrating the hierarchy of settings:

- New CAPs Channel:** Shows a channel named 'channel1' with a frequency of 2412 MHz.
- New CAPs Configuration:** Shows the 'Channel' tab with 'channel1' selected, but the frequency is overridden to 2437 MHz.
- New Interface:** Shows the 'Channel' tab with 'channel1' selected, but the frequency is overridden to 2462 MHz.
- Interface <cap1>:** Shows the 'Channel' tab with the current state: 'running-ap', '2462/20-eC/gn(30dBm)', 'CCK:1-11 OFDM:6-54 BW:1x-2x HT:0-7', and 'OFDM:6 BW:1x HT:0-7'.

CAPsMAN Auto Certificate

- Enable Certificate and CA Certificate on CAPsMAN



The screenshot shows the CAPsMAN Manager configuration window. The 'Manager' tab is selected and highlighted with a red box. The 'Enabled' checkbox is checked. The 'Certificate' and 'CA Certificate' dropdown menus are both set to 'auto'. The 'Require Peer Certificate' checkbox is unchecked. The 'Generated Certificate' and 'Generated CA Certificate' fields are empty.

Name	Type	MTU	L2 MTU
CAPs Manager			

☒ Enabled

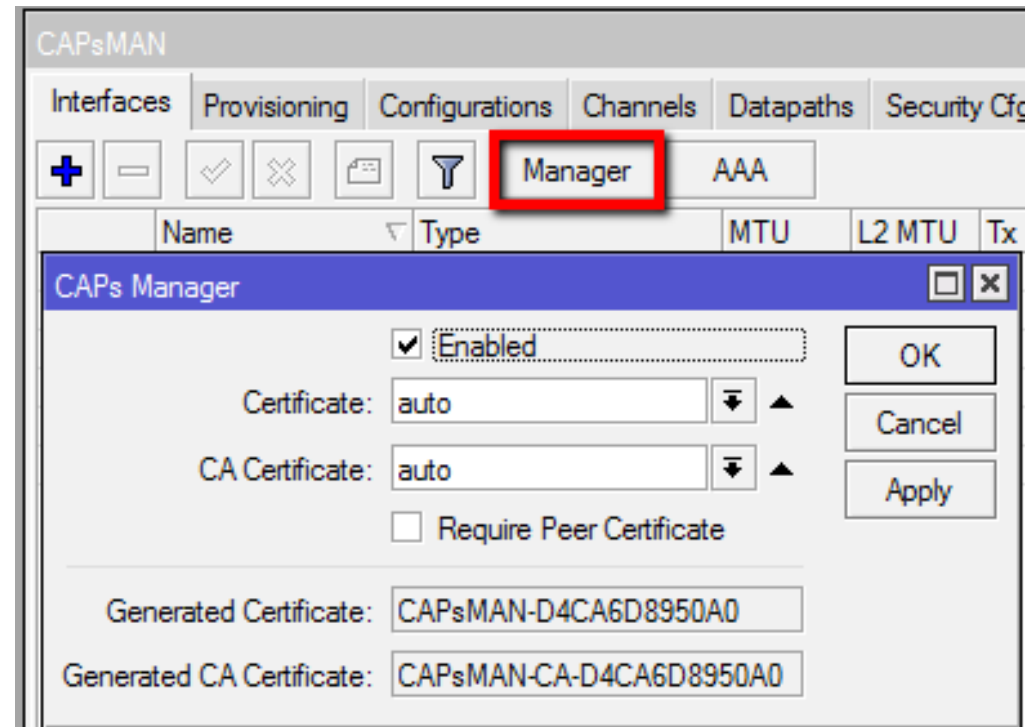
Certificate: auto

CA Certificate: auto

☐ Require Peer Certificate

Generated Certificate:

Generated CA Certificate:



The screenshot shows the CAPsMAN Manager configuration window. The 'Manager' tab is selected and highlighted with a red box. The 'Enabled' checkbox is checked. The 'Certificate' and 'CA Certificate' dropdown menus are both set to 'auto'. The 'Require Peer Certificate' checkbox is unchecked. The 'Generated Certificate' field displays 'CAPsMAN-D4CA6D8950A0' and the 'Generated CA Certificate' field displays 'CAPsMAN-CA-D4CA6D8950A0'.

