



Centralized Managed Wireless Network Using Mikrotik CAPsMAN V2

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About Me

- **Name:**

- **Shakeel Khan**

- **Education:**

Electronic Engineer

- **Position:**

- **Technical Product Manager**

- **Native Language:**

URDU

- **Trainings:**

- ▶ MikroTik Trainer (Recently)
- ▶ MTCNA (MikroTik Certified Network Associate)
- ▶ MTCWE (MikroTik Certified Wireless Engineer)
- ▶ MTCTCE (MikroTik Certified Traffic Control Engineer)
- ▶ UBWS (Ubiquiti Broadband Wireless Specialist)
- ▶ UBWA V2 (Ubiquiti Broadband Wireless Admin)
- ▶ UBWE (Ubiquiti Enterprise Wireless Admin Ubiquiti Broadband Wireless Admin)
- ▶ VoIP YEASTAR

About Company

- ▶ Started in 2003
- ▶ Top Wireless/Security & Network Equipment Distributor in Pakistan.
- ▶ We are Master Distributor for:



We Deals in:

- ▶ IT managed services
- ▶ Trainings
- ▶ Security Solutions
- ▶ Electrical & Instrumentation Solutions with SCADA

Presentation Objectives

- ▶ Modes of Wireless Networks
- ▶ Applications of Wireless Networks
- ▶ Centralized Management
- ▶ Mikrotik's CAPsMAN & its Deployment
- ▶ Questions & Answers

Modes Of Wireless Networks

PTP (Point to Point):

- ▶ Required for long distance links
- ▶ High throughput (BACKHUAL PURPOSE)

PTMP (Point to Multi Point):

- ▶ Mostly in WISP's (One To Many)
- ▶ Shared link with multiple users
- ▶ Cheap compared to point to point

Centralized Managed Wireless Network (Enterprise Hotspots)

- ▶ To provide wireless coverage for the roaming/fixed stations
- ▶ Highly managed

Advantage & Disadvantage of Wireless Networks

Advantages:

- ▶ Required minimum time for installation
- ▶ Low cost
- ▶ High availability

Disadvantages / Limitations:

- ▶ Bandwidth limitations
- ▶ Regulatory limitations (Where Applicable)

Mostly Applications of Wireless Network

- ▶ Wireless ISPs
- ▶ Wireless CCTV
- ▶ Wireless VoIP
- ▶ Wireless Advertisements
- ▶ Wireless SCADA
- ▶ Wireless Data Networks

Why We Need Centralized Managed System ?

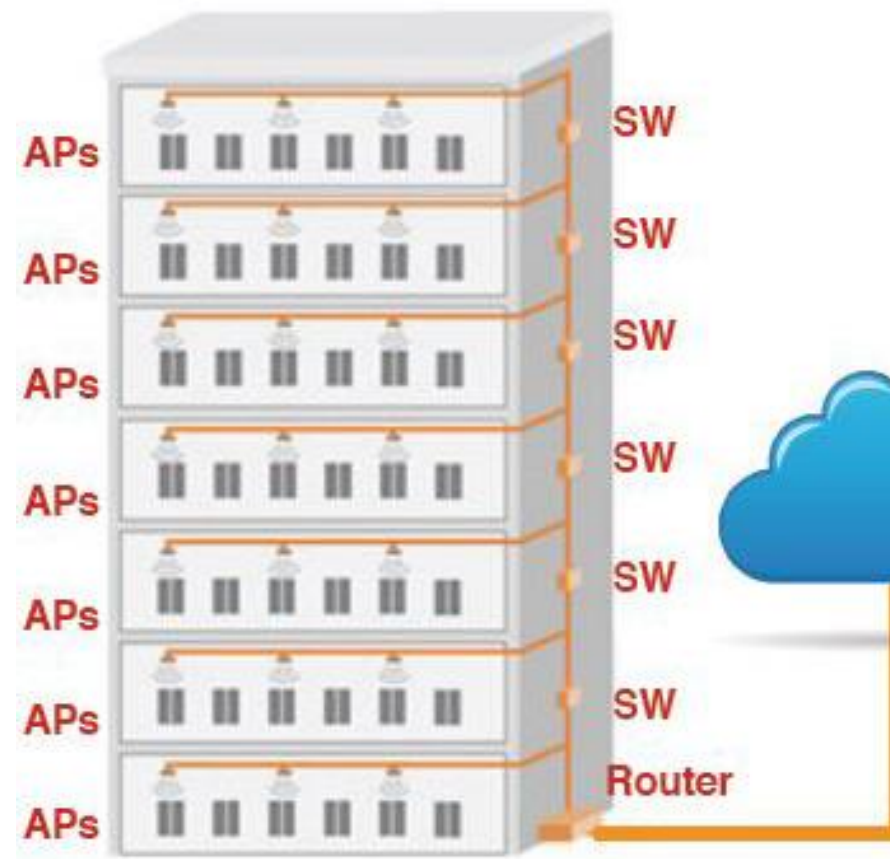
- ▶ For high availability of network
- ▶ One click management
- ▶ One windows statics of network

