Hướng dẫn sử dụng Router MikroTik (Phần 2)

**

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Nội dung chi tiết:

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Safe Mode	Session: 192.168.1.1	
🔏 Quick Set		
CAPsMAN		
Interfaces		
Wireless		
📲 🙀 Bridge		
📑 PPP		
°t <mark>8</mark> Mesh		
∰ IP ►		
፵ IPv6 ▷		
🖉 MPLS 🗈 🗈		
😹 Routing 🗈	BTest Server	
System ►	Bandwidth Test	
Dueues	Email	
Files	Flood Ping	
Log	Graphing	
Radius	IP Scan	
🗙 🗙 Tools 🗈	MAC Server	
New Terminal	Netwatch	
	Packet Sniffer	
Partition	Ping	
Make Supout.rif	Ping Speed	
Manual	Profile	
New WinBox	RoMON	

×	Safe Mode	Session: 192.168.1.1							a
	Quick Set	Ping (Running)							۲.
		General Adva	nced				. [Start]
	🗊 Wireless	Ping To:	8.8.8.8					Stop	j
	🕌 🖁 Bridge	Interface:					- I	Close	
	📑 PPP		ARP Ping						
	°t <mark>8</mark> Mesh	Packet Count:					, l	New Window	
	255 IP N	Tacket Count.	1000						
	👳 IPv6 🛛 🗅	limeout:	1000				ms		
	🖉 MPLS 🗈 🗈								
	😹 Routing								
	i System ▷	Sea # / Host		Time	Reply Size	TTI	Status		-
	Queues	0 8.8.8.8	3	46ms	50	48			
	Files	1 8.8.8.8	3	46ms	50	48			
		2 8.8.8.8	3	46ms	50	48			
	E Log	3 8.8.8.8	3	46ms	50	48			-
>	< 🧟 Radius	4 8.8.8.8	5	46ms	50	48			-
	🛛 🗶 Tools	6 8 8 8 8	}	46ms	50	40			-
	New Terminel	7 8.8.8.8	3	46ms	50	48			
Ň		8.8.8.8	3	46ms	50	48			
	ECD								
č	🕗 Partition								
ģ	🛛 🗋 Make Supout.rif								
l	😧 Manual	9 items 9 of 9	packets rece	0% packet loss	Min: 46 m	s Av	g: 46 ms	s Max: 46 ms	-
à	🖉 💿 New WinBox	<u> </u>					_	,	

Ping bằng giao diện CLI.

```
- Nhấn tổ hợp phím Ctrl+C để ngắt tiến trình Ping.
```

```
[admin@MikroTik] > ping 8.8.8.8
SEQ HOST SIZE TTL TIME STATUS
0 8.8.8.8 56 45 37ms
1 8.8.8.8 56 45 37ms
2 8.8.8.8 56 45 37ms
sent=3 received=3 packet-loss=0% min-rtt=37ms avg-rtt=37ms max-rtt=37ms
[admin@MikroTik] >
```

Phần 13.2. Tính năng Cable Test trên Router MikroTik.

```
[admin@MikroTik] > interface ethernet cable-test ether2
name: ether2
status: link-ok
[admin@MikroTik] >
```

```
Phần 13.3. Thống kê lưu lượng trên các Interface của Router MikroTik.
```

[admin@MikroTik] > /interface eth	hernet	pri	nt s'	tats														
name:		eth	er1		ethe	er2	ether3	ether4	ether5	ether6	ether7	ether8	ether9	ether10	ether11	L	eth	er12
driver-rx-byte:	325 4	189	033 3	112	444 6	564	0	0	0	0	0	0	0	0	C) 7	637	721
driver-rx-packet:	4	153	769		200 (89	0	0	0	0	0	0	0	0	C)	31	633
driver-tx-byte:	113 8	334	442 3	281	015 2	281	0	0	0	0	0	0	0	0	0	29	154	666
driver-tx-packet:	1	198	958		285 2	232	0	0	0	0	0	0	0	0	C)	36	038
rx-bytes:	327 3	304	109 3	113	245 (20	0	0	0	0	0	0	0	0	C) 7	764	253
rx-packet:	4	453	769		200 (89	0	0	0	0	0	0	0	0	c)	31	633
rx-too-short:			0			0	0	0	0	0	0	0	0	0	C)		0
rx-64 :		79	452		46 5	586	0	0	0	0	0	0	0	0	c)	2	590
rx-65-127:		67	173		56 5	568	0	0	0	0	0	0	0	0	C)	20	512
rx-128-255:		50	878		88	889	0	0	0	0	0	0	0	0	C)	2	195
rx-256-511:		42	191		7 9	999	0	0	0	0	0	0	0	0	C)	1	832
rx-512-1023:		15	661		14 8	353	0	0	0	0	0	0	0	0	c)	1	917
rx-1024-1518:	1	198	414		65 1	194	0	0	0	0	0	0	0	0	C)	2	587
rx-1519-max:			0			0	0	0	0	0	0	0	0	0	C)		0
rx-too-long:			0			0	0	0	0	0	0	0	0	0	c)		0
rx-broadcast:		99	367		14	130	0	0	0	0	0	0	0	0	C)		162
rx-pause:			0			0	0	0	0	0	0	0	0	0	c)		0

rx-multicast.	55 598	6 274	0	0	0	0	0	0	0	0	0	8 347	
rx-fcs-error:	0	5 2,4	ő	ő	ő	ő	ő	ő	ő	ő	ő	0	
rx-align-error:	0	ő	ő	ő	õ	ő	ő	ő	Ő	ő	ő	ő	
rx-overflow:	0	ő	ő	ő	õ	ő	ő	ő	Ő	ő	ő	ő	
ry-length-error:	0	ő	0	0	ő	ő	0	ő	ő	ő	ñ	ő	
rx-code-error:	0	1	ő	ő	ő	ő	ő	ő	ő	ő	ő	ő	
rx-jabber:	0	-	ő	ő	ő	ő	ő	ő	ő	ő	ő	ő	
ry-in-beader-checksum-error:	0	ő	0	0	ő	ő	0	ő	ő	ő	ñ	ő	
rx-top-checksum-error:	0	0	0	ñ	ñ	0	0	ñ	ñ	0	0	0	
rx-udp-checksum-error:	0	0	ő	ő	ő	ő	ő	ő	ñ	ő	ñ	ő	
the unp checkball criter.	114 904 107	282 327 929	0	ñ	ñ	ő	0	ñ	Ô	ů	0.29	311 178	
tx-nacket:	198 958	285 232	ő	ő	ő	ő	ő	ő	ő	ő	0 2 9	36 038	
tx-64:	44 997	29 056	ő	ő	ő	ő	ő	ő	ő	ő	ñ	5 444	
tx-65-127:	55 456	36 248	0	0	0	ő	0	0	0	0	ő	6 857	
tx-128-255:	11 201	9 749	ő	ő	ő	ő	ő	ő	ő	ő	ñ	2 122	
tx-256-511:	9 047	10 074	ő	ő	ő	ő	ő	ő	ñ	ő	ñ	2 022	
tw=512=1023	10 457	16 496	0	ñ	ñ	ő	0	ñ	Ô	ů	ő	1 463	
tx-1024-1518:	67 800	183 609	ő	ő	ő	ő	ő	ő	ő	ő	ñ	18 130	
ty-1519-max:	0, 000	205 005	ő	ő	ő	ő	ő	ő	ő	ő	ñ	10 100	
tx-broadcast	505	734	ő	ő	ő	ő	ő	ő	ő	0	ő	204	
ty-nause:	0	,54	0	0	0	ő	0	0	0	0	ő	_04	
tx-multicast:	1 006	900	ő	ő	ő	ő	ő	ő	ő	ő	ñ	421	
tx-underrun:	1 000	0	ő	ő	ő	ő	ő	ő	ő	ő	ñ		
tx-excessive-collision:	0	ő	ő	ő	ő	ő	ő	ő	ő	0	ő	ő	
tx-multiple-collision:	0	ő	0	0	ő	ő	0	ő	0	ő	ő	ő	
tx-single-collision:	0	ő	ő	ő	ő	ő	ő	ő	ő	0	ő	ő	
tx-deferred:	0	ő	ő	ő	ő	õ	õ	õ	õ	õ	õ	ő	
tx-late-collision:	0	0	0	0	0	ő	0	0	0	0	ő	0	
tx-fcs-error:	0	0	ő	ő	ő	ő	ő	ő	ő	ő	ñ	ő	
ty-carrier-sense-error:	0	0	ő	ő	ő	ő	ő	ő	ő	ő	ñ	ő	
[admin@MikroTik] >	v	Ū	v	v	v	v	Ū	v	5	5	0	v	
[doministration] >													

Phần 13.4. Kiểm tra số lượng kết nối thời gian thực trên Router MikroTik.