Name	Type	MTU	L2 MTU	Tx
CAPs Manager				

☒ Enabled

Certificate: auto

CA Certificate: auto

☐ Require Peer Certificate

Generated Certificate: CAPsMAN-D4CA6D8950A0

Generated CA Certificate: CAPsMAN-CA-D4CA6D8950A0

CAPsMAN Auto Certificate

- Enable “Request” Certificate on CAP

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security Pr

+ - ✓ ✗ CAP Scanner Freq. Usage

Name / Type L2 MTU Tx

CAP

☒ Enabled

OK

Cancel

Apply

Interfaces: wlan1

Certificate: request

Discovery Interfaces: ether1

☐ Lock To CAPsMAN

CAPsMAN Addresses:

CAPsMAN Names:

CAPsMAN Certificate Common Names:

Bridge: bridgeLocal

Requested Certificate:

Locked CAPsMAN Common Name:

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security Pr

+ - ✓ ✗ CAP Scanner Freq. Usage

Name / Type L2 MTU Tx

CAP

☒ Enabled

OK

Cancel

Apply

Interfaces: wlan1

Certificate: request

Discovery Interfaces: ether1

☐ Lock To CAPsMAN

CAPsMAN Addresses:

CAPsMAN Names:

CAPsMAN Certificate Common Names:

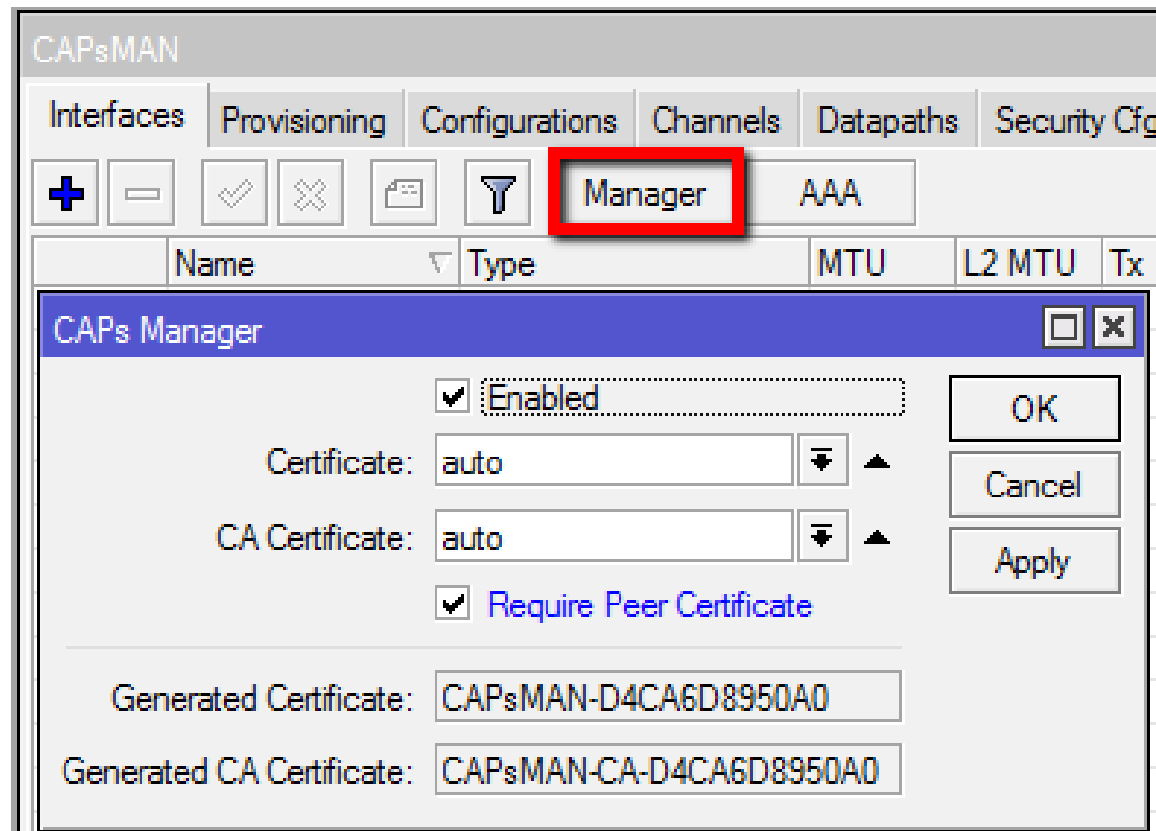
Bridge: bridgeLocal

Requested Certificate: CAP-4C5E0C6C634A

Locked CAPsMAN Common Name:

