

MikroTik Enterprise Wireless Networks

based on

CAPsMAN

1999 – LAN Networks Supervisor 2001 – IBM Pro Netfinity Servers, WindowsNT 2001 – Omega Networking and Service, Linux Servers, Virtualization 2006 – ENS, Easy Network Solutions 2007 – MUM Egypt, MT Consultant 2011 – MUM Budapest, MTCRE 2018 – MUM Tirana, Presenter 2019 – MUM Budapest, Presenter 2020 – Etronic.al UBRSA)







2021 – UBIQUITI Certified Trainer (UEWA, UBWS, UBWA, UBRSS, 2

I spend a lot of time on network planning: IP, IPTV, VOIP, CCTV, deployment, configuring, troubleshooting, multivendor. Especially I like to spend time on virtualization, and cloud services.







Active member of the team when Pnetlab was created, especially the learning center features

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CERTIFIED TRAINER CERTIFICATE No: TR0657



Wireless Networks are everywhere

- (nearly) All mobile devices support them
- The preferred way of connecting to the internet by most people
- Offer liberty of movement
- Go, where no wire can go.





Enterprise Wireless Networks

- Multiple Access Points are needed for multiple areas to cover
- Necessity for higher bandwidth, and increasing interference, has brought the need for smaller APs
- The bigger the number of the APs, the more difficult is their control



Power is Nothing!

Without Control





Have full and fast control over a big number of APs.





MikroTik's Response to this is CAPSMAN

Controlled Access Points Manager

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What is it?

- CAPsMAN, is a centralizing system by MikroTik. It gives the possibility to create a system of controlled access points, called CAPs, by a Controller called CAPsManager.
- It is completely FREE (as in beer). It can be installed in RouterBOARDs and CHR too.
- Since its introduction in 2014, it has changed the way we plan, implement and expand wireless networks.

What is needed

- At least 1 device, with 1 wireless card
- Latest version of RouterOS, with level 4.

Interface Interface List Ethemet EoIP Tunnel IP Tunnel GRE Image: State of the stat
R 42bridgeLAN Bridge 1500 R 42bridgeLAN Ethemet 1500 RS 42bether1 Ethemet 1500 RS 42bether2 Ethemet 1500 RS 42bether3 Ethemet 1500 Bridge Ports VLANs MSTIs Port MST Ovemides Bridge Ports VLANs MSTIs Settings
Name Type L2 MTU Tx R 4:1bridgeCAPS Bridge 1600 R 4:1bridgeLAN Bridge 1596
CAPSMAN CAP Interface Provisioning Configurations Channels Datapaths +
Name Type MTU Actu SMB ☆ PWR-AP-01-1 CAP Interface 1500 SMB ☆ PWR-AP-02-1 CAP Interface 1500

Simplest CAPsMAN

hAP Mini – a device l'm in love with.

It is the cheapest RB with 1 wireless card, and 3 Ethernet ports.



Bigger setup?

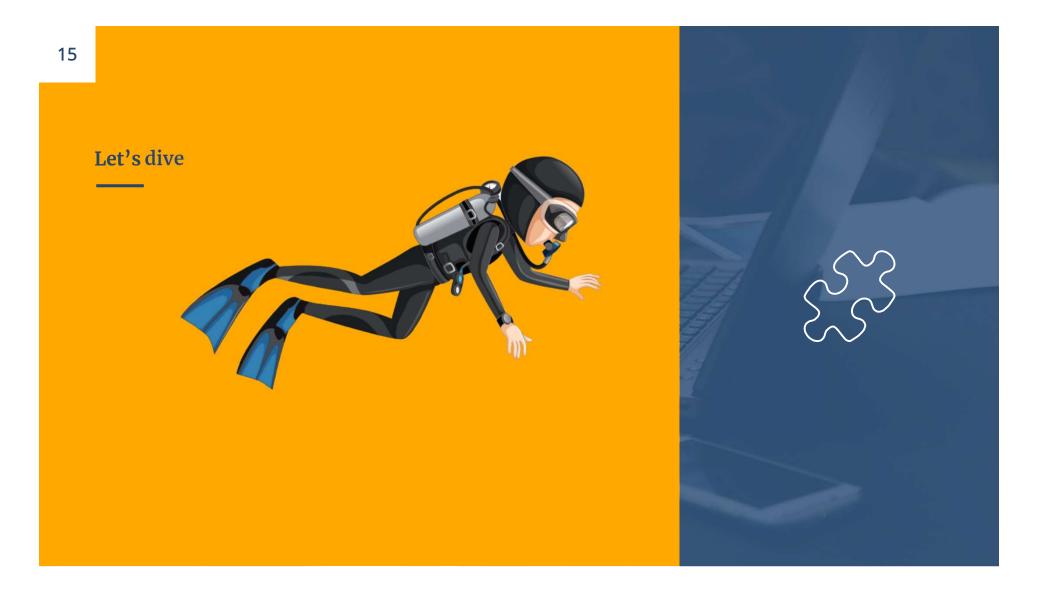
Durres Harbour Container Terminal: Latitude: 41° 17' 60.00" N Longitude: 19° 26' 60.00" E

27 Towers with 2–3 APs (SXT 2, SXT SA5, NetMetal) 27 x RB260GSP 1 x CRS326–24G–2S+RM 1 x CCR2004–16G–2S+

13

Even BIGGER?

- 123 x wsAP ac Lite
- 10 x wAP ac
- 10 x cAP Ac
- 6 x CRS328-24P-4S+RM
- 1 x CCR2004-16G-2S+

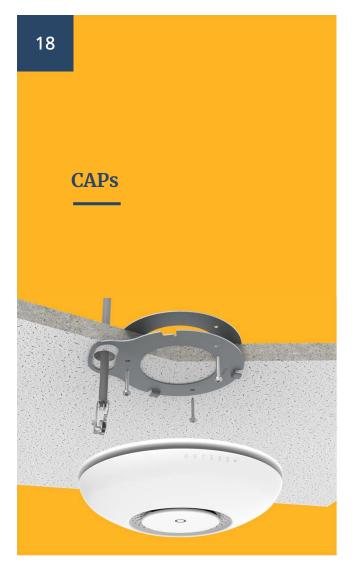


CAPSMAN VERSIONS Version v1.
 Introduced in RouterOS 6.11
 Discontinued from 6.37