Applications:

- ▶ Hospitals
- ▶ Universities
- ▶ Industries
- ▶ Malls and cafe
- ▶ Homes / Apartments
- ▶ Ports and container terminals

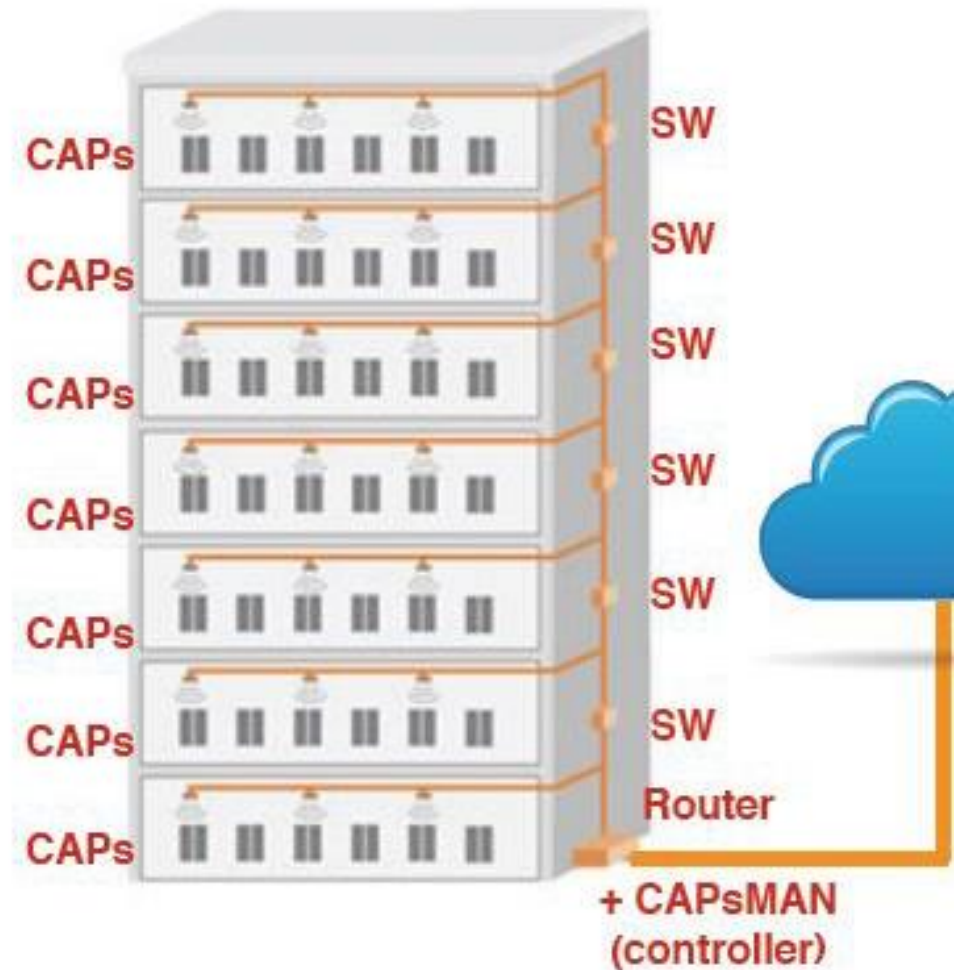
Conventional problems

- ▶ Conventionally, administering Wireless Access Point is done Individually one by one.
- ▶ Administrator has to make sure That the configurations are the Same for all APs like SSID, Security, Access List, Policy, etc.
- ▶ That needs more time and Manpower if we need to changes something for the enterprise WLAN Setups i.e Apartment As Shown.