Safe Mode	Session: 192.168.1.1	
🔏 Quick Set		
CAPsMAN		
🔚 Interfaces		
🚊 Wireless		
📲 👹 Bridge	ARP	
📑 PPP	Accounting	
°t¦8 Mesh	Addresses	
255 IP 1	Cloud	
v⊈ IPv6 ▷	DHCP Client	
⊘ MPLS ►	DHCP Relay	
🐹 Routing 🗈	DHCP Server	
System ▷	DNS	
Queues	Firewall	
Files	Hotspot	
Log	IPsec	
Radius	Kid Control	
	Neighbors	
New Terminal	Packing	
	Pool	
Malus Superst of	Routes	
Marcal	SMB	
Manual	SNMP	
New WinBox	Services	

Ю	C* Safe Mode	Session: 19	2.168.1.	1									0
	🔏 Quick Set												
	CAPsMAN												
	Interfaces												
	Wireless												
	😹 Bridge	Firewall] ×
	📑 PPP	Filter Rules	NAT	Mangle	Raw	Service Ports	Con	nections	Address Lis	ts Layer7	Protocols		
	°t <mark>8</mark> Mesh	- 7	Tracki	ing								Find	
	255 IP D	5	Src. Addre	ess	A D	st. Address		Proto	Connecti	Timeout	TCP State	Orig./Repl. R	a 🔻
	vé IPv6	Cs 4	9.213.11	4.55:19	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	+
		Cs 4	9.213.11	4.55:20	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	
	MPLS P	Cs 4	9.213.11	4.55:21	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	
	😹 Routing 🛛 🗅	Cs 4	9.213.11	4.55:22	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	
	All Contract N	Cs 4	9.213.11	4.55:23	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	
	sey System	Cs 4	9.213.11	4.55:24	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	
	Queues	Cs 4	9.213.11	4.55:25	1	/2.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
	Files	Cs 4	9.213.11	4.55:26	1	/2.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
		Cs 4	9.213.11	4.55:27	1	/2.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
	Eog	Cs 4	9.213.11	4.55:28	- 1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
~	🧟 Radius	Cs 4	9.213.11	4.55:29	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
õ	S Tasla	Cs 4	19.213.11	4.00:30	1	72.16.10.2:6204	4	6 (tcp)		23:57:44	established	0 bps/0 bps	-
8	× TOOIS		10 212 11	4.55.22	1	72.16.10.2.6204	4	6 (tcp)		23.57.44	established	0 bps/0 bps	
÷	New Terminal		9.213.11	4.00.02		/2.10.10.2.0204	-	o (top)		23.37.44	catabilaricu	o ops/o ops	÷
\$	ECD	250 items				Max Entries	: 104	8576		_			
00	🕗 Partition	1											
Ter] Make Supout.rif												
but	😧 Manual												
Ř	New WinBox												

```
Phần 13.5. Giám sát lưu lượng theo thời gian thực trên các Interface của Router MikroTik.
```



Phần 13.6. Kiểm tra tài nguyên Resource trên Router MikroTik.

5	C# Safe Mode	Session: 192.168.1.1				I
	🖉 Quick Set					
	CAPsMAN					
	Wireless					
	Bridge	Auto Upgrade				
	PPP	Certificates				
	°1° Mesh	Clock				
	255 IP	Console				
	xé IPv6	Disks				
		Drivers				
	Routing	Health				
	System	History				
		Identity				
	Files	LEDs				
		License				
	A Radius	Logging				
õ	Tools	Packages				
nB	New Terminal	Password				
Ň		Ports				
Š	Partition	Reboot				
0	Make Support of	Reset Configuration				
ute	Manual Manual	Resources				
8	New WinBox	Routerboard				
		SNTP Client				
5	Call Safe Mode	Session: 192.168.1.1				I
	A Quick Set					
	CAPsMAN					
	Interfaces		Resources			
	Wireless		Uptime:	05:37:46	OK	
	Bridge					
	💼 PPP		Free Memory:	1722.8 MiB	PCI	
	°t <mark>8</mark> Mesh		Total Memory:	1939.3 MiB	USB	
	255 IP N			Let.	CPU	
	🛒 IPv6 🗈		CPU:	tilegx	IRQ	
	Ø MPLS		CPU Count:	16		
	😹 Routing 🛛 🗅		CPU Frequency:	1200 MHz		
	∰ System ト		CPU Load:	0 %		
	Queues		E	204.0110		
	Files		Free HDD Space:	384.6 MIB		
	E Log		Total HDD Size:	512.0 MiB		
×	O Data		Architecture Name	tile		
8	Mis Radius		and the second sec			
A DESCRIPTION OF TAXABLE PARTY.	Tools		Roard Name	CCB1016-12G		
lin l	X Tools ▷ New Terminal		Board Name:	CCR1016-12G		
Win	Tools		Board Name: Version:	CCR1016-12G 6.42.5 (stable)		
OS Win	Knolus Tools New Terminal LCD Partition		Board Name: Version: Build Time:	CCR1016-12G 6.42.5 (stable) Jun/26/2018 12:12:08		
erOS Win.			Board Name: Version: Build Time: Factory Software:	CCR1016-12G 6.42.5 (stable) Jun/26/2018 12:12:08		
outerOS Win	Tools Tools Tools Tools According Acco		Board Name: Version: Build Time: Factory Software:	CCR1016-12G 6.42.5 (stable) Jun/26/2018 12:12:08		

Phần 13.7. Kiểm tra kết nối Session hiện tại và Maximum Session trên Router MikroTik.

Safe Mode	Session: 192.168.88.1
🔏 Quick Set	ARP
CAPsMAN	Accounting
Interfaces	Addresses
🗊 Wireless	Cloud
Sig Bridge	DHCP Client
🚅 PPP	DHCP Relay
🕎 Switch	DHCP Server
°t¦8 Mesh	DNS
IP N	Firewall
🖉 MPLS 🗈 🗈	Hotspot
😹 Routing 💦 🗈	IPsec
🌐 System 🗈	Kid Control
Queues	Neighbors
Files	Packing
E Log	Pool
🗙 🧟 RADIUS	Routes
🖁 🄀 Tools 🔹 🗅	SMB
🗧 📰 New Terminal	SNMP
MetaROUTER	Services
🖉 🦺 Partition	Settings
🔲 📃 Make Supout.rif	Socks
🔁 😢 Manual	TFTP
🗠 🔘 New WinBox	Traffic Flow
	UPnP

Thông tin phiên kết nối Session trên Router MikroTik.

- 10 items: số lượng phiên Session hiện tại trên thiết bị.
- Max Entries: 217922 > số lượng phiên Session tối đa mà thiết bị hỗ trợ.