CAPsMAN Auto Certificate

- Accept connections only from CAPs with valid certificate

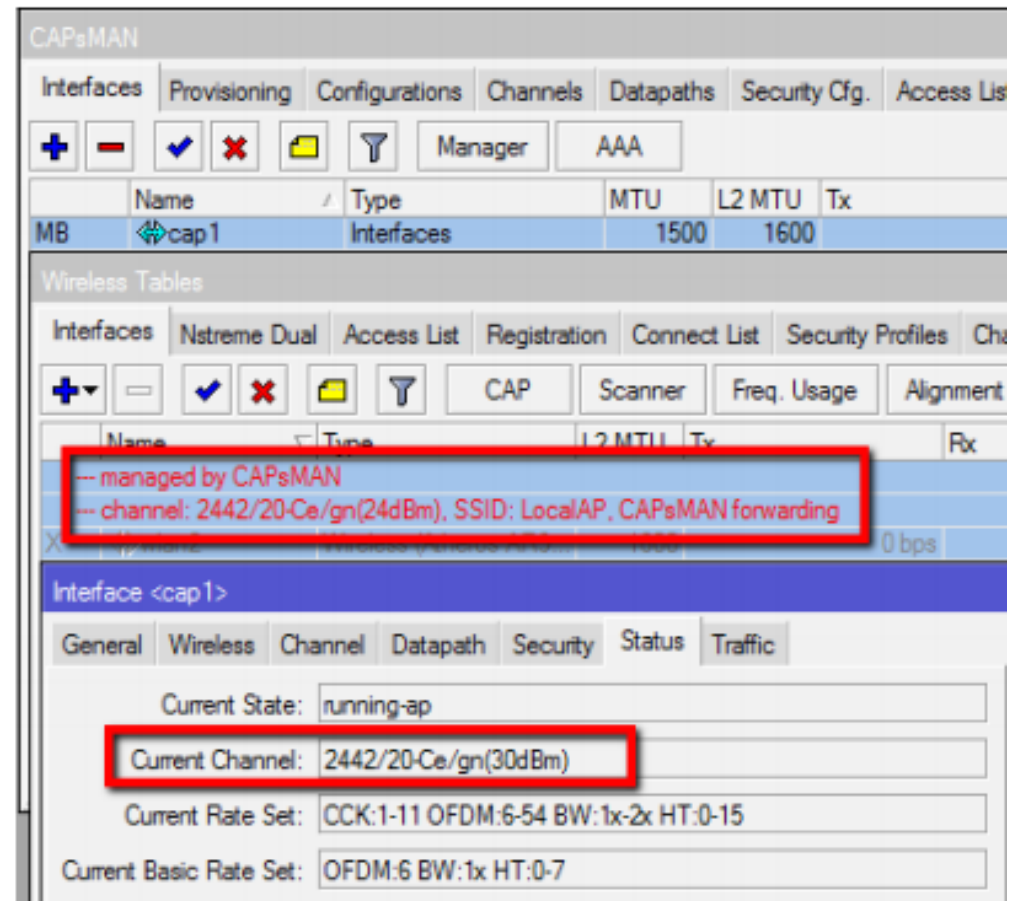


CAPsMAN Antenna Gain (Country Regulations)