Version v2.
 Started working from RouterOS 6.22

 Current version (the WifiWave2 version).
 Introduced in RouterOS V7. **CAPsMAN**

- CAPsMAN server can be installed on any RouterOS device, even if the device itself does not have a wireless interface
- Unlimited CAPs supported by CAPsMAN
- Up to 32 Radios per CAP
- Up to 32 Virtual interfaces per master radio interface



Any RouterOS device can be a controlled wireless access point (CAP) as long as it has at least a **Level 4** RouterOS license

CAP – Controlled Access Point

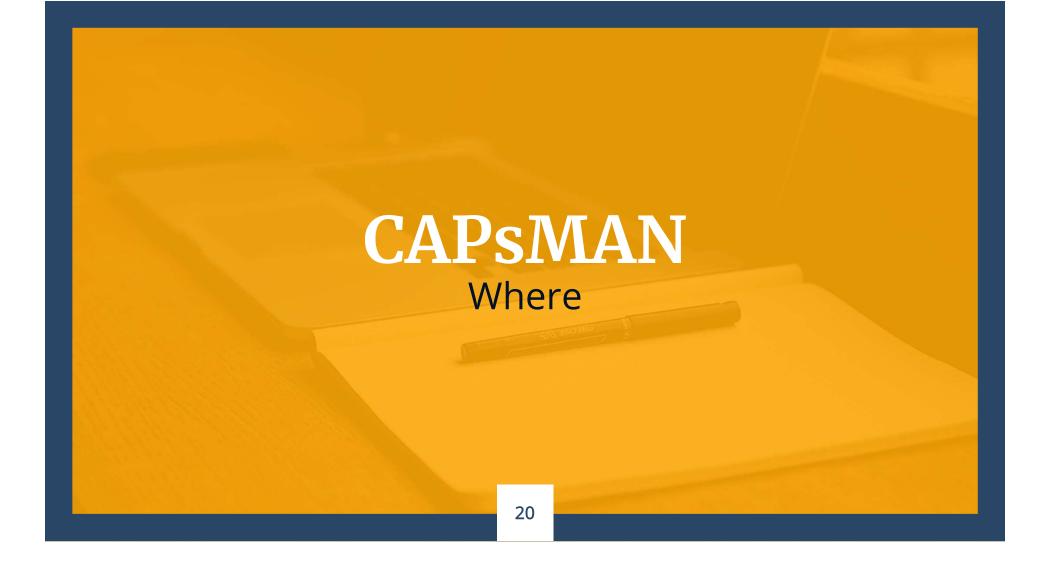


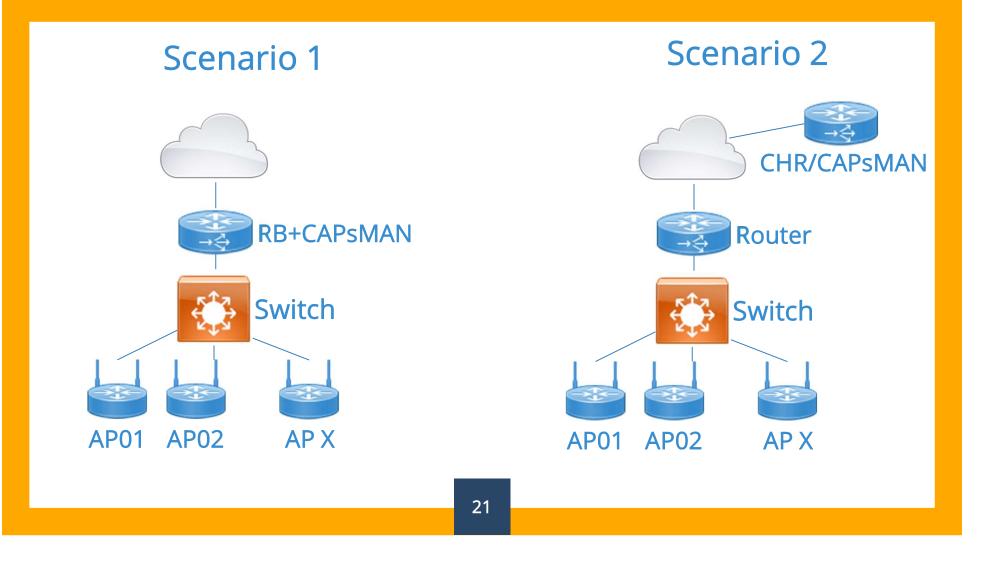
cAP – Ceiling AP

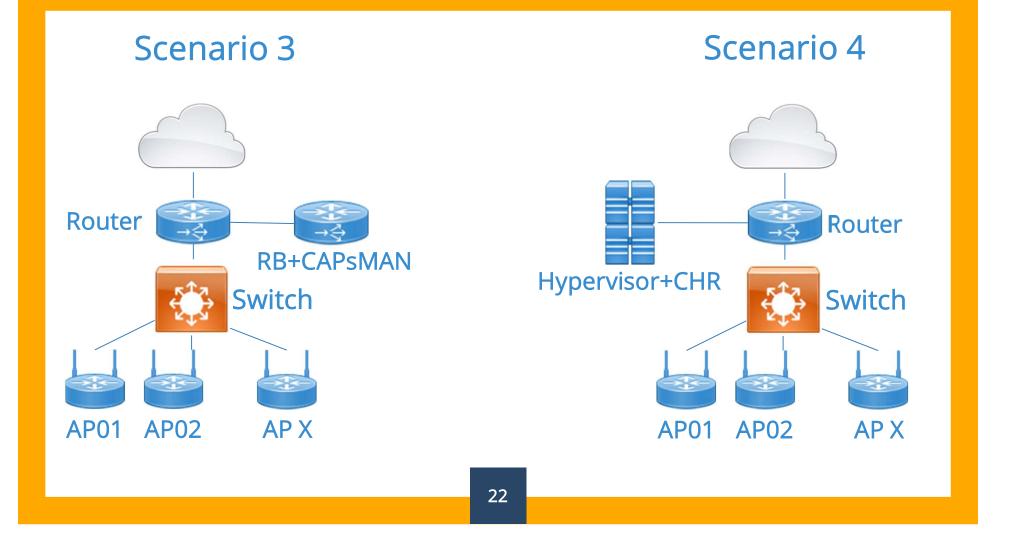
VS











Safe Mode	Session: 18:FD:74:68:50:F2
🚀 Quick Set	
CAPSMAN	
	CAPsMAN
🗘 Wireless	CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP
💢 Bridge	🛉 📼 🖉 🕅 🗑 Reselect Channel Manager AAA
🛓 PPP	
🙄 Switch	Name / Type Actual MTU L2 MTU Tx Rx 💌
°∏° M esh	
IP 1	
🗿 MPLS 🛛 🗅	
P Routing	
📑 Routing 👔	
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System Moduling Generation System Moduling Generation System Moduling Generation Systems Moduling Generation Syste	CAPSMAN v2 in RouterOS 6.49.10