5	Call Safe Mode	Session:	192.168.88	3.1								i 🗖 🧰
	🔏 Quick Set											
	CAPsMAN											
	Interfaces											
	🗊 Wireless											
	Bridge											
	E PPP	Firewall										
	🕎 Switch	Filter Rule	s NAT	Mangle F	Raw	Service Ports	Conne	ections	Address Li	sts Layer7	Protocols	
	°t <mark>8</mark> Mesh	- 7	Track	ing								Find
	IP N		Src. Addr	ess	D	st. Address	1	Proto	Connecti	Timeout	TCP State	Orig./Repl. Ra -
	MPLS N	SAC	192.168.8	88.253:5642	27 19	92.168.88.1:829	1	6 (tcp)		23:59:59	established	640 bps/7.8 kbps
	Caratina N	SACFs	192.168.8	88.253:565	19 49	9.213.114.117:4	43	6 (tcp)		23:59:29	established	0 bps/0 bps
	Routing	SACFs	192.168.8	88.253:564	18 64	4.233.188.188:4	43	6 (tcp)		23:59:50	established	0 bps/0 bps
	System	SACFs	192.168.8	38.253:5640	06 52	2.230.84.0:443		6 (tcp)		23:59:46	established	0 bps/0 bps
		SACFs	192.168.8	38.253:564	16 52	2.230.84.217:44	3	6 (tcp)		23:52:20	established	0 bps/0 bps
	I docto	SACES	192.168.8	38.253:5654	29 54	2.114.132./4:44	3	6 (tcp)		23:59:50	established	0 bps/0 bps
	Files	SACEs	192.168.8	38.253:564	12 52	2.230.84.217:44	3	6 (tcp)		23:53:49	established	0 bps/0 bps
	Log	SACE	192.168.8	38.253:565	14 45	9.213.114.116:4	13	6 (tcp)		23:59:41	established	0 bps/0 bps
		SACE	192.168.8	38.253:5640	0 1	57.240.15.16:44	5	6 (tcp)		23:59:58	established	328 bps/ 320 bps
X	M RADIUS	SACES	132.100.0	00.200.0040	00 1	37.240.13.10.44	2	o (ich)		23.33.31	established	U bps/ U bps
B	💥 Tools 🗈 🗅											
Vin	New Terminal											
>	MetaROUTER	4										•
00	🕗 Partition	10 items				Max Entries	2179	92				•
Ter	Aake Supout.rif			_				_		_		
n	🕜 Manual											
Ř	S New WinBox											

Phần 13.8. Backup và Restore cấu hình Router MikroTik.



Có 2 loại file backup:

- .backup
 - o Hỗ trợ password
 - o Không thể hiệu chỉnh
 - o Chỉ hỗ trợ restore trên cùng model
- .rsc
 - Không cần mật khẩu
 - o Có thể hiệu chỉnh file
 - Hỗ trợ restore trên các dòng model khác nhau
 - o Chỉ có thể export hoặc import bằng CLI
 - Nếu trước đó thiết bị có file cấu hình thì phương thức import cấu hình này sẽ không khả thi, thiết bị sẽ báo lỗi.

Safe Mode	Session: 4C:5E:0C:17:F0:38	E						
CAPsMAN	File List							×
Interfaces	- 7 6 6	Backup R	estore	Upload			Find	
Wireless	File Name	A	Туре		Size	Creation Time	•	•
Stell Dridge	auto-before-reset.back	kup	backup		19.8 KiB	Jan/01/19	70 07:00:17	•
ang bridge	console-dump.txt		.txt file		945.5 KiB	Mar/02/20	20 19:06:08	
📑 PPP	⊟ ctryip.txt		.txt file		2 B	Jan/08/20	20 05:07:52	
°t ^e Mesh	ail-over.backup		backup		38.6 KiB	Jan/15/20	20 13:42:21	
	hostpot.backup		backup		29.5 KiB	Oct/11/20	19 13:16:10	
P P	notspot		directory		1207 0	Apr/01/20	20 21:01:51	
🖉 MPLS 🛛 🗅	notspot/aiogin.ntm	1	.ntmi file		13U/ B	Apr/01/20	20 21:01:50	
	hotspot/errors.txt		tyt file		030 D 3615 B	Apr/01/20	20 21:01:50	
	hotspot/favicon.id		.txt me		3013 B	Api/01/20	20 21:01:30	
🔀 Routing 🗈	hotspot/ima	Backup						
🎲 System 🗈	hotspot/img/lo	Name	onfia milere	eit.			Deeluur	
	hotspot/login.html	Name.	onnganikit	un			васкир	
- dacaca	hotspot/logout.htm	Password:				-	Cancel	
Files	hotspot/lv		1 050					
📄 Log	42 items	Encryption: a	es-sha256	_		+		
🧟 RADIUS		L	Don't En	crypt				
🗙 🎇 Tools 🛛 🖻								
🖌 📰 New Terminal								
«¦> Dot1X								
ECD								
Partition								
👖 🗋 Make Supout.rif								
😧 Manual								
🗹 🍥 New WinBox								

î CAPsMAN	File List				×
Interfaces	🗕 🍸 🖹 🔒 Backup	Restore Upload.		Find	
🗊 Wireless	File Name	∆ Туре	Size	Creation Time	-
Bridge	auto-before-reset backup	backup	19.8 KiB	Jan/01/1970 07:00:17	+
s ooo	Config-mikrotik.backup	backup	13.3 KiB	Apr/03/2020 16:39:53	
PPP	Console-dump.txt	.txt file	340.0 NB	Mar/02/2020 19:06:08	
🕄 Mesh	E fail-over backup	backup	38.6 KiB	Jan/15/2020 03:07:32	
55 IP	hostpot backup	backup	29.5 KiB	Oct/11/2019 13:16:10	
	hotspot	directory		Apr/01/2020 21:01:51	
ØMPLS P	hotspot/alogin.html	.html file	1307 B	Apr/01/2020 21:01:50	
⁄⊴IPv6 ▷	hotspot/error.html	.html file	898 B	Apr/01/2020 21:01:50	
Routing	hotspot/errors.txt	.txt file	3615 B	Apr/01/2020 21:01:50	
	hotspot/favicon.ico	.ico file	903 B	Apr/01/2020 21:01:50	
😸 System 🛛 🗅	hotspot/img	directory		Apr/01/2020 21:01:50	
Queues	hotspot/img/logobottom.png	.png file	3925 B	Apr/01/2020 21:01:50	
	l hotspot/login.html	.html file	3576 B	Apr/01/2020 21:01:50	
Files	hotspot/logout.html	.html file	1813 B	Apr/01/2020 21:01:50	٠
Log	43 items (1 selected) 90.7 MiB	of 512.0 MiB used	82%	6 free	
& RADIUS					
 ∦ Tools					
New Terminal					
Dot1X					
LCD					
Partition					
🐊 Make Supout.rif					
Make Supout.rif					
🖅 Manual					
New WinBox					

Kéo file cấu hình về máy tính của người quản trị.



Backup lại cấu hình Router MikroTik.