Solution

- Using Mikrotik Capsman
It Shall Fix All conventional Problems.



Solution with MIKROTIK CAPsMAN (Success Story)



Reason to use MIKROTIK CAPsMAN

- ▶ **Highly flexible**
- ▶ **Reliable**
- ▶ **No additional license required (Comes Free With Routerboard Hardware)**
- ▶ **Highly scalable**
- ▶ **CAP can be any MIKROTIK hardware with at least one wireless interface**
- ▶ **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**
- ▶ **Easy availability**
- ▶ **Low cost**

Component of CAPs Management System

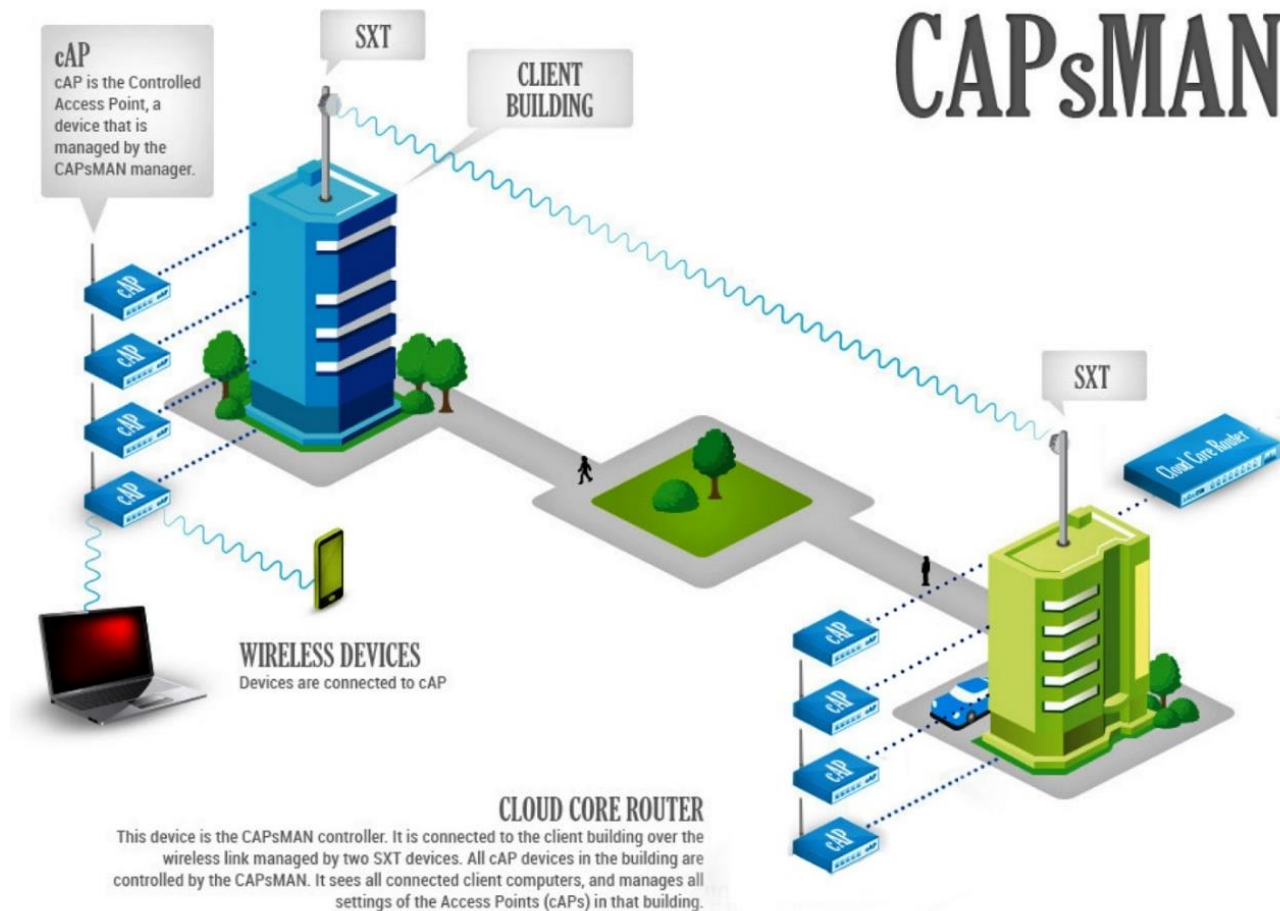
► CAPsMAN

- x86 or RouterBOARD based device
- Newest RouterOS v6 version
- Wireless-cm2 package installed and enabled