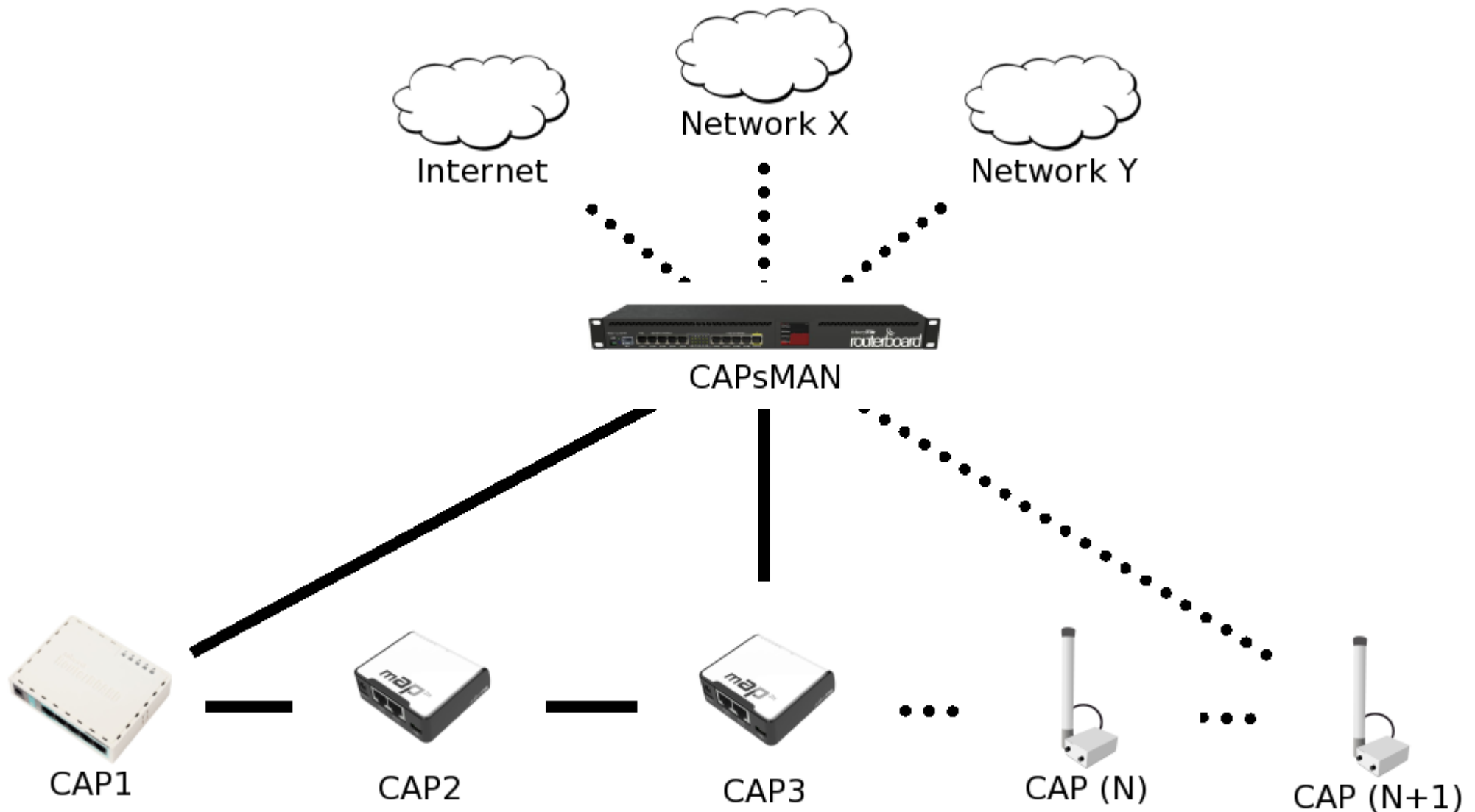
- Antenna-gain value is taken from the CAP interface
- Must be configured on AP before you enable radio in CAP mode

Example

- Antenna-gain: 6dBi
- EIRP: 30dB

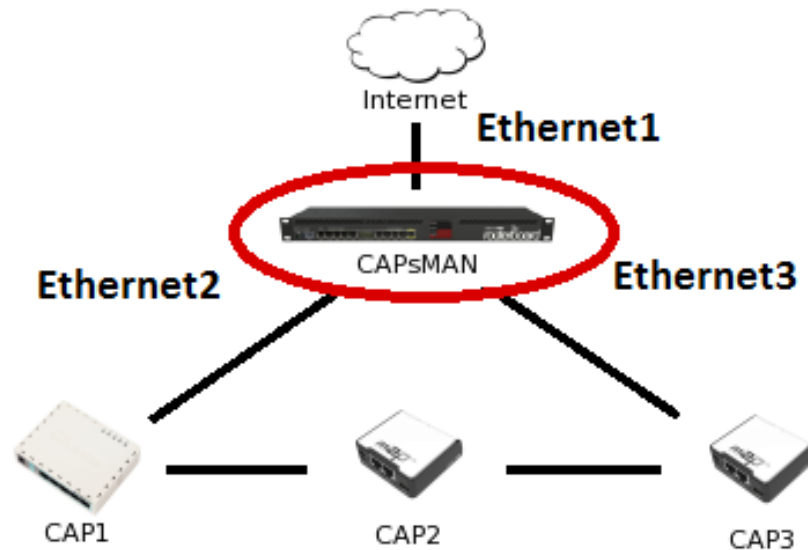


Simple Routed CAPs Network (with redundancy)