K	Safe Mode	Session: 4C:5E:0C:17:F0:3E		
F	🔏 Quick Set			
	CAPsMAN			
	Time Interfaces	Find		
	🤶 Wireless	File Name / Type Size Creation Time 🔻		
	📲 Bridge	auto-before-reset.backup backup 19.8 KiB Jan/01/1970 07:00:17		
	📑 PPP	Console-dump.txt .txt file 945.5 KiB Mar/02/2020 19:06:08		
	°t¦8 Mesh	Ertyip.txt txt file 2 B Jan/08/2020 05:07:52 [□ fail-over backup 38.6 KiB Jan/15/2020 13:42:21		
	ESS IP N	hostpot.backup backup 29.5 KiB Oct/11/2019 13:16:10		
	🖉 MPLS 🛛 🗅	hotspot directory Apr/01/2020 21:01:51 hotspot/alogin.html html file 1307 B Apr/01/2020 21:01:50		
	👳 IPv6 🛛 🗅	☐ hotspot/error.html		
	🍂 Routing 🛛 🗅	hotspot/errors.txt Restore		
	🎲 System 🗈	hotspot/ing Backup File: config-mikrotik backup		
	🙊 Queues			
	📄 Files	Cancel		
	📄 Log	43 items (1 selected)		
	🧟 RADIUS			
>	🗙 🄀 Tools 🛛 🖻			
B	📰 New Terminal			
/in	∢i> Dot1X			
	📮 LCD			
C	🏓 Partition			
	🔋 🗋 Make Supout.rif			
	🤁 Manual			
à	🔘 New WinBox			
_				
K)	Safe Mode	Session: 4C:5E:0C:17:F0:3E		
	C Safe Mode	Session: 4C:5E:0C:17:F0:3E		
E C	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E		
ю	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E		
	C Safe Mode C Quick Set CAPsMAN Interfaces Wireless	Session: 4C:5E:0C:17:F0:3E		
Ð	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E		
8	Carl Safe Mode CAPSMAN Interfaces Wireless Bridge PPP	Session: 4C:5E:0C:17:F0:3E		
5	CAPSMAN Capedo C	Session: 4C:5E:0C:17:F0:3E Fie List Fie Name / Type Size Creation Time Fie Name / Type Size Creation Time / Size / Siz		
5	CAPSMAN CAPSMA	Session: 4C:5E:0C:17:F0:3E ■ ▼ ■ ■ Find ■ ▼ ■ Backup Restore Upload Find File Name ✓ Type Size Creation Time ▼ ■ auto-before-reset.backup backup 19.8 KiB Jan/01/1970 07:00:17 ● ■ console-dump.txt backup 13.3 KiB Apr/03/2020 16:39:53 ● ■ console-dump.txt .txt file 945.5 KiB Mar/02/2020 19:06:08 ● □ console-dump.txt .txt file 2 B Jan/15/2020 13:42:21 ● □ hostpot.backup 0.86 KiB Jan/15/2020 13:42:21 ● ● □ hostpot.backup backup 28.6 KiB Oct/11/2019 13:16:10 ●		
5	C Safe Mode Image: CAPsMAN <	Session: 4C:5E:0C:17:F0:3E Image: Consoler dump.txt Find Image: Consoler dump.txt Type Size Creation Time Image: Consoler dump.txt Image: Consoler dump.txt Type Size Creation Time Image: Consoler dump.txt backup 13.3 KiB Apr/03/2020 16:39:53 Apr/03/2020 19:06:08 Image: Consoler dump.txt txt file 2 B Jan/08/2020 01:07:52 Jan/08/2020 01:07:52 Image: Fail-over backup backup 38 KiB Dar/08/2020 01:34:21 Dar/08/2020 01:34:21 Image: Ima		
5	C Safe Mode Image: CAPsMAN <	Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: File Name / Type Size Creation Time / Find Image: Session: Mar/02/2020 Size Creation Time / Image: Session / Image: Session <th image:="" se<="" th=""><th></th></th>	<th></th>	
	C* Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:F0:3E Image: Session: 4C:5E:0C:17:50:17:50		
	C* Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E Fie List Fie List Fie Aame / Type Size Creation Time / Type Size / Type // 13.3 KiB // 07/07:00:17 //		
2 A	C* Safe Mode Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN </th <th>Session: 4C:5E:0C:17:F0:3E Fie List Fie List Fie Aame / Type Size Creation Time / Type // Config-mikrotik.backup // Dackup // 13.3 KiB // Apr/03/2020 // 13.3 // B // 03/2020 // 13.3 // B // 03/2020 // 13.3 // B // 03/2020 // 13.4 // 14.1 // 14</th> <th></th>	Session: 4C:5E:0C:17:F0:3E Fie List Fie List Fie Aame / Type Size Creation Time / Type // Config-mikrotik.backup // Dackup // 13.3 KiB // Apr/03/2020 // 13.3 // B // 03/2020 // 13.3 // B // 03/2020 // 13.3 // B // 03/2020 // 13.4 // 14.1 // 14		
	C* Safe Mode Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN </th <th>Session: 4C:5E:0C:17:F0:3E Fie List Fie List Fie List Fie Aame Type Backup Restore Upload Find Fie Name Type Size Creation Time Auto-before-reset backup backup 13.3 KiB Apr/01/1970 07:00:17 config-mikrotik backup backup 13.3 KiB Apr/03/2020 16:39:53 console-dump.txt txt file 945.5 KiB Apr/03/2020 05:07:52 and/backup backup 29.5 KiB Cr/11/2019 13:16:10 hotspot/a Restore 1307 B Apr/01/2020 21:01:50 By Backup Do you want to restore configuration and reboot? Notspot/a Notspot/</th> <th></th>	Session: 4C:5E:0C:17:F0:3E Fie List Fie List Fie List Fie Aame Type Backup Restore Upload Find Fie Name Type Size Creation Time Auto-before-reset backup backup 13.3 KiB Apr/01/1970 07:00:17 config-mikrotik backup backup 13.3 KiB Apr/03/2020 16:39:53 console-dump.txt txt file 945.5 KiB Apr/03/2020 05:07:52 and/backup backup 29.5 KiB Cr/11/2019 13:16:10 hotspot/a Restore 1307 B Apr/01/2020 21:01:50 By Backup Do you want to restore configuration and reboot? Notspot/a Notspot/		
2	C* Safe Mode Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN </th <th>Session: 4C:5E:0C:17:F0:3E</th> <th></th>	Session: 4C:5E:0C:17:F0:3E		
3	C* Safe Mode Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN </th <th>Session: 4C:5E:0C:17:F0:3E</th> <th></th>	Session: 4C:5E:0C:17:F0:3E		
K S	C* Safe Mode Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN </th <th>Session: 4C:5E:0C:17:F0:3E</th> <th></th>	Session: 4C:5E:0C:17:F0:3E		
Box	Image: Control of the section of t	Session: 4C:5E:0C:17:F0:3E		
inBox	Image: Control of the section of t	Session: 4C:5E:0C:17:F0:3E		
WinBox	C* Safe Mode Image: CAPSMAN Image: CAPSMAN Image: CAPSMAN Image: CAPSMAN </th <th>Session: 4C:5E:0C:17:F0:3E</th> <th></th>	Session: 4C:5E:0C:17:F0:3E		
DS WinBox	Image: Control of the section of t	Session: 4C:5E:0C:17:F0:3E		
erOS WinBox	Image: Control of the section of t	Session: 4C:5E:0C:17:F0:3E		
uterOS WinBox	Image: Control of the section of t	Session: 4C:5E:0C:17:F0:3E		

Phần 13.9. Giám sát thông tin các thiết bị đầu cuối thông qua tính năng IP Neighbor (CDP) trên thiết bị Router MikroTik.



Đảm bảo giao thức CDP đang được kích hoạt trên Router MikroTik.

[admin@MikroTik] >
/ip neighbor discovery-settings set discover-interface-list=!dynamic

[admin@MikroTik] > /ip neighbor discovery-settings print discover-interface-list: !dynamic [admin@MikroTik] >

[admin@Mikro	<pre>Fik] > /ip neighbor print</pre>		
# INTERFACE	ADDRESS	MAC-ADDRESS	IDENTITY
0 ether1	172.16.1.132	00:0B:82:63:B2:9D	gxp1400
1 ether1	172.16.1.241	00:1F:27:88:4E:2B	SWkythuat
<mark>2 ether2</mark>	192.168.1.254	00:1C:B0:72:B1:03	CiscoSw
[admin@Mikro	Tik] >		

```
[admin@MikroTik] > /ip neighbor print detail
0 interface=ether1 address=172.16.1.132 address4=172.16.1.132
  mac-address=00:0B:82:63:B2:9D identity="gxp1400 000b8263b29d" platform=""
  version="" unpack=none age=23s interface-name="eth0"
  system-description="GXP1400 1.0.5.32" system-caps=bridge,telephone
  system-caps-enabled=bridge,telephone
1 interface=ether1 address=172.16.1.241 address4=172.16.1.241
  mac-address=00:1F:27:88:4E:2B identity="SWkythuat"
  platform="cisco WS-C2960-48TT-L"
  version="Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version
       15.0(2)SE4, RELEASE SOFTWARE (fc1)\nTechnical Support:
       http://www.cisco.com/techsupport\nCopyright (c) 1986-2013 by Cisco
       Systems, Inc.\nCompiled Wed 26-Jun-13 02:49 by prod rel team"
  unpack=none age=6s interface-name="FastEthernet0/43" system-caps=""
  system-caps-enabled=""
2 interface=ether2 address=192.168.1.254 address4=192.168.1.254
  mac-address=00:1C:B0:72:B1:03 identity="CiscoSwitch"
  platform="cisco WS-C3750-48P"
  version="Cisco IOS Software, C3750 Software (C3750-ADVIPSERVICESK9-M), Version
       12.2(25)SEE4, RELEASE SOFTWARE (fc1)\nCopyright (c) 1986-2007 by Cisco
       Systems, Inc.\nCompiled Mon 16-Jul-07 03:24 by myl"
  unpack=none age=10s interface-name="FastEthernet1/0/1" system-caps=""
  system-caps-enabled=""
[admin@MikroTik] >
```