C Safe Mode	Session: 48:A9:8A:8B:7B:27
🖋 Quick Set	
Interfaces	
Q Wireless	
😝 WireGuard	Package List
Bridge	Y Check For Updates Enable Disable Uninstall Unschedule Downgrade Check Installation Find
The PPP	Name / Version Build Time Scheduled 🗸
🙄 Switch	Image: system The
°]° Mesh	
IP	Wireless Tables
Pv6	Security AAA Datapath Interworking Steering Registration Access List Provisioning Radios Remote CAP
MPLS	Find
3 Routing	
System	Address / Identity Board Serial Version 🔻
🙅 Queues	
📄 Files	
Log	
Le RADIUS	
🔀 Tools	
💵 New Terminal	
	CAPsMAN up to 7.13



BIG CHANGE from RouterOS 7.13

- The 'WiFi' configuration menu, introduced in RouterOS 7.13, manages Wi-Fi 5 wave2 + newer WiFi interfaces + CAPsMAN.
- 'wifi-qcom-ac' driver package (for 802.11ac chipsets)
 - 'wifi-qcom' driver package for 802.11ax and newer chipsets.
- Used to be called 'wifiwave2' in RouterOS versions before 7.13, where it was a part of the 'wifiwave2' software package.



"wifi-qcom-ac" driver package

- MikroTik Wi-Fi 5 APs, which ship with their interfaces managed by the 'wireless' menu, can install the additional 'wifiqcom-ac' package to make their interfaces compatible with the 'wifi' menu.
- To do this, it is necessary to uninstall the 'wireless' package, then install 'wifi-qcomac'.

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			File folder		
wifi-qcom-ac-7.14-arm.npk	2,986,129	2,980,310	NPK File	2/29/2024 3:51 PM	
wireless-7.14-arm.npk	2,322,577	2,316,122	NPK File	2/29/2024 3:51 PM	
zerotier-7.14-arm.npk	774,289	767,186	NPK File	2/29/2024 3:51 PM	
iot-7.14-arm.npk	385,169	377,539	NPK File	2/29/2024 3:51 PM	
] lora-7.14-arm.npk	16,529	11,764	NPK File	2/29/2024 3:51 PM	
] rose-storage-7.14-arm.npk	3,367,057	3,360,588	NPK File	2/29/2024 3:51 PM	
tr069-client-7.14-arm.npk	135,313	129,476	NPK File	2/29/2024 3:51 PM	
] ups-7.14-arm.npk	45,201	39,803	NPK File	2/29/2024 3:51 PM	
user-manager-7 14-arm opk	364,699	360,618	NDK File	2/20/2024 3-51 PM	
wifi-qcom-7.14-arm.npk	7,921,809	7,917,050	NPK File	2/29/2024 3:51 PM	
calea-7.14-arm.npk	20,625	15,787	NPK File	2/29/2024 3:51 PM	
] container-7.14-arm.npk	<mark>98,44</mark> 9	91,905	NPK File	2/29/2024 3:51 PM	
dude-7.14-arm.npk	1,355,921	1,348,992	NPK File	2/29/2024 3:51 PM	
gps-7.14-arm.npk	24,721	17.602	NPK File	2/29/2024 3:51 PM	



"wifi-qcom-ac" driver package brings

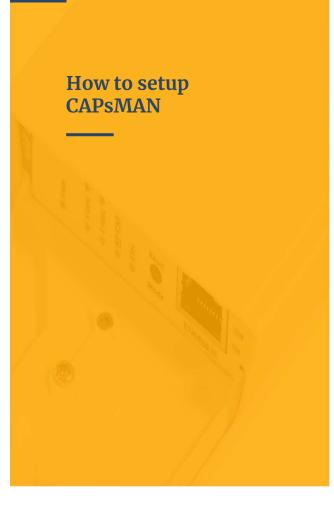
- WPA3 authentication
- OWE (opportunistic wireless encryption)
- 802.11w standard management frame protection
- 802.11r/k/v
- **MU-MIMO** and beamforming
- 400Mb/s maximum data rate in the 2.4GHz band for IPQ4019



"wifi-qcom-ac" driver package compatibility

- Audience
- Audience LTE kit
- Chateau (all variants of D53)
- hAP ac^2
- hAP ac^3
- cAP ac (yay ☺)
- cAP XL ac
- LDF 5 ac
- LHG XL 5 ac
- LHG XL 52 ac
- NetMetal ac^2
- mANTBox 52 15s
- wAP ac (RBwAPG-5HacD2HnD)
- SXTsq 5 ac

2	Q	Safe Mod	e	Session:	48:A9:8A:8B:7E	3:27							
	1	Quick Set)									
	T	WiFi	6										
		Interfaces	45	WiFi									
	60	WireGuard		WiFi	Configuration	Channel	Security	AAA	Datap	ath Inte	rworkir	ng Ste	er
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	-	IPv6	1										
		MPLS	12										
		Routing	1										
		System	12										
	-	Queues											
		Files											
	Charles .	Log				PsM/							



- CAPsMAN server is configured/enabled
- CAP is configured
- CAP discovers and connects to CAPsMAN
 - Layer 2
 - Layer 3
- Provisioning. CAPsMAN sends to CAP the configurations
- Traffic flow begins, and depending if CAP forwarding (local forwarding) or CAPsMAN forwarding, it flows through the CAP or CAPsMAN