Simple Routed CAPs Network (with redundancy)

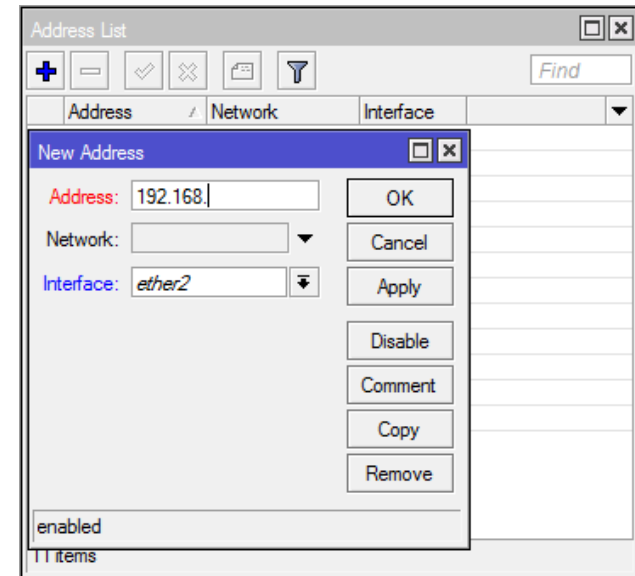
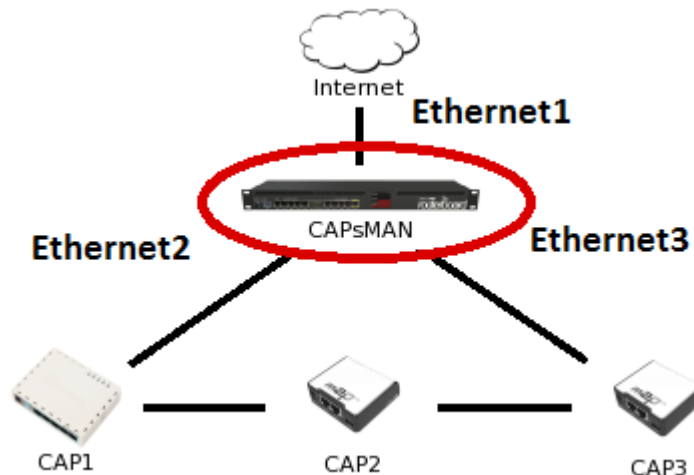
CAPsMAN



- Ethernet1: Internet Connection
- Ethernet2: Connection with CAP1
- Ethernet3: Connection with CAP2

Simple Routed CAPs Network (with redundancy)