Ŋ	Q	Safe Mode	e	Session: 4C:5	E:0C:17:F0:3E								= 🔒
	20 20 100 100 100 100 100 100 100 100 10	Quick Set CAPsMAN Interfaces Mireless											
	P P	PPP		Neighbor List									
	°të N	Mesh		Discov	ery Settings							F	ind
	255	P	Þ	Interface	△ IP Address		MAC Address	Identity	Platfor	m Ve	ersion	Board Na	IPv6 ▼
	Ø 1	MPLS	\triangleright	ther1	172.16.1.2	41 22	00:1F:27:88:4E:2B	SWkyt	huat cisco \	NS Ci	sco 10		no
	<u>v6</u>	Pv6	Þ	ther2	172.10.1.1	52	Discovery Settings	gxp140		x Ci	sco 10		no
	200 F	Routing	\triangleright				Interface:	-					
	@ S	System	Þ				intenace. 🗈 dynamic		UK	-			
	👰 (Queues							Cancel				
	📄 F	iles							Apply				
	L	.og				l							
	<u></u> F	RADIUS											
×	Жт	Fools	Þ										
B		New Terminal		•									+
Vin	«¦» [Dot1X		3 items									
	e L	_CD											
Ŏ	🕭 P	Partition											
Ę	🛄 N	Make Supout.r	if										
ou	😧 N	Manual											
R	N	New WinBox											

Ь	0	Safe Mode	Ses	sion: 4C:5E:0C:	:17:F0:3E						a
	1	Quick Set									
	Î	CAPsMAN									
]	Interfaces									
	Î	Wireless									
	50 275	Bridge									
	¢	PPP	Neig	hbor List							
	°t8	Mesh	7	Discovery S	ettings					F	ind
	255	IP	► Inter	rface /	IP Address	MAC Address	Identity	Platform	Version	Board Na	IPv6 ▼
	0	MPLS		ether1 ether1	172.16.1.132	00:0B:82:63:B2:9D 00:1F:27:88:4F:2B	gxp1400 SW/kythuat	cisco WS	Cisco IO		no
	<u>v6</u>	IPv6		ether2	192.168.1.254	00:1C:B0:72:B1:03	Switch	cisco WS	Cisco IO		no
	23	Routing									
	63	System	\triangleright								
	۶	Queues									
		Files									
		Log									
	æ	RADIUS									
×	×	Tools									
B	>-	New Terminal	•								•
Vin	«¦ ≯	Dot1X	3 iter	ms (1 selected)							
>	-	LCD									
ö	٩	Partition	_								
Ę		Make Supout.ri	F								
ou	Q	Manual									
Ř	0	New WinBox									

Safe Mode	Session: 4C:5E:0C:17:F0:	BE			a
Quick Set CAPsMAN Imm Interfaces			0.00.70.01.00		
Image: Stress Stres	Neighbor List Discovery Settings Interface / IP Ac Å ether1 172. Å ether1 172. Å ether2 192.	Interface: IP Address: IPv6 Address: MAC Address: Identity: Platform: Version: Board Name: Interface Name:	ether2 192.168.1.254 00:1C:80:72:81:03 Switch cisco IVS-C3750-48P Cisco IOS Software, C375 FastEthernet1/0/1	OK Ping MAC Ping Telnet MAC Telnet Torch	Find Board Na IPv6 V no D no D no
	items (1 selected)	Software ID: Unpacking: Age: Uptime:	none	_	•
Manual New WinBox					

Kiểm tra thông tin CDP trên Cisco Switch.

```
      Switch# show cdp neighbors

      Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge

      S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone

      Device ID
      Local Intrfce
      Holdtme
      Capability
      Platform
      Port ID

      MikroTik
      Fas 1/0/1
      64
      R
      MikroTik ether2

      Switch#
      Switch#
      Switch#
      Switch#
      Switch#
```

```
Switch# show cdp entry MikroTik
------
Device ID: MikroTik
Entry address(es):
    IP address: 192.168.1.1
Platform: MikroTik, Capabilities: Router
Interface: FastEthernet1/0/1, Port ID (outgoing port): ether2
Holdtime : 82 sec
Version :
 6.46.4 (stable)
advertisement version: 1
Management address(es):
Switch#
```

Xác định hostname trên Router MikroTik.

```
[admin@MikroTik] > /system identity print
name: MikroTik
```

[admin@MikroTik] > /system identity set name=MikroTik



Tắt giao thức CDP trên Router MikroTik.

ら 🖓 Safe	Mode	Session: 4C:5	E:0C:17:F0:3E					🔳 🛅
CAPSMAI CAPSMAI Im Interfaces C Wireless S Bridge PPP	: 1	Neighbor List	eny Settings					Eint
255 IP	1	Interface	/ IP Address	MAC Address	Identity	Platform	Version	Board Na IPv6 🔻
MPLS	Þ							
ve IPv6	Þ			Discovery Settings				
🐹 Routing	Þ			Discovery Settings	-			
System	Þ			Interface: 🛄 none	┛╴└	ОК		
Queues					L	Cancel		
Files						Apply		
E Log								
ARADIUS								
🗙 🄀 Tools	Þ							
📓 📰 New Tem	ninal	•						•
S AP Dot1X		0 items						
CD 🗐 LCD								
Partition								
👩 🗋 Make Su	out.rif							
🗧 💜 Manual								
🗠 🔘 New Win	Box							