Ce Safe Mode	Session: 18:FD:74:68:50:F1	
🖋 Quick Set	CAPSMAN	
CAPsMAN		
Interfaces	CAP Interface Provisioning Configurations Channels	Datapaths Security Cfg.
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💥 Bridge	Name / Type Ad	tual MTU Tx
늘 PPP	Come (Jpsc)	
😴 Switch	CAPs Manager	
1. Mesh	Enabled	ОК
IP ト	Certificate:	
MPLS N		Cancel
CRouting		Apply
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🙅 Queues	Generated Certificate:	
Files	Generated CA Certificate:	
Log		
LI RADIUS	Package Path:	

Safe Mode	Session: 192.168.2.119	e: 05:57:1(
🏏 Quick Set		
🔉 WiFi		
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😝 WireGuard	AAA Datapath Interworking Steering Registration Access List Provisioning Radios Remote	CAP
Bridge	Provision Upgrade Set Identity CAPsMAN	Find
The PPP		1. ma
🕎 Switch	CAPsMAN	
°T <mark>°</mark> Mesh	Enakled OK	
P P		
😴 IPv6 🛛 🗅	Cancer	
MPLS N	CA Certificate: Apply	
Routing	Certificate:	
System	Require Peer Certificate	
💂 Queues	Package Path:	
📔 Files	Upgrade Policy: none	
Log		
Le RADIUS	Generated CA Certificate: WiFi-CAPsMAN-CA-48A98A	
🗙 🔀 Tools 💦 🕅	Generated Certificate: WiFi-CAPsMAN-48A98A8B7 Enable CAPSMAN	Lourro



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C Safe Mode	Session: 18:FD:	74:68:50:F1					
🚀 Quick Set	Wireless Tables						
	WiFi Interface:	s W60G Station Nstr	eme Dual Acc	ess list	Be	distration	Connect L
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💭 Wireless			CAP WPS Clie	ent	etup	Repeater	Scanner
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Se Queues	ll r		LOCK TO CAP	SIMPAIN	_		6
📔 Files		CAPsMAN Addresses:		Ĩ	\$		
Log		CAPsMAN Names:	-		\$		-
RADIUS	CAROMANICO	tificate Common Names:					
🗙 Tools 🛛 🗅	CAPSMAN CE				\$		
Mew Terminal		Bridge:	none		Ŧ	C	C:
Dot1X			Static Virtual			COL	nfigu

C Safe Mode	Session: 192.16	8.2.124						Uptin
🖋 Quick Set	WIE							
🔉 WiFi	WiFi Configu	uration Channel	Security A	AA Datapatł	n Interworkin	a Steen	na Reai	stration
Interfaces						21	2 2	Stration
🙌 WireGuard	+	× 🗆 7	WPS Accept	ot CAP	Scan Freq	. Usage	Sniffer	
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The second se	CAP							
🙄 Switch			🔽 Enab	lad		······		1
* Mesh		1.		2000 States and			Oł	
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🗐 IPv6 🗈 🗈		Certif	icate:				Арр	lv.
MPLS N		CAPsMAN Addre	esses:			\$		
Routing		CAPsMAN N	ames:			\$		
System 🗈	CAPSMAN Cer	rtificate Common N	ames.			4		
Queues						Ξ.		
Files		Lock To CAPs	MAN:					

Ce Safe Mode	Session: 192.168.2.124			Upt
🖉 Quick Set	WiFi			
🔉 WiFi	Press have been press without the Press from	Annally Laborated	Dania Da	tabusti su
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😝 WireGuard	+ - 🖌 🗶 🗂 🍸 WPS Accept C/	AP Scan Fre	q. Usage Sniffer	
Bridge	Name / Type	Actual MTU	L2 MTU ARP	Mode
PPP		1500	1500	
🙄 Switch	In the second	1500	1560	ap
T <mark>o</mark> Mesh	Interface <wifi1></wifi1>			
별 IP N	General Configuration Channel Security EAP	FT	OK	
∰ IPv6 ト	Configuration:		Cancel	
MPLS N	SSID:	:	2000 CONTRA	
Routing			Apply	
🔯 System 🗈	Country:	_	Disable	
🗣 Queues	Chains:		Comment	
Files	Tx Chains:			
🗐 Log	Tx Power:	_	Сору	
RADIUS	Antenna Gain:		Remove	
🗙 Tools 🛛 🗅	Hide SSID:		Torch	
Mew Terminal	Manager Inc.			
Dot1X	Manager: local	<u>,</u>	Reset Traffic Coun	ters



- CAPSMAN server is configured/enabled
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Session: 18:FD:74:68:50:F1	
CAPsMAN	1 >
Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Table	
Address / Name Board Serial Version Identity Base MAC State	•
	CAPsMAN Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Table Image: Security Cfg. Access List Rates Remote CAP Radio Registration Table Image: Security Cfg. Access List Rates Remote CAP Radio Registration Table Image: Security Cfg. Access List Rates Remote CAP Radio Registration Table Image: Security Cfg. Security Cfg. Access List Rates Remote CAP Radio Registration Table Image: Security Cfg. Security Cfg. Access List Rates Remote CAP Radio Registration Table Address / Name Board Serial Version Identity Base MAC State 127.0.0.1 [18:FD:74:68: RBD52G-5Ha HCX084NH8FF 6.49.10 capsmanv2 18:FD:74:68:50:F1 Run

C Safe M	ode	Session: 192	2.168.2.119							Uptime: 00:0	05:32	
🖋 Quick Set		WiFi										×
🔉 WiFi		AAA Dat	tapath Inter	rworking	Steering	Registration	Access Lis	t Provision	ning Radio	s Remote CAP		
Interfaces			-	1211	10	10	10		ing hadio		1	-1
WireGuard		- 7	Provision	Upgrade			sMAN				nd	
Bridge		Address	1	Identity cAP_MTP	Board	1 APGi-5acD2r	Serial	ZDRHOW	Version 7.14	State Ok		•
PPP Switch		F		Cru _HIII			ie nerio	Lonnon	14.117	- MA		
												-
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¶ Mesh ∰ IP	4											
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t Mesh 55 IP ⊈ IPv6 J MPLS	1											
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Mesh EV6 MPLS Routing System Queues	4											
Mesh IP IPv6 MPLS Routing System Queues Files	4											
Mesh EV6 MPLS Routing System Queues	4											