► CAP

- X86 or RouterBOARD based device
- Newest RouterOS v6 version
- Atheros chipset (a/b/g/n/ac) wireless card
- Wireless-cm2 package installed and enabled
- At least Level4 RouterOS license

CAPsMAN Simple Setup



CAPsMAN v2 features

- ▶ CAPsMAN automatic upgrade of all CAP clients (configurable)
- ▶ Improved CAP<->CAPsMAN data connection protocol
- ▶ Added "Name Format" and "Name Prefix" setting for Provision rules
- ▶ Improved logging entries when client roams between the CAPs
- ▶ Added L2 Path MTU discovery

CAPsMAN v2 compatibility

- ▶ CAPsMAN v2 is NOT compatible with current CAPsMAN v1 (CAPsMAN v1 CAP devices will not be able to connect to CAPsMAN v2 and CAPsMAN v2 CAP devices will not be able to connect to CAPsMAN v1).
- ▶ Both CAPsMAN and CAP devices should have wireless-cm2 package installed in order to make CAPsMAN v2 system to work.

CAPsMAN/Cap Setup Step By Step

- ▶ **Enable CAPsMAN service**
- ▶ **Create Bridge interface**
- ▶ **Add IP configuration to Bridge interface**
- ▶ **Run DHCP Server with NAT**
- ▶ **Create CAPsMAN Configuration**
- ▶ **Create Provisioning rule**
- ▶ **Enable CAP mode on the Aps**
- ▶ **Efficient Roaming Configuration TIP**
- ▶ **Specific Brand Allow Only Without Authentication**

CAPsMAN Setup LAB

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

Quick Set CAPsMAN Interfaces Wireless Bridge PPP Switch Mesh IP MPLS Routing System Queues Files Log Radius Tools New Terminal LCD MetaROUTER Partition Make Supout.tif

Package List

Name	Version	Build Time	Scheduled
routing	6.30.4	Aug/25/2015 12:59:46	
security	6.30.4	Aug/25/2015 12:59:46	
system	6.30.4	Aug/25/2015 12:59:46	
wireless-cm2	6.30.4	Aug/25/2015 12:59:46	
wireless-fp	6.30.4	Aug/25/2015 12:59:46	

12 items (1 selected)

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)	SSID
------	------	-----	--------	----	----	-----------------	-----------------	------

CAPs Manager

☒ Enabled

Certificate: auto

CA Certificate: auto

☐ Require Peer Certificate

Generated Certificate: CAPsMAN-E48D8C0D8C06

Generated CA Certificate: CAPsMAN-CA-E48D8C0D8C06

Package Path:

Upgrade Policy: none

OK Cancel Apply

CAPsMAN Setup LAB

The screenshot shows the Mikrotik WinBox interface with the following configurations highlighted in red boxes and numbered 1 through 4:

- Box 1: Bridge Configuration**
 - Bridge: **bridge1**
 - Type: Bridge
 - L2 MTU: 1598
- Box 2: Address List Configuration**
 - Address: **192.168.1.1/24**
 - Network: **192.168.1.0**
 - Interface: **bridge1**
- Box 3: DHCP Server Configuration**
 - DHCP: **dhcp1**
 - Interface: **bridge1**
- Box 4: Firewall NAT Configuration**
 - Filter Rules: **NAT**
 - Action: **srcnat**

CAPsMAN Setup LAB

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

Quick Set CAPsMAN Interfaces Wireless Bridge PPP Switch Mesh IP MPLS Routing System Queues Files Log Radius

CAPsMAN

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

Find

Name	Frequency	Width	Band	Extension Channel	Tx. Power
CAPs.Channel <channel1>					
Name: channel1	Frequency: 2412 MHz	Width: 20 MHz	Band: 2ghz-b/g/n	Extension Channel: disabled	Tx. Power:
					OK Cancel Apply Comment Copy Remove