Phần 13.10. Khởi tạo tài khoản User cho phép đăng nhập vào thiết bị Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Thiết lập mật khẩu cho tài khoản mặc định admin.
- **Bước 3.** Thiết lập tài khoản subadmin chỉ cho phép Monitor và không được quyền cấu hình thiết bị Router MikroTik.
- Bước 4. Khảo sát quá trình Login của tài khoản subadmin.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

```
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Thiết lập mật khẩu cho tài khoản mặc định admin.

- <blank> đổi thành mobile24h.

Safe Mode	Session: 4C:5E:0C:17:F0:3E]
Quick Set		
CAPsMAN		
🛲 Interfaces		
🔔 Wireless		
📲 🖁 Bridge	Auto Upgrade	
📑 PPP	Certificates	
°t\$ Mesh	Clock	
255 IP N	Console	
🖉 MPLS 🗈 🗅	Disks	
ve IPv6 ♪	Health	
😹 Routing 🛛 🗅	History	
💮 System 🗅	Identity	
Queues	LEDs	
Files	License	
E Log	Logging	
A RADIUS	Note	
🗙 🄀 Tools 📃 🗈	Packages	
🔏 🕅 New Terminal	Password	
S de Dot1X	Ports	
	Reboot	
🔆 🤩 Partition	Reset Configuration	
👩 🗋 Make Supout.rif	Resources	
🔁 🔮 Manual	Routerboard	
🞽 🔘 New WinBox	SNTP Client	
	Scheduler	

5	C ⁴ Safe Mod	e	Session: 4C:5E:0C:17:F0:3E
	🄏 Quick Set		
	CAPsMAN		
	Interfaces		
	Wireless		
	🕌 🖁 Bridge		
	📑 PPP		
	°t¦8 Mesh		
	255 IP	1	
	MPLS	1	
	ve IPv6	1	Change
	😹 Routing	1	
	System	1	Old Password: Change
	👳 Queues		New Password: Cancel
	Files		Confirm Password:
	Log		
	A RADIUS	h	
X	X Tools	P	
ВЧ	New Terminal		
Wil	Dot1X		
S			
5	Malus Consult		
l te	Manual	П.	
100	New Manual		
Ľ	Wew WinBox		

Lúc này không thể đăng nhập vào Router MikroTik bằng tài khoản admin với password là rỗng nữa.

	WinBox v3.1	18 (Addresses)					_		×
File	Tools								
	Connect To:	4C:5E:0C:17:F0:3E					✓ Kee	p Passwo	rd
	Login:	admin					Ope	n In New	Window
	Password:								
		Add/Set		Conne	ct To RoMON	Connect			
ERR	OR: wrong us	ername or password							
Mar	naged Neigh	nbors							
	T Set	t Master Password					Fit	nd	all ∓
Add	fress		User						•
0 iter	ms								

Đăng nhập vào Router	MikroTik bằng tài khoản admin/mobile24h.
----------------------	--

WinBox v3.18 (Addresses)			_		×
File Tools					
Connect To: 4C:5E:0C:17:F0:3E Login: admin Password: *******	1		V Kee	p Passwoi n In New	d Window
Add/Set		Connect To RoMON Connect]		
Managed Neighbors					
Set Master Password			Fit	nd	all ∓
	030				
0 items					

Bước 3. Thiết lập tài khoản subadmin chỉ cho phép Monitor và không được quyền cấu hình thiết bị Router MikroTik.

N)	Q.	Safe Mod	е	Session: 4C:5E:0C:17:F0:3E	
	🄏 Qu	iick Set			
	î CA	PsMAN			
) and Int	erfaces			
	î W	reless			
	📲 Bri	dge			
	🚅 PP	P			
	°t <mark>8</mark> Me	esh			
	255 IP		\land		
	🖉 MF	PLS	\triangleright		
	v∰ IP∖	v6	\triangleright		
	🙈 Ro	outing	\land		
	🌐 Sy	stem	₽	Auto Upgrade	
	👰 Qu	ieues		Certificates	
	📄 Fik	es		Clock	
	E Lo	g		Console	
	🧟 RA	DIUS		Disks	
	🗶 То	ols	1	Health	
X	🔳 Ne	w Terminal		History	
1 B B	«¦> Do	ot1X		Identity	
-IN		D		LEDs	
S	🥭 Pa	rtition		License	
5	🛄 Ma	ake Supout.r	if	Logging	
te l	😧 Ma	anual		Note	
б	🔘 Ne	w WinBox		Packages	
				Password	
				Ports	
				Reboot	
				Reset Configuration	
				Resources	
				Routerboard	
				SNTP Client	
				Scheduler	
				Shutdawa	
				Snutdown	
				Special Login	
				Watehdea	
				watchdog	

ĸ	Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	Quick Set		
	CAPsMAN		
	Interfaces		
	Wireless		
	Bridge	lleer Liet	
	📑 PPP	User List	
	°t¦8 Mesh		
	255 IP N		Find
	🧷 MPLS 🗈 🗅	Name / Group Allowed Address Last Logged In	▼
	👳 IPv6 🗈	▲ admin full	
	😹 Routing 🛛 🗅		
	🎲 System 🗈		
	Queues		
	Files		
	📄 Log		
	🧟 RADIUS		
\times	🄀 Tools 🗈 🗈		
B	🔚 New Terminal		
li.	≼ ≱ Dot1X		
	📃 LCD	1 item	
Ö	🕭 Partition		
l a] Make Supout.rif		
B	😧 Manual		
Ř	New WinBox		
5	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	Carl Safe Mode	Session: 4C:5E:0C:17:F0:3E	■ 🔒
	Cafe Mode	Session: 4C:5E:0C:17:F0:3E	■
(K)	C Safe Mode Cuick Set CAPsMAN	Session: 4C:5E:0C:17:F0:3E	■
5	Cell Safe Mode Called Safe Mode CAPsMAN Im Interfaces Called Wireless	Session: 4C:5E:0C:17:F0:3E	
۲ ۲	C Safe Mode Cuick Set CAPSMAN Im Interfaces CWireless Sign Bridge	Session: 4C:5E:0C:17:F0:3E	
8	C Safe Mode C Quick Set C CAPSMAN Im Interfaces Wireless S Bridge M PPP	Session: 4C:5E:0C:17:F0:3E	
5	C Safe Mode C Quick Set C CAPsMAN Im Interfaces C Wireless S Bridge PPP C Mesh	Session: 4C:5E:0C:17:F0:3E	
2	C Safe Mode C Quick Set C CAPsMAN Im Interfaces C Wireless S Bridge C PPP C Mesh S IP N	Session: 4C:5E:0C:17:F0:3E	Find
2	Image: Carlow Safe Mode Image: CAPsMAN Image: CAPsMAN <t< th=""><th>Session: 4C:5E:0C:17:F0:3E</th><th>Find</th></t<>	Session: 4C:5E:0C:17:F0:3E	Find
5	Image: Carlow Safe Mode Image: CAPsMAN Image: CAPsMAN <t< th=""><th>Session: 4C:5E:0C:17:F0:3E</th><th>Find</th></t<>	Session: 4C:5E:0C:17:F0:3E	Find
5	C Safe Mode A Quick Set Image: CAPsMAN Image: CAPsMAN Image: CAPsMAN <tr< th=""><th>Session: 4C:5E:0C:17:F0:3E</th><th>Find</th></tr<>	Session: 4C:5E:0C:17:F0:3E	Find
5	Image: CAPsMAN Image:	Session: 4C:5E:0C:17:F0:3E	
	Cell Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E	Find
0	Image: CAPsMAN Image:	Session: 4C:5E:0C:17:F0:3E	Find
8	Call Safe Mode Image: CAPsMAN Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E User List Users Groups SSH Keys SSH Coups SSH Keys Name Group Name Group Name Group System default user OK Group: read Allowed Address: Allowed Address: Password: Comment Copy	Find
8	Call Safe Mode Auick Set Image: CAPSMAN Image: CAPSMAN Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E Users Groups SSH Keys SSH Private Keys Active Users Image: State St	Find
DX DX	Call Safe Mode Auick Set Interfaces CAPSMAN Image: Safe Mode Image: Safe Mode Safe Mode Image: Safe Mode Safe Mode Image: Safe Mode N Image: System N Image: Files N Image: Safe Mode <	Session: 4C:5E:0C:17:F0:3E Users Groups Users Groups SSH Keys SSH Private Keys Admin Concel Name Group It admin OK Allowed Address: Apply Last Logged In: Disable Password: Comment Confirm Password: Copy Remove enabled	Find
1Box	Image: Safe Mode Image: CAPSMAN Image	Session: 4C:5E:0C:17:F0:3E	Find
MinBox 3	Image: Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E User List Users Users Groups SSH Keys SSH Private Keys Active Users Image: State Sta	Find
S WinBox	Image: Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	Find
rOS WinBox	Image: Carlos Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	Find
IterOS WinBox	Image: Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E	Find
souterOS WinBox	Image: Safe Mode Image: CAPsMAN Ima	Session: 4C:5E:0C:17:F0:3E	Find



Ø	Safe Mode	Session: 4C:5E:0C:17:F0:3E	= 🔒
		User List Users Groups SSH Keys Group sead	Find
×	💥 RADIUS	Skin: default 🛛 🔻	
inBo	New Terminal	System	
		3 items (1 selected)	
OS	🕗 Partition		
E L	🗋 Make Supout.rif		
out	😧 Manual		
Ř	🔘 New WinBox		

Bước 4. Khảo sát quá trình Login của tài khoản subadmin.

	🥥 WinBox v3.⁻ File Tools	18 <mark>(Addresses)</mark>						_		×
	Connect To: Login: Password:	o: 4C:5E:0C:17:F0:3E n: subadmin d: Add/Set Connect To BoMON							Passwor	d ∕∕indow
	Managed Neigh	Add/Set			Connect	To RoMON	Connect	Fino	d	al Ŧ
	Address			User						•
() items									

Cả admin và subadmin đều có thể quan sát danh sách các tài khoản user đang Login vào thiết bị Router MikroTik.

R)	0	Safe Mode	;	Session	: 4C:5E:0	C:17:F0:3E						= 🔒
	溢	Quick Set										
	Î	CAPsMAN										
]	Interfaces										
	Î	Wireless										
	22	Bridge	_[User Lis	t							
	¢	PPP		Users	Groups	SSH Kevs	SSH Private Kevs	Active Users				
	°T8	Mesh					,-	I.			Г	Find
	255	IP	\triangleright	U				F		10	6	Fina
	0	MPLS	\triangleright	Nam	ie . Idmin	∆ At Ja	n/02/1970 00:03:23	From 14:18:77:CA:5	7:3A	Via winbox	full	
	v6	IPv6	Þ	Å s	ubadmin	Ja	an/02/1970 00:08:14	14:18:77:CA:5	7:3A	winbox	read	
	23	Routing	Þ									
	633	System	Þ									
		Queues										
		Files										
		Log										
	æ	RADIUS										
×	×	Tools	Þ									
B		New Terminal										
/in	« þ	Dot1X										
		LCD	L	2 items								
Ö	٩	Partition										
e l		Make Supout.rit	f									
B	•	Manual										
Ř	0	New WinBox										

Khi subadmin đăng nhập vào giao diện Terminal thông qua Winbox.

Ю	0	Safe Mode	e Session: 4C:5E:0C:17:F0:3E	
		Quick Set		
	Î	CAPsMAN		
]	Interfaces		
	ŝ	Wireless		
	50 275	Bridge	User List	×
	¢	PPP	Users Groups SSH Keys SSH Private Keys Active Users	
	°t°	Mesh	Find	
	255	IP	Name (At Erom Via Group	ŧ
	27	MPLS	At India Jan/02/1970 00:03:23 14:18:77:CA:57:3A winbox full	-
	v6	IPv6	▷ Subadmin Jan/02/1970 00:08:14 14:18:77:CA:57:3A winbox read	
	×	Routing	▶ ♦ Subadmin Jan/02/1970 00:09:55 0.0.0.0 local read	
	63	System		
	Ş	Queues		
		Files		
		Log		
	A	RADIUS		
	×	Tools	1	
×	2.	New Terminal		
R	«¦>	Dot1X		
/in	-	LCD	3 items	
\leq	٩	Partition		
ļ		Make Supout.ri	f	
<u>j</u>	0	Manual		
out	0	New WinBox		

Subadmin có thể quan sát danh sách các IP hiện có trên thiết bị nhưng vẫn có thể giám sát được băng thông real-time trên các cổng vật lý.

5	Call Safe Mode	Session: 4C	:5E:0C:17:F0:3E				
╞	🖗 Quick Set						
	© \\/relee						
	Bridge						
			Address	List			
	earrr ™ Mesh					Find	
		ADD			buock Interface		
		ARP	D et 1	72.16.1.169/ 172	2.16.1.0 ether1		
		Accounting		92.168.1.1/24 192	2.168.1.0 ether2		
	Section 1	Addresses					
	Sustem	Cloud					
		DHCP Clien	t				
		DHCP Rela	У				
		DHCP Serv	er				
		DNS Fireces					
		Hotzat					
ŏ	New Terminal	IPage					