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Ce Safe Mode	Session: 18:FD:74:68:50:F	-1					
🖋 Quick Set	CAPsMAN						
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🔉 Wireless							
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PPP	New CAPs Provisioning						
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"[<mark>"</mark> Mesh	Hw. Supported Modes:		\$	Cance			
😳 IP 🗈 🗈	Identity Regexp						
🕑 MPLS 🛛 🗅	Common Name Regexp:			Apply	5		
Routing	and the second s			Disabl	e		
🔯 System 🛛 🗅	IP Address Ranges:		\$				
🗣 Queues	Action:	create enabled	₹	Comme	nt		
📔 Files	Master Configuration:	cfg1	Ŧ	Сору			
Log	Slava Canfinumbian		\$	Remov	e –		
RADIUS	Slave Configuration:		•				
🗙 Tools 🛛 🗅	Name Format:	сар	Ŧ				
🖾 New Terminal	Name Prefix	cap	L	3			
Dot1X		identity prefix			D	rovisi	or
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Safe Mode	Sessio	n: 192.168.2.119				L
🖌 💓 Quick Set	WIE					
🗘 WiFi	10120340				L	
Interfaces	AAA	A Datapath Interworkin	g Steering Registration	Access	List Provisioning	Radios Re
😝 WireGuard	+		7			
💥 Bridge	#	Provisioning				<u>.</u>
늘 PPP		Radio MAC:	6	•	ОК	
🕎 Switch						
°] ° Mesh		Identity Regexp:		_	Cancel	
😇 IP 🗈 🗅	2.2	Common Name Regexp:		-	Apply	
🐺 IPv6 🛛 🗅		Address Ranges:		\$		
	10.0	Supported Bands:		\$	Disable	
C Routing ►		Action:	create enabled	Ŧ	Comment	
💭 System 🗅	10.00	Master Configuration:	601	₹ ▲	Сору	
🙅 Queues		Slave Configurations:		- -	Remove	
Files		Sec. Dans and			Hemove	N
Log		Name Format:	<mark>/</mark> al	-		\square
RADIUS		enabled				

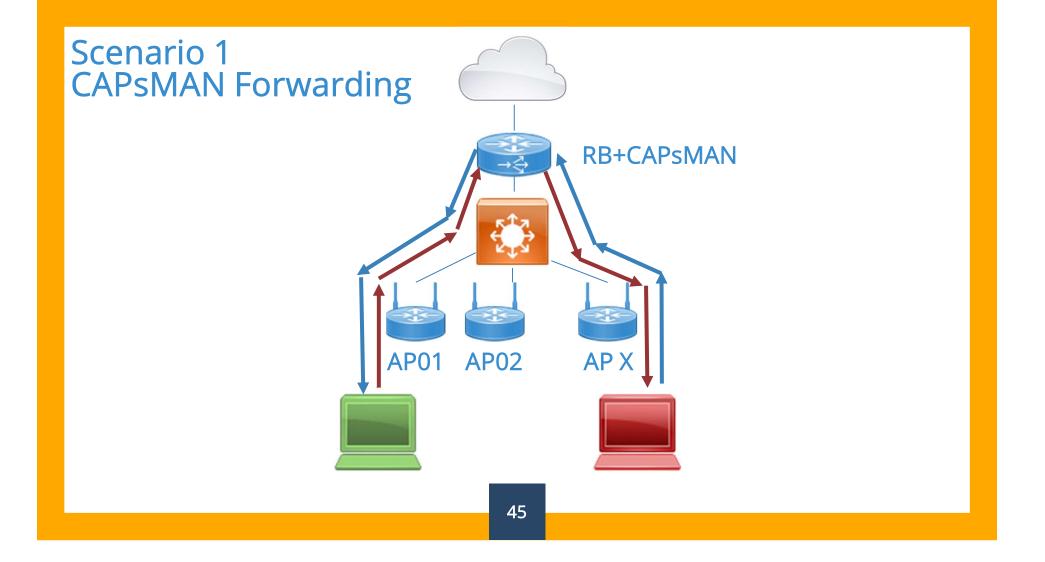
Datapath

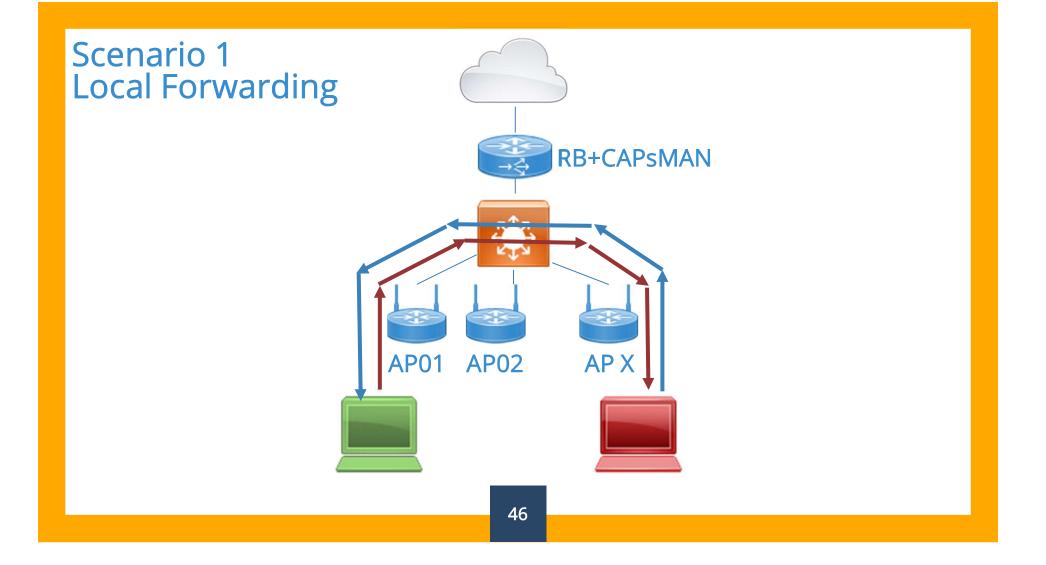
Is the path that user data will follow through a CAPsMAN network