CAPs Datapath Configuration <datapath1>	
Name: datapath1	OK Cancel
Bridge: bridge1	Apply
Bridge Cost:	Comment
Bridge Horizon:	Copy
Local Forwarding: ☒	Remove
Client To Client Forwarding: ☒	
VLAN Mode:	
VLAN ID:	

CAPs Security Configuration <LAB SECURITY>	
Name: LAB SECURITY	
Authentication Type: ☒ WPA PSK ☒ WPA2 P	
Encryption: ☒ aes ccm ☐ tkip	
Group Encryption: aes ccm	
Passphrase: 987654321	
EAP Methods:	
TLS Mode:	
TLS Certificate:	

CAPsMAN Setup LAB

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

CAPsMAN

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

New CAPs Configuration

Wireless Channel Datapath Security

Name: MUM-CONFIGURATION
Mode: ap
SSID: MUM-USA-2016
Hide SSID:
Load Balancing Group:
Country: pakistan
Max Station Count:
Multicast Helper:
HT Tx Chains:
HT Rx Chains:
HT Guard Interval:

OK Cancel Apply Comment Copy Remove

New CAPs Configuration

Wireless **Channel** Datapath Security

Channel: channel1
Frequency:
Width:
Band:
Extension Channel:
Tx. Power:

OK Cancel Apply Comment Copy Remove

New CAPs Configuration

Wireless Channel Datapath **Security**

Security: LAB SECURITY
Authentication Type:
Encryption:

OK Cancel Apply Comment

CAPs Configuration: <cfg1>

Channel **Datapath** Security

Datapath: datapath1
Bridge: bridge1
Bridge Cost:
Bridge Horizon:
Local Forwarding:
Client Forwarding:
VLAN Mode:
VLAN ID:

OK Cancel Apply Comment Copy Remove

OS WinBox

Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rtf

CAPsMAN Setup LAB Complete

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

CAPsMAN

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

+ - ✓ ✗ 📄 🔍

#	Radio MAC	Identity Regexp	Common Nam...	Action	Master Configurati...	Slave Configuration
0	00:00:00:00:00:00			create dy...	MUM-CONFIGUR...	

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

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

Hw. Supported Modes: Cancel

Identity Regexp: Apply

Common Name Regexp: Disable

IP Address Ranges: Comment

Action: create dynamic enabled Copy

Master Configuration: MUM-CONFIGURATION Remove

Slave Configuration:

Name Format: prefix

Name Prefix: MUM-USA

enabled

CAP to CAPsMAN Connection

▶ MAC Layer2:

- No IP configuration required
- CAP and CAPsMAN must be in the same Layer 2 network

▶ IP (UDP) Layer3:

- CAP must reach the CAPsMAN using IP protocol
- Can traverse NAT if necessary

- **Management connection between CAP and CAPsMAN is secured using DTLS.**
- **CAP client data traffic is not secured – if necessary additional encryption by using IPSec or encrypted tunnels is needed**

How Cap Selects CAPSMAN

- ▶ **CAP attempts to contact CAPsMAN and build available CAPsMAN list:**
 - List of CAPsMAN IPs,.
 - List of CAPsMAN IPs obtained from DHCP.
 - Broadcasting on configured interfaces using IP and MAC Layer.
- ▶ **CAP selects the CAPsMAN based on such rules:**
 - If CAPsMAN names setting is matched it will prefer that CAPsMAN earlier in the list
 - MAC layer connectivity to CAPsMAN is preferred over IP connectivity
 - If list is empty it will connect to any available CAPsMAN

CAP Configuration on AP LAB

admin@00:0C:42:8D:08:3E (WAP CAP 1) - WinBox v6.33.3 on wAP (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 00:0C:42:8D:08:3E

Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
MPLS
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual

Bridge

Bridge Ports Filters NAT Hosts

Name	Type	L2 MTU	Tx	Rx
R bridge1	Bridge	1598	51.9 kbps	

1

DHCP Client

DHCP Client DHCP Client Options

Interface	Use P...	Add D...	IP Address	Expires After	Status
ether1	yes	yes	192.168.1.24...	00:08:56	bound

2

CAP

Enabled

Interfaces: wlan1

Certificate: none

Discovery Interfaces: bridge1

Lock To CAPsMAN

CAPsMAN Addresses: 192.168.1.1

CAPsMAN Names:

CAPsMAN Certificate Common Names:

OK
Cancel
Apply

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security

+ - ✓ ✗ Settings CAP Scanner Freq. Usage

Name	Type	Tx
--- managed by CAPsMAN		
--- channel: 2412/20/gn(20dBm), SSID: MUM-USA-2016, local forwarding		
RS wlan1	Wireless (Atheros AR9...	4.0 kbps

4

1 item out of 3

CAPConfiguration on AP LAB

- ▶ Make sure that the latest package of firmware should be updated

The screenshot displays the WinBox v6.33.3 interface for a MikroTik WinBox user. The main window shows the 'Package List' tab, which contains a table of installed and available packages. The 'wireless-cm2' package is highlighted with a red box, indicating it is the latest version (6.33.3) and was built on Dec/03/2015 16:08:10. A 'CAP' configuration dialog is open, showing settings for the 'wlan1' interface. The 'Enabled' checkbox is checked, and the 'Certificate' is set to 'none'. The 'Discovery Interfaces' are set to 'bridge1'. The 'CAPsMAN Addresses' are set to '192.168.1.1'. The 'Bridge' is set to 'bridge1'. The 'Requested Certificate' and 'Locked CAPsMAN Common Name' fields are empty.

Name	Version	Build Time	Scheduled
advanced-t...	6.33.3	Dec/03/2015 16:08:10	
dhcp	6.33.3	Dec/03/2015 16:08:10	
hotspot	6.33.3	Dec/03/2015 16:08:10	
ipv6	6.33.3	Dec/03/2015 16:08:10	
mpls	6.33.3	Dec/03/2015 16:08:10	
ppp	6.33.3	Dec/03/2015 16:08:10	
routing	6.33.3	Dec/03/2015 16:08:10	
security	6.33.3	Dec/03/2015 16:08:10	
system	6.33.3	Dec/03/2015 16:08:10	
wireless-cm2	6.33.3	Dec/03/2015 16:08:10	
wireless-fp	6.33.3	Dec/03/2015 16:08:10	

12 items (1 selected)

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security

Log Radius Tools New Terminal MetaROUTER Partition Make Supout.rf Manual

1 item out of 3

CAP Configuration Dialog:

- Enabled: ☒
- Interfaces: wlan1
- Certificate: none
- Discovery Interfaces: bridge1
- Lock To CAPsMAN: ☐
- CAPsMAN Addresses: 192.168.1.1
- CAPsMAN Names:
- CAPsMAN Certificate Common Names:
- Bridge: bridge1
- Requested Certificate:
- Locked CAPsMAN Common Name:

CAP Connected with CAPsMAN LAB

The image displays three screenshots of the WinBox interface, illustrating the configuration of a CAP (Client Access Point) connected to CAPsMAN (Central Authentication Protocol for Management).

Top Left Screenshot: Shows the WinBox interface for a MikroTik device (admin@00:0C:42:8D:08:3E) running WinBox v6.33.3. The "Wireless Tables" tab is active, displaying a table with columns: Name, Type, Tx, and Rx. The table contains one entry: RS wlan1, Wireless (Atheros AR9...), 5.2 kbps. The interface also shows a sidebar with various configuration options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.rf, and Manual.

Top Right Screenshot: Shows the WinBox interface for a MikroTik device (admin@E4:8D:8C:F4:7B:92) running WinBox v6.32.4. The "Wireless Tables" tab is active, displaying a table with columns: Name, Type, Tx, and Rx. The table contains one entry: RS wlan1, Wireless (Atheros AR9...), 4. The interface also shows a sidebar with various configuration options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.rf, and Manual.

Bottom Screenshot: Shows the WinBox interface for a MikroTik device (admin@D4:CA:6D:BF:6E:80) running WinBox v6.34.2. The "Wireless Tables" tab is active, displaying a table with columns: Name, Type, Tx, Rx, and Tx Pa. The table contains one entry: RS wlan1, Wireless (Atheros AR9...), 5.2 kbps, 0 bps. The interface also shows a sidebar with various configuration options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.rf, and Manual.