nB		IFSEC Kid Cantal	23.000 (1 and a stard)			
Wi		Naishhan	2 items (selected)			
S	Partition	Decking					
5	Make Supout rif	Packing					
Ë	Manual Manual	Pool					
8		CMD					
		SIMD					
5		Causian 40	55-00-17-50-25				
F-2	Sale Mode	Session: 40	3E.0C:17.F0.3E				
	Quick Set						
	CAPsMAN		Interface <ether1></ether1>				
	Interfaces		Overall Stats Rx Stat	s Tx Stats Statu	s Traffic	OK	
	1 Wireless		Tx/Rx Rate	e: 0 bps	/ 7.7 kbps		
	Bridge	Interface List	Tx/Ry Packet Rat	e: O n/e	/ 16 n/e	Torch	
		Interface		. op/s		Cable Test	Е
	Mesh		FP Tx/Rx Rate	e: 0 bps	/ 7.7 kbps	Blink	Find
	(월 NPLO)	Name	FP Tx/Rx Packet Rate	e: 0 p/s	/ 16 p/s	Reset MAC Address	_
	MPLS N	R 4 >eth				Basel C	7.7 k
		rt ≪i≯eth ≮i≯eth	Tx/Rx Byte	s: 6.6 KiB	/ 842.5 KiB	Reset Counters	<u>8.6 к</u> 0
	Routing	♦ eth	Tx/Rx Packet	s: 53	/ 12 450		0
	System	<i>eth <i>eth</i></i>	Tx/Rx Drop	s: 0	/ 0		0
	Queues	≮ ≯eth	Tx/Rx Error	s: 0	/0		0
	Files	♦i>eth ♦i>eth					0
		≮ ≯eth					0
	Task	♦i≯eth ♦i≯eth	Ty: 0 bos				0
		1. 20	Rx: 7.7 kbps		undhaattanku		Ť
ŏ		•					
nB		12 items (1 s					
Wi							
S	Malus Consult 1		Tx Packet: 0 p/s				
5	Marcal		Rx Packet: 16 p/	S			
122							
utel	Manual		enabled	running	slave	link ok	

Subadmin có thể quan sát cổng giao tiếp được kích hoạt chức năng DHCP và danh sách địa chỉ IP đã cấp phát.



Phần 13.11. Thiết lập giao thức đồng bộ hóa thời gian NTP trên thiết bị Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Tải và cài đặt gói ntp-6.46.4-tile.npk trên Router MikroTik.
- Bước 3. Thiết lập chức năng NTP Client trên Router MikroTik.
- Bước 4. Thiết lập chức năng NTP Server trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Tải và cài đặt gói ntp-6.46.4-tile.npk trên Router MikroTik.

Xác định kiến trúc phần cứng trên thiết bị Router MikroTik trước khi lựa chọn gói Extra Packages phù hợp để tải về.

2	C Safe Mod	е	Session: 4C:5E:0C:17:F0:3E					a
	🔏 Quick Set							
	🗊 CAPsMAN							
	Interfaces							
		-1						
	Bridge							
	PPP	- 1						
1	🕄 Mesh							
ļ	IP	\triangleright						
	MPLS	\land						
	vé IPv6	\mathbb{N}						
	Routing	<u> </u>	Package List					
	System	$\overline{\mathbb{N}}$	Check For Updates Enable	Disable	Uninstall Ur	schedule	Downgrade	Check Installation
1	Queues	Ĩ	Name	∠ Version	Build Time		Scheduled	
	2	-	🗃 routeros-tile	6.46.4	Feb/21/20	20 11:26:37		
	Files		advanced-tools	6.46.4	Feb/21/20	20 11:26:37		
	E Log		e dhcp	6.46.4	Feb/21/20	20 11:26:37		
	🥵 RADIUS		hotspot	6.46.4	Feb/21/20	20 11:26:37		
-	- Toole	N	a mole	6.40.4	Feb/21/20	120 11.20.37		
4	10013		a pop	6 46 4	Feb/21/20	20 11:26:37		
š	New Terminal		PPP	6.46.4	Feb/21/20	20 11:26:37		
ď.	Dot1X		security	6.46.4	Feb/21/20	20 11:26:37		
51			🗃 system	6.46.4	Feb/21/20	20 11:26:37		
2			wireless	6.46.4	Feb/21/20	20 11:26:37		
0	Partition		🖨 user-manager	6.46.4	Feb/21/20	20 11:26:37		
5] Make Supout.	if						
	• • • •							
Ð	💓 Manual							
anne	Manual		12 items					

0	KikroTik Routers and V	Wirel × +				Ť	_ 🗆	\times
	< > C ==	Aikrotikls SIA [LV]	mikrotik.com/d	lownload	0 🥑 ⊳	0	* ₹	ŧ
☆ 	Mikro tik	Home About	Buy Jobs	Hardware Soft	vare Suppor	rt Trainin	ng Accoun	t
	Software	Downloads	Changelogs	Download archive	RouterOS T	he Dude	Mobile app	
٩	WinBox ~	The Dude 🗸 💦 I	Netinstall 🗸					
-								
Q								
\triangleright								
-	RouterOS	3					?	
		6 45 8 (Long-term)	E AE A (Stable	a) 6.47beta5	3 (Testing)	7.0beta5		
\bigcirc		6.45.6 (Long-term)	0.40.4 (Stable	e) 0.47 Delas	o (Testilig)	(Developm	nent)	
Ē	MIPSBE	CRS1xx, CRS2xx, CRS312-4C+ NetBox, NetMetal, PowerBox, P Groove, Metal, Sextant, RB7xx,	+8XG, CRS326-24S+2Q WR-Line, QRT, RB9xx, hEX PoE	+, DISC, FiberBox, hAP, hAP a SXTsq, cAP, hEX Lite, RB4xx, i	c, hAP ac lite, LDF, L wAP, BaseBox, Dynal	.HG, ItAP mini, m Dish, RB2011, S	ANTBox, mAP, XT, OmniTik,	
	Main package							
	Extra packages							
ŝ	SMIPS	hAP mini, hAP lite						
	Main package			B				
	Extra packages			Ē		Ē		
	TILE	CCR						
	Main package		B			Ē		
	Extra packages		Ē			E)		

https://mikrotik.com/download

📙 🕑 📙 🗢 all_packages-tile-6.46.4										
File Home Share View										
Pin to Quick Copy Paste	ath hortcut to y	New item •	Properties	Select all Select none						
Clipboard	Organize	New	Open	Select						
	cal Disk (C) > Extra Backager > all packs	ages-tile-6.46.4								
	Name Name	Date modified	Туре	Size						
Vuick access	advanced-tools-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	193 KB						
Desktop 📌	calea-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	89 KB						
🔶 Downloads 🛛 🖈	dhcp-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	317 KB						
📄 Documents 🛛 🖈	gps-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	117 KB						
📰 Pictures 🛷	hotspot-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	297 KB						
	ipv6-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	365 KB						
Glebilve	lora-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	261 KB						
💻 This PC	mpls-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	165 KB						
🧊 3D Objects	multicast-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	141 KB						
Desktop	🗹 🗋 ntp-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	373 KB						
Documents	openflow-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	153 KB						
	ppp-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	449 KB						
- Downloads	routing-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	193 KB						
J Music	security-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	541 KB						
Pictures	system-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	13,101 KB						
📑 Videos	tr069-client-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	261 KB						
Local Disk (C:)	ups-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	137 KB						
A Network	user-manager-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	1,253 KB						
INCLIVITY INCLIVITY	wireless-6.46.4-tile.npk	2/27/2020 3:08 PM	NPK File	1,853 KB						

Tiến hành copy gói cài đặt ntp-6.46.4-tile.npk vào bộ nhớ Flash của thiết bị Router MikroTik sau đó tiến hành khởi động lại thiết bị.

Auick Set	·					
	File List					×
		Backup	Restore Upload		Find	
Interfaces		Buchap	-		Filia	
Wireless	File Name	∆ Type S		Size	Creation Lime	•
St Bridge	hotspot/xml/	VISPACCessua	xsd file	4201 B	Apr/01/2020 21:01:51 Apr/01/2020 21:01:51	•
	l hotspot/xml/€	error html	html file	416 B	Apr/01/2020 21:01:51	
	hotspot/xml/f	logout.html	.html file	361 B	Apr/01/2020 21:01:51	
°tö Mesh	hotspot/xml/	ogin.html	.html file	787 B	Apr/01/2020 21:01:51	
🚛 IP 🗈	hotspot/xml/l	ogout.html	.html file	359 B	Apr/01/2020 21:01:51	
22 MPLS N	hotspot/xml/r	login.html	.html file	530 B	Apr/01/2020 21:01:51	
	i mip.txt		.txt file	14 B	Jan/08/2020 05:07:48	
v∰ IPv6 Γ	The second secon		package	372.1 KiB	Apr/04/2020 18:04:44	
🌌 Routing 🛛 🗅	pub		directory	2.0	Jan/11/2020 09:32:40	
📾 System	Auto Upgrado		directory	3 0	Jan/00/2020 10.12.16	
	Auto opgrade		.tar file	17.5 KiB	Mar/27/2020 20:17:25	
Queues	Certificates		directory		Jan/02/1970 07:00:19	
Files	Clock	qldb	file	6.0 KiB	Mar/27/2020 20:17:25	•
📄 Log	Console	91.0 MiB o	of 512.0 MiB used	82%	% free	_
🥵 RADIUS	Disks					
🎇 Tools 🛛 🗅	Health					
🗙 📰 New Terminal	History					
d 🚯 Dot1X	Identity					
📮 LCD	LEDs					
Nartition	License					
👌] Make Supout.rif	Logging					
🛛 🔁 Manual	Note					
🔘 New WinBox	Packages					
	Password					_
	Ports					
	Reboot					
	Reset Configuration					
	-					

Sau khi thiết bị khởi động thành công thì chúng ta có thể quan sát thấy gói NTP xuất hiện tại giao diện Package List.

Ю	0	Safe Mode	•	Sessi	on: 4C:5E:0C:17:F0:38	Ξ						a
	*	Quick Set										
	Î	CAPsMAN										
	1	Interfaces										
	î	Wireless										
	50	Bridge										
		PPP										
	0_0	Maab										
	255	ID	<u> </u>									
	2		- -									
	~	MPLS	P									
	<u>v6</u>	IPv6		Paoka	ao Lint							
	×	Routing		Гаска	ge List							
	63	System	Þ	Y	Check For Updates	Enable	e Disa	ble	Uninstall	Unschedule	Downgrade	Check Installation
	۶	Queues		Nam	e		∠ Versi	on	Build Tim	e	Scheduled	
		Files		8r	itp		6.46	4	Feb/2	1/2020 11:26:37	7	
		Log			advanced-tools		6.46	4 4	Feb/2	1/2020 11:26:37	7	
		E US		1	B dhop		6.46	4	Feb/2	1/2020 11:26:37	7	
	2	RADIUS		1	hotspot		6.46	4	Feb/2	1/2020 11:26:37	7	
\sim	×	Tools	\triangleright	1	₿ipv6		6.46	4	Feb/2	1/2020 11:26:37	7	
2	2.	New Terminal		1	🗃 mpls		6.46	4	Feb/2	1/2020 11:26:37	7	
멷	-	B. MAR		1	🗃 ppp		6.46	4	Feb/2	1/2020 11:26:37	7	
1	4i>	Dot1X		1	Trouting		6.46	4	Feb/2	1/2020 11:26:37		
>		LCD		1	secunty		6.46	4	Feb/2	1/2020 11:26:3/	7	
S		Partition			system		6.46	4	Feb/2	1/2020 11:26:3/	7	
Г		Make Supout.ri	F	8.	iser-manager		6.46	4	Feb/2	1/2020 11:26:37	7	
ute	0	Manual										
8	0	New WinBox		13 iten	ns (1 selected)							

Bước 3. Thiết lập chức năng NTP Client trên Router MikroTik.

Khai báo thông tin địa chỉ IP hoặc Domain Name tương ứng với các NTP Server ở ngoài Internet.



Kiểm tra thời gian hiện tại của thiết bị đã được đồng bộ hóa hay chưa.

- Thiết lập thời gian thủ công trên Router MikroTik.

					-			
[admin@M	likro Ti	ik] >	>					
/system	clock	set	date	=apr/04/2020	time=18:37:00	time-zone-name=Asia/Ho	Chi	Minh

- Kiểm tra thời gian hiện tại trên thiết bị.

Thiết lập chức năng NTP Client trên thiết bị Router MikroTik.