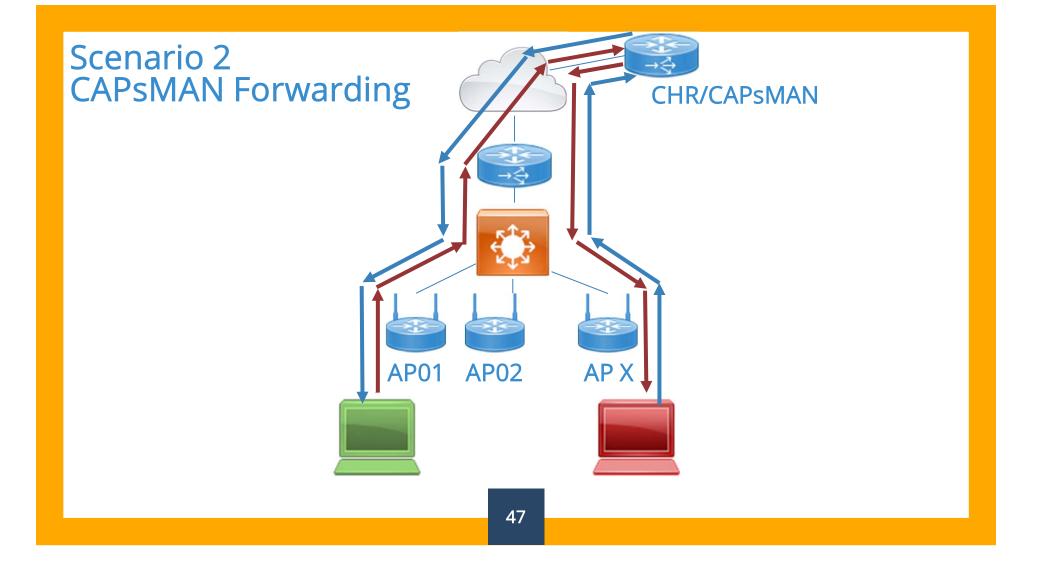
Important concept!

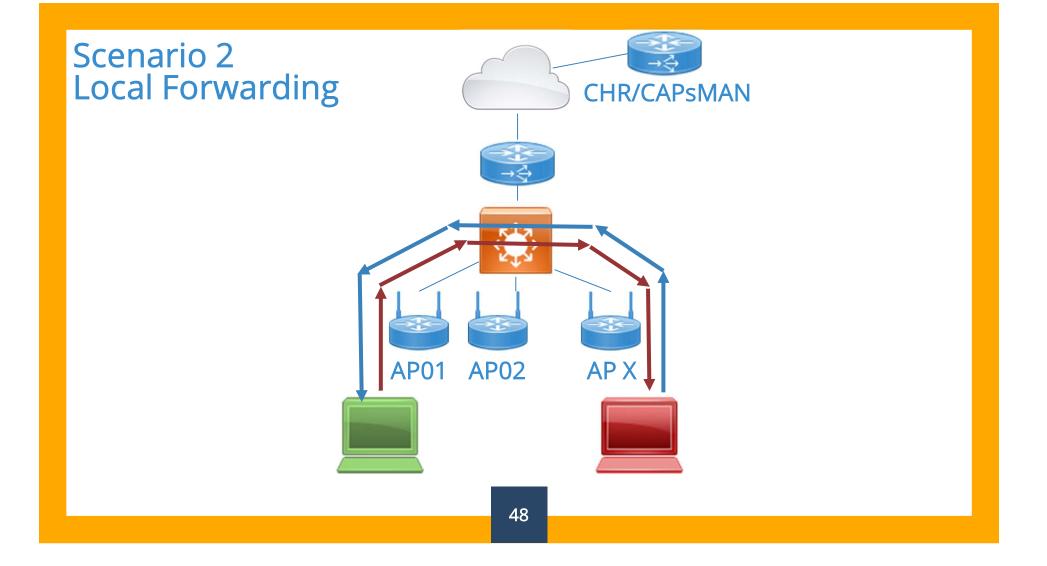
- CAPsMAN forwarding
- Local forwarding











C Safe Mode	Session: 18:FD:74	68:50:F1			
🏏 Quick Set	CAPsMAN				
CAPsMAN			1		
Interfaces	Channels Dat	apaths Security Cfg. Access List	Rates Remote CA	P Radio Registration	Table
🗘 Wireless	+ - 2	New CAPs Datapath Configuration			Find
🔀 Bridge	Name	Name: datap	atb1	ОК	-
The PPP		MTU:	and a second		
🕎 Switch		an increase and the		Cancel	
°T <mark>°</mark> Mesh		L2 MTU:		Apply	
P P		ARP:		10 K. K.	
J MPLS		Bridge:		Comment	
Calify Routing				Сору	
🔯 System 🗅		Bridge Cost:	*	Remove	
🙅 Queues		Bridge Horizon:	¥		
📔 Files		Local Forwarding:	•	-	
Log		Client To Client Forwarding:			
RADIUS	0.7				
🗙 Tools 🛛 🗅	0 items	VLAN Mode:			
🖾 New Terminal		VLAN ID:			_
🚸 Dot1X		Interface List:		Local Forwarding	
🤔 Partition				T OF IF	

🖋 Quick Set	Wireless Tables							
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🗘 Wireless		CAP WPS Client	Setup Repeater	Scanner	Freq. Usage	Alignment	Wireless Sniffer	
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🔤 New Terminal	CAPsMAN Names	:	\$		Interface	Bridge bridgeloca	Horizo	n Tr
🚸 Dot 1X	CAPsMAN Certificate Common Names	:	\$		🚨 wlan2	bridgeloca		no
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New WinBox		Static Virtual						
🛃 Exit	Requested Certificate	:]					
	Locked CAPsMAN Common Name							
🔲 Windows 🛛 🗅								
								.
					r in ic	DCALT	orward	

Ce Safe Mode	Session: 48:A9:8A:24:B2:B3
🖋 Quick Set	Wireless Tables
CAPsMAN	WiFi Interfaces W60G Station Nstreme Dual Access List Registration Connect List Security Profiles Channel
Interfaces	
Wireless	In Instant CAP WPS Client Setup Repeater Scanner Freq. Usage Alignment
Bridge	Name / Type Actual MTU Tx Rx Tx
🕎 Switch	managed by CAPSMAN
* Mesh	
면 IP ト	managed by CAPsMAN
System N	
Queues	RS 🙌 wlan2 Wireless (IPQ4019) 1500 0 bps 2.7 kbps
Files	
Log	
a? RADIUS	
🗙 Tools 🛛 🗅	
Mew Terminal	
Dot1X	CAP in local forwardin