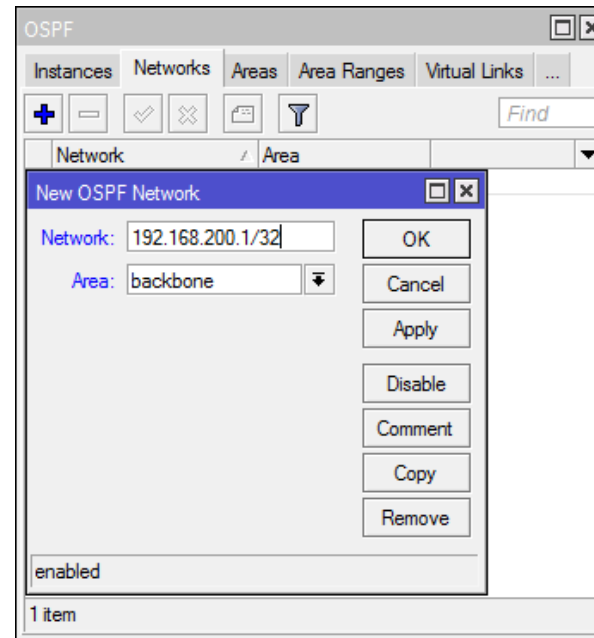
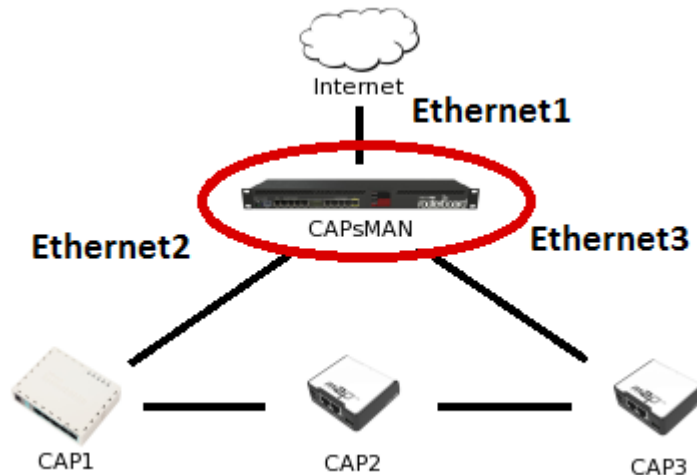
CAPsMAN



- Add IP addresses for CAPsMAN <-> CAP1 & CAP3 communication
 - CAPsMAN Ethernet2(to CAP1 Ethernet1): 192.168.100.1/30
 - CAPsMAN Ethernet3(to CAP3 Ethernet2): 192.168.100.14/30
- Create a Bridge interface and add IP address 192.168.200.1/32 on it
 - From now on known as loopback IP address of CAPsMAN

Simple Routed CAPs Network (with redundancy)

CAPsMAN

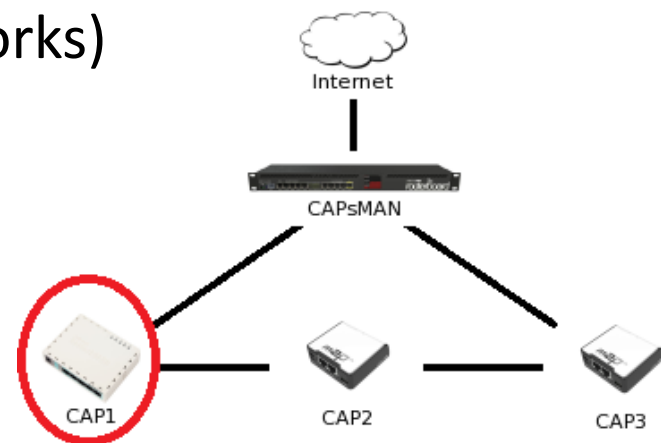


- Enable OSPF routing protocol (add networks)
 - 192.168.100.0/30
 - 192.168.100.12/30
 - 192.168.200.1/32

Simple Routed CAPs Network (with redundancy)

Similarly do on CAP1

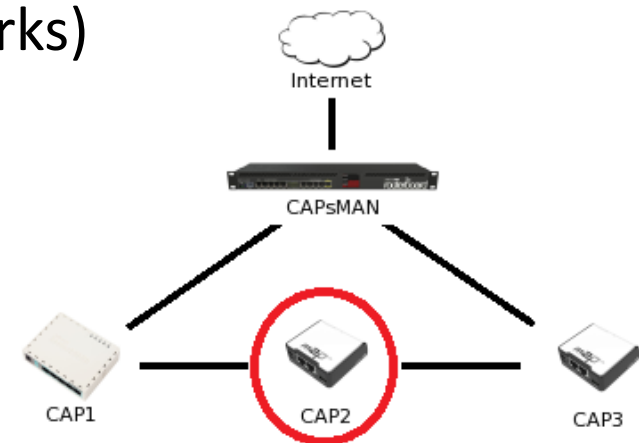
- Add IP addresses
 - CAP1 Ethernet1(to CAPsMAN Ethernet2): 192.168.100.2/30
 - CAP1 Ethernet2(to CAP2 Ethernet1): 192.168.100.5/30
- Add loopback interface(new bridge) and IP address 192.168.101.1/32 on it
- Enable OSPF routing protocol (add networks)
 - 192.168.100.0/30
 - 192.168.100.4/30
 - 192.168.101.1/32