CAP Radio Table on CAPsMAN

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

Quick Set CAPsMAN Interfaces Wireless Bridge PPP Switch Mesh IP MPLS Routing System Queues

CAPsMAN

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

Provision Find

	Radio MAC	Remote CAP Name	Remote CAP Iden...	Interface
P	00:0C:42:8D:08:3E	[00:0C:42:8D:08:...	WAP CAP 1	MUM-USA1
P	D4:CA:6D:BF:6E:81	[D4:CA:6D:BF:6E:...	MikroTik	MUM-USA2
P	E4:8D:8C:F4:7B:93	[E4:8D:8C:F4:7B:...	MikroTik	MUM-USA3

3 items (3 selected)

CAP Identification On Capsman

- ▶ MAC / IP Address
- ▶ RouterBoard model
- ▶ Serial Number of the Board
- ▶ RouterOS version
- ▶ System Identity
- ▶ Main wireless MAC
- ▶ State of the CAP
- ▶ Provided radio count

CAPsMAN									
Interfaces Provisioning Configurations Channels Datapaths Security Cfg. Access List Remote CAP Radio Registration Table									
Provision Upgrade Set Identity									
Address	/	Name	Board	Serial	Version	Identity	Base MAC	State	Radios
00:0C:42:8D:08:3E		[00:0C:42:8D:...	RBwAP2nD	5D470150508A	6.33.3	MikroTik	00:0C:42:8D:08:3D	Run	1
D4:CA:6D:BF:6E:80		[D4:CA:6D:B...	RB Groove A...	448C0290B31C	6.34.2	MikroTik	D4:CA:6D:BF:6E:80	Run	1
E4:8D:8C:F4:7B:92		[E4:8D:8C:F4...	RBcAP2n	654705BD7E...	6.32.4	MikroTik	E4:8D:8C:F4:7B:92	Run	1

Station Registered on CAPsMAN

admin@192.168.1.1 (CAPsMAN CONTROLLER) - WinBox v6.30.4 on RB2011UiAS (mipsbe)

Sessions Settings Dashboard

Safe Mode Session: 192.168.1.1

Quick Set CAPsMAN Interfaces Wireless Bridge PPP Switch Mesh IP MPLS Routing System

CAPsMAN

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

Find

Interface	SSID	MAC Address	Tx Rate	Rx Rate	Tx Signal	Rx Signal	Uptime	Tx/F
MUM-USA1	MUM-USA-2016	2C:33:7A:50:F2:33	52Mbps...	65Mbps...	0	-65	00:40:01...	27 051/
MUM-USA1	MUM-USA-2016	00:73:8D:8B:ED:CC	65Mbps...	65Mbps...	0	-43	00:38:58...	9 760/7
MUM-USA3	MUM-USA-2016	90:8D:6C:AF:9E:11	65Mbps...	65Mbps...	0	-60	00:14:54...	27 930/

3 items (1 selected)

CAPsMAN Access List Features

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

Efficient Roaming Configuration TIP



Efficient Roaming Configuration TIP

admin@E4:8D:8C:ED:CB:37 (CAPSMAN) - WinBox v6.35 on RB951Ui-2HnD (mipsbe)

Session Settings Dashboard

Safe Mode Session: E4:8D:8C:ED:CB:37

CAPsMAN

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

#	MAC Address	MAC Mask	Interface	Signal Ra...	Action	Client To Clie...	VLAN Mo...	VLAN ID
0			all	-60..120	accept	yes		
1			all	-120..-61	reject	yes		

2 items (1 selected)

CAPs Access Rule <>

MAC Address: OK

MAC Mask: Cancel

Interface: all Apply

SSID Regexp: Disable

Signal Range: -60..120 Comment

Time

Action: accept Copy

Remove

AP Tx Limit:

Client Tx Limit:

Private Passphrase:

Client To Client Forwarding: ☒

RADIUS Accounting:

VLAN Mode:

VLAN ID:

enabled

CAPs Access Rule <>

MAC Address: OK

MAC Mask: Cancel

Interface: all Apply

SSID Regexp: Disable

Signal Range: -120..-61 Comment

Time

Action: reject Copy

Remove

AP Tx Limit:

Client Tx Limit:

Private Passphrase:

Client To Client Forwarding: ☒

RADIUS Accounting:

VLAN Mode:

VLAN ID:

enabled

RouterOS WinBox

MAC Authentication

- By using this rule you can reject the undesired stations only

The screenshot displays the RouterOS WinBox interface. The top status bar shows the user 'admin@E4:8D:8C:ED:CB:37 (CAPSMAN)' and the version 'winBox v6.35 on RB951UI-2HnD (mipsbe)'. The left sidebar contains a menu with options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.tif, Manual, New WinBox, and Exit.