C Safe Mode	Session: 48:A9:8A	:24:B2:B3						
🖋 Quick Set	Wireless Tables							
CAPsMAN	WiFi Interfaces	MICOC CLUI A		A 11.1	D	0	C	C 1
Interfaces	wiri intenaces	W60G Station N	Istreme Dual	Access List	Registration	Connect List	Security Profiles	s Channel
🗘 Wireless	+	× @ 7	CAP WP	S Client	Setup Repeater	Scanner	Freq. Usage	Alignment
💢 Bridge	Name	/ Type		Actual M	TU Tx		Rx	Tx
🕎 Switch	- managed by							
° 🕻 Mesh	X Sig wan1	47/20-eC/gn(28dBn Wineles	n), SSID: MTP s (IPQ4019)		MAN forwarding	0 bps		0 bps
P P	- managed by	CAPsMAN						0.000
System 🗅		20/20-Ceee/ac/DP				warding		
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🔀 Tools 💦 🕅	2							
🔤 New Terminal								
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Q	Safe Mode		Session: 48:A9:8A	:24:B2:B3							
1	Quick Set		Wireless Tables								
Ŧ	CAPsMAN		WiFi Interfaces	MICOC CLU	Nu D.I	A			0	C	a
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P	Wireless		+ 0	× 🖻 🍸	CAP WF	S Client	Setup	p Repeater	Scanner	Freq. Usage	Alignment
36	Bridge		Name	/ Type	r	Actual I	UTN	Tx		Rx	Tx
-	Switch		- managed by		-						
•	Mesh		channel: 24 X & wlan1	47/20-eC/gn(28d	Bm), SSID: MTF ess (IPQ4019)	2024, CA	2sMAI 1500		0 bps		0 bps
255	IP	$\left \right\rangle$	- managed by		035 (11 0440.15)		1000	¢	0.000		0.003
101	System	\mathbb{N}		20/20-Ceee/ac/[D: MTPC202					
•	Queues		RS 🙌 wlan2	2 Wirel	ess (IPQ4019)		1500		0 bps		0 bps
P	Files										
圓	Log										
-	RADIUS										
×	Tools	\wedge									
	New Terminal										
0	Dot1X										
1000	Partition									CAP in l	nyhr

"CAPsMAN forwarding" in current version

For the moment it is not possible in the current version

But the options are there, and are selectable for CAP interfaces in CAPsMAN. That makes us believe that MikroTik is working on it



CAPsMAN own wifi interfaces

CAPsMAN v2 we used adding the "own wifi interfaces" by creating a bridge and making the cap window option to look for the CAPsMAN in the bridge



Safe Mode	Session: 48:A9:8A:24:B2:B3	
Quick Set		
CAPsMAN	CAPSMAN	11
Interfaces	CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio	Registration T
Wireless	+ - 🖉 🛞 🗇 🍸 Reselect Channel Manager AAA	
Bridge	Name Type Actual CAP	12
Switch	MB W CARSMANV2-1 CAP Intellace	
Mesh	MB 🙌 CAPsMANv2-2 CAP Interface	
IP 🗅	Interfaces: wlan1	Ŧ \$
System 🗅	Wireless Tables Wan2	F +
Queues	WiFi Interfaces W60G Station Nstreme Dual Access List Certificate: none	
Files	+ → → ⊗ ⊗ ⊡ ŷ CAP WPS Client Set Discovery Interfaces: bridge	₹ \$
Log		L .
RADIUS		
Tools 1	channel: 2412/20-Ce/gn(28dBm), SSID: OWN, CAPsMAN fo CAPsMAN Addresses:	\$
New Terminal	X Indiana Wireless (IPQ4019) 15 	•
Dot1X	channel: 5785/20-eeCe/ac(27dBm), SSID: OWN, CAPsMAN CAPsMAN Certificate Common Names:	÷
Partition	X 💱 wlan2 Wireless (IPQ4019) 15	
Make Supout.rif	Bridge Dates Manual	Ŧ
New WinBox		
Exit	Bridge Ports Port Extensions VLANs MSTIs Port MST Requested Certificate:	
	+ □ ✓ ※ □ ▼ Settings Locked CAPsMAN Common Name:	
Windows N	Name / Type L2 MTU	rfaces

CAPsMAN own wifi interfaces

CAPsMAN v3 all options: security profiles, configurations, etc, are in the same menu and work for both local interfaces and CAP interfaces, so we just need to put "local" in the manager field and apply the desired config.



Ca Safe Mode	Session: 192.168.2.12	4				U	pt
🖌 Quick Set	WIE						
🗘 WiFi	I see a second	Channel Security AAA	Datapath	Interwork	ting Steerin	a Registration	
Interfaces	Conliguration			1.		21	E
😝 WireGuard	+ - ×	WPS Accept	CAP	Scan Fre	eq. Usage	Sniffer	
💥 Bridge	Name	/ Type	Ac	tual MTU	L2 MTU A	RP Mode	
🛓 PPP	- SSID not set	1 WiFi		1500	1560		
🙄 Switch	SMB 😡 wifi	I VVIEL	_	1000	1360	ap	
°∏° Mesh	Interface <wifi1></wifi1>						
별 IP 🗈 N	General Configura	ation Channel Security E	AP FT		C	К	
🗐 IPv6 🗈 🗈	Configuration:			-	Car	ncel	
MPLS N							
📬 Routing 💦 ト	SSID:				Ap	ply	
💭 System 🗈	Country:			▼	Dis	able	
👰 Queues	Chains:			•			
Files	Tx Chains:			•	Com	ment	
Log	Tx Power:			•	Co	ру	
Le RADIUS	Antenna Gain:				Ren	nove	
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Mew Terminal	Hide SSID:					rch	
🚸 Dot 1X	Manager:	And a state of the		<u>,</u>		ic Counters	_
Partition		capsman capsman or local			() Web	Accept	erfac
Make Supout.rif	DTIM Period:	local			WPS		LIIUC