Simple Routed CAPs Network (with redundancy)

Similarly do on CAP2

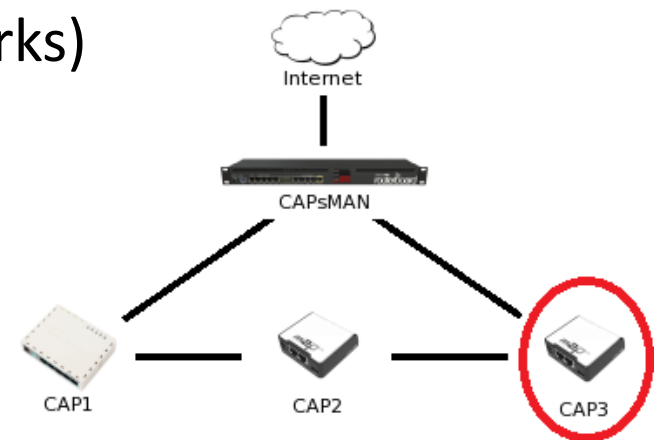
- Add IP addresses
 - CAP2 Ethernet1(to CAP1 Ethernet2): 192.168.100.6/30
 - CAP2 Ethernet2(to CAP3 Ethernet1): 192.168.100.9/30
- Add loopback interface(new bridge) and IP address 192.168.101.2/32 on it
- Enable OSPF routing protocol (add networks)
 - 192.168.100.4/30
 - 192.168.100.8/30
 - 192.168.101.2/32



Simple Routed CAPs Network (with redundancy)

Similarly do on CAP3

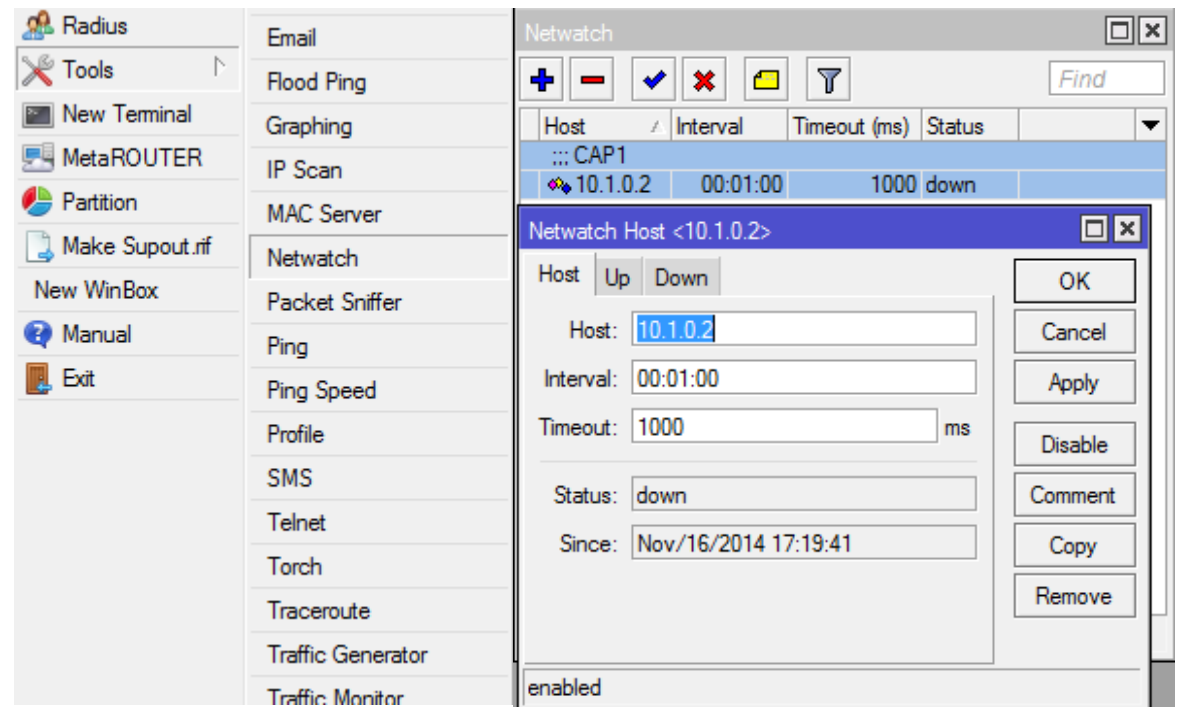
- Add IP addresses
 - CAP3 Ethernet1(to CAP2 Ethernet2): 192.168.100.10/30
 - CAP3 Ethernet2(to CAPsMAN Ethernet3): 192.168.100.13/30
- Add loopback interface(new bridge) and IP address 192.168.101.3/32 on it
- Enable OSPF routing protocol (add networks)
 - 192.168.100.8/30
 - 192.168.100.12/30
 - 192.168.101.3/32