The main window is titled 'CAPsMAN' and has tabs for Interfaces, Provisioning, Configurations, Channels, Datapaths, Security Cfg., Access List, Rates, Remote CAP, Radio, and Registration Table. The 'Access List' tab is active, showing a table with columns: #, MAC Address, MAC Mask, Interface, Signal Ra..., Action, Client To Clie..., VLAN Mo..., and VLAN ID. The table contains three rows: row 0 with MAC Address '90:8D:6C:AF:9E:11' and Action 'reject'; row 1 with MAC Address '90:8D:6C:AF:9E:11' and Action 'accept'; and row 2 with MAC Address '90:8D:6C:AF:9E:11' and Action 'reject'.

A dialog box titled 'CAPs Access Rule <90:8D:6C:AF:9E:11>' is open, showing the configuration for the selected rule. The fields are: MAC Address: 90:8D:6C:AF:9E:11, MAC Mask: (empty), Interface: (empty), SSID Regexp: (empty), Signal Range: (empty), Action: reject, AP Tx Limit: (empty), Client Tx Limit: (empty), Private Passphrase: (empty), Client To Client Forwarding: (empty), RADIUS Accounting: (empty), VLAN Mode: (empty), and VLAN ID: (empty). The dialog has buttons for OK, Cancel, Apply, Disable, Comment, Copy, and Remove. At the bottom of the dialog, it says 'enabled'.

At the bottom of the WinBox window, it says '3 items (1 selected)'.

Brand Based Authentication

- By using this rule you can allow selected Brands Via Mac Orders

The screenshot displays the RouterOS WinBox interface, specifically the CAPsMAN configuration page. The left sidebar shows the navigation menu with options like Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.rtf, Manual, New WinBox, and Exit.

The main panel is titled "CAPsMAN" and includes tabs for Interfaces, Provisioning, Configurations, Channels, Datapaths, Security Cfg., Access List, Rates, Remote CAP, Radio, and Registration Table. The "Access List" tab is active, showing a table with columns: #, MAC Address, MAC Mask, Interface, Signal Ra..., Action, Client To Clie..., VLAN Mo..., VLAN ID, and Comment. Two entries are listed:

#	MAC Address	MAC Mask	Interface	Signal Ra...	Action	Client To Clie...	VLAN Mo...	VLAN ID	Comment
3	90:8D:6C:00:00:00	FF:FF:FF:00:00:00			accept				Brand Allow
4					reject				Deny All

Below the table, it indicates "5 items (1 selected)". The selected item is "CAPs Access Rule <90:8D:6C:00:00:00>". The configuration details for this rule are shown in two panels:

Left Panel (CAPs Access Rule <90:8D:6C:00:00:00>):

- MAC Address: 90:8D:6C:00:00:00
- MAC Mask: FF:FF:FF:00:00:00
- Interface: (empty)
- SSID Regexp: (empty)
- Signal Range: (empty)
- Time: 00:00:00 - 1d 00:00:00
- Days: ☒ sun ☒ mon ☒ tue ☒ wed ☒ thu ☒ fri ☒ sat
- Action: accept
- AP Tx Limit: (empty)
- Client Tx Limit: (empty)
- Private Passphrase: (empty)
- Client To Client Forwarding: (empty)
- RADIUS Accounting: (empty)
- VLAN Mode: (empty)
- VLAN ID: (empty)

Right Panel (CAPs Access Rule <>):

- MAC Address: (empty)
- MAC Mask: (empty)
- Interface: (empty)
- SSID Regexp: (empty)
- Signal Range: (empty)
- Action: reject
- AP Tx Limit: (empty)
- Client Tx Limit: (empty)
- Private Passphrase: (empty)
- Client To Client Forwarding: (empty)
- RADIUS Accounting: (empty)
- VLAN Mode: (empty)
- VLAN ID: (empty)

At the bottom of each panel, the status "enabled" is shown.

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Questions & Answers

<http://wiki.mikrotik.com/wiki/Manual:CAPsMAN>