C Safe Mode	Session: 192.168.2.12	4				Up	xt
🖌 Quick Set	WIE						T
🗘 WiFi	I see a second	Channel Security AAA	Datapath	Interwork	ing Steerin	Registration	
MM Interfaces	Conliguration			10			
😝 WireGuard	+ - *	WPS Accept	CAP S	Scan Fre	eq. Usage	Sniffer	
💥 Bridge	Name	/ Type	Ac	tual MTU	L2 MTU AF	RP Mode	
늘 PPP	SSID not set SMB 66 wifi	1 WiFi		1500	1560	1	
🙄 Switch	Constant Sector	I VVIEL		1000	1360	ap	
°[<mark>°</mark> Mesh	Interface <wifi1></wifi1>						
면 N 역 🕎	General Configura	ation Channel Security E	AP FT		0	к	
🗐 IPv6 🗈	Configuration:	-			Car		
MPLS N					7507		
📑 Routing ►	SSID:				Ap	ply	
💭 System 🗈	Country:				Disa	able	
👰 Queues	Chains:			•			
Files	Tx Chains:			•	Com	ment	
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Le RADIUS	Antenna Gain:			=.	Rem	ove	
🔀 Tools 💦 🕅	Hide SSID:			≓↓	To		
Mew Terminal							
🚸 Dot 1X	Manager:	And a state of the		Ī, A	Reset Traff		
Partition		capsman capsman or local		1	N	sciept int	erfac
Make Supout.rif	DTIM Period:	local			WPS		LIIUC



- You can have both versions Version 2 and Current version run in the same RouterBOARD, bare metal or CHR
 - The two setups will have **separate configurations** and you will have to do things twice if they are needed to be done in both of them
- Depending on the CAP's version, they will be added automatically to their compatible version CAPsMAN

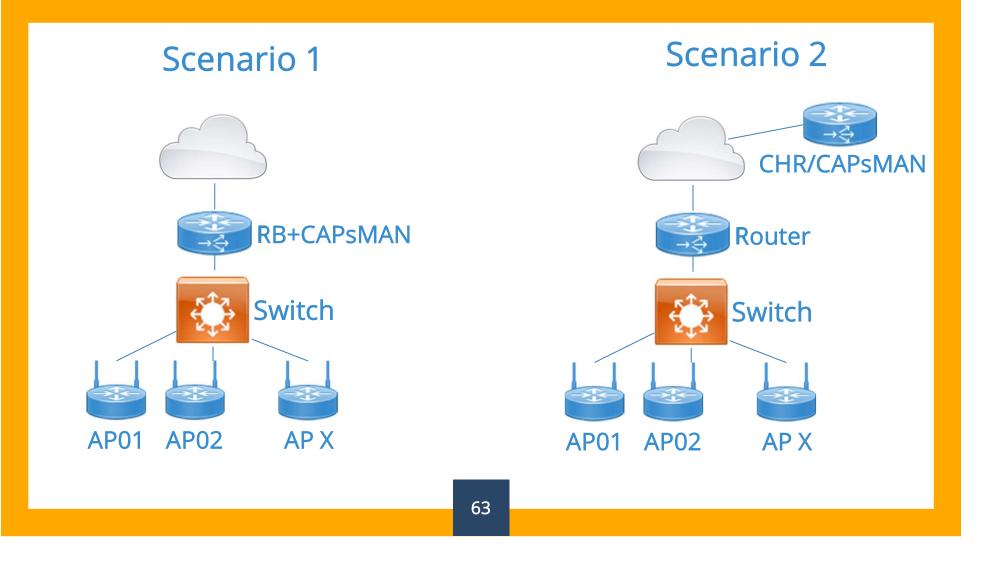
Safe Mode	Session: 48:8F:5A:29:FE:2E			
✓ Quick Set ✓ WiFi ✓ Wireless ✓ Interfaces ✓ WireGuard ✓ Bridge ✓ PPP ✓ Switch ✓ Mesh 🖾 IP ✓ IPv6	CAPsMAN Wireless AAA Datapath Interworking Stee	Generated Certificate: Generated CA Certificate: Package Path:		
MPLS N Routing N System N	Enabled Interfaces: bridge CA Certificate:	Upgrade Policy: none	₹	
🙅 Queues 📄 Files 📄 Log	Certificate:	Peer Certificate		
RADIUS	Package Path: Upgrade Policy: none			
New Terminal	Generated CA Certificate: WiFi-CAPsM Generated Certificate: WiFi-CAPsM		V2 + Curren	t Versio

A bit of security

CAPsMAN uses

- UDP port 5246 for manager traffic
- UDP port 5247 for data traffic





and a second sec	(Main-MikroTik-chr-6.48) - WinBox (64bit) v6.48.6 on CHR (x86_64)	L
ession Settings Dash	lboard	
Safe Mode	Session: 88.198.100.83	
V Quick Set CAPsMAN	Frewall Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols	
T Wireless	🛉 👝 🧭 🖄 🖾 🍸 ro Reset Counters 🕜 Reset All Counters 🛛 🕞 Find 🔤	Ŧ
💥 Bridge	H ACUON Chain STC. Address Dst. Address Proto Stc. Polt Dst. Polt InVin. In YOUL Int Stc. Ad D bytes Packets	
🚋 PPP		8
°L <mark>°</mark> Mesh		
	CAPsMAN	
O MPLS ►	CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Table	
📑 Routing	🔸 👝 🛷 🖄 📇 🍸 Reselect Channel Manager AAA	Fine
💭 System 🗈		
🙅 Queues	Name / Type Actual MTU Tx Rx Tx Packet (p/s) Rx Packet (p/s) MI (+) cap1 CAP Interface 0 bps 0 bps 0 0	FP T
Files		0
Log		
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🔀 Tools 💦 🕅		
🔤 New Terminal		
Dot 1X		
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Make Supout.rif		
New WinBox		

Feature request (communication section)

- Possibility to disable L2 CAPsMAN and/or L3 CAPsMAN.
- Possibility to change the default ports 5246/5247 in server side and CAP side



Conclusions

 CAPsMAN has gone through a lot of changes during the years

- We should focus on V2 and Current version
- Preferably use devices that support the same protocol
- If old CAPsMAN setups are in need of upgrade we can check their compatibility with the "wifi-qcom-ac"

drivers

Conclusions

After deploying we will have:
Much more control over the Wifi Network

- Easier expansion
- More stable client connections
- A nearly unlimited number of options on configurations of such networks

Happy Clients
 Paid bills ©





Thanks for your attention! Questions?

Let's connect on LinkedIn