Monitor CAPs

- Get notified when any of your **C**ontrolled **A**ccess **P**oints goes down
 - Power Supply Failure?
 - Board Failure?
 - Any other reason

➤ Just use loopback address of each CAP as “host”

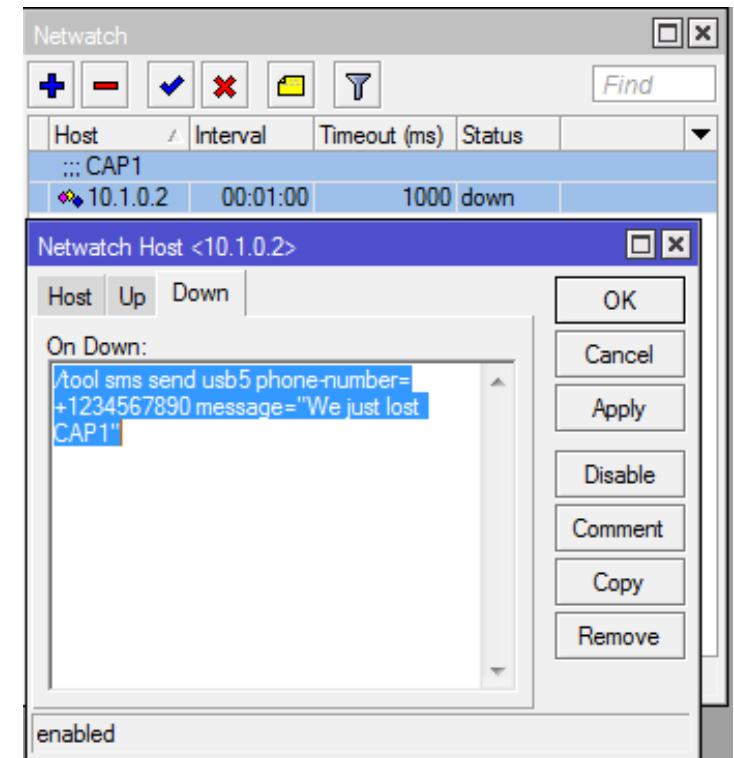


Monitor CAPs

➤ You can use sms or email tool

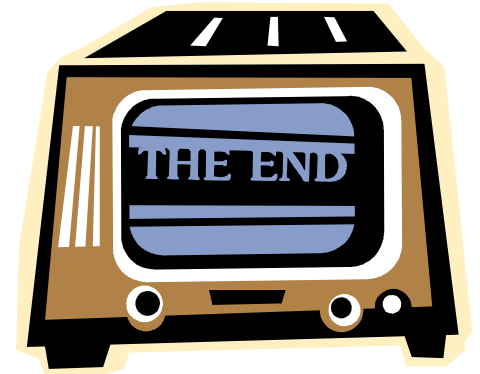
Suggestion/idea for
MikroTik Development Team
(maybe in CAPsMAN v2)

- ☐ Option to Enable Monitoring for IP Managed CAPs(one/a group/all)
- ☐ Every time “Monitoring” is enabled for an IP CAP ,a Dynamic rule could be created on Netwatch
 - Dynamic Rule will be remove if monitoring option is disabled
 - The same option/tab can configure the Up/Down Scripts



Comments? Questions?


Thank You!
Enjoy the Rest of the MUM




Need Help? A reliable partner? Contact me for:

- MikroTik Training Enquiries (Greek & English)
- Consultancy & Solutions for New or Existing ISP/WISP
- Telephony-VoIP Solutions (Wholesale or Retail/CallingCard)
- A custom Network/Telecom service or solution

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