```
[admin@MikroTik] >
/system ntp client set enabled=yes mode=unicast primary-ntp=3.vn.pool.ntp.org
   - Thiết bị tự động phân giải tên miền thành địa chỉ IP tương ứng.
[admin@MikroTik] > /system ntp client print
        enabled: yes
        mode: unicast
        primary-ntp: 162.159.200.123
        secondary-ntp: 0.0.0.0
        dynamic-servers:
            status: synchronized
```

```
[admin@MikroTik] >
```

_

ю	Q	Safe Mode	Ses	sion: 4C:5E:0C:17:F0:3E							a
	溢	Quick Set									
	Î	CAPsMAN									
]	Interfaces									
	Î	Wireless									
	5 P 7 5	Bridge									
		PPP									
	°të	Mesh									
	255	IP 🗅			Clock						
	0	MPLS N			Time	Manual Tim	. 7				
	v6	IPv6 ▷	_		T IIII C	Manual Tim	ie zone			UK	
	2	Routing 🗈	Pac	kage List		Time:	18:28:52			Cancel	
		System 🗅	T	Check For Updates		Date:	Apr/04/2	2020		Apply	ck Installatior
		Queues	Na	ame			✓ Time 2	Zone Autodetect			
	ñ	Files		ntp	Time 2	Zone Name:	Asia/Ho	_Chi_Minh ₹			
		Log		advanced-tools			07.00				
		RADIUS		dhcp	(GMT Offset:	+07:00				
_		Tools		hotspot finv6			DST /	Active			
ô		New Terminal		🗃 mpls							
ШШ	<u></u>	Dot1X		€ppp I €routing		6.4	6.4	Feb/21/2020 11:26:37	_		
\geq				Security		6.4	6.4	Feb/21/2020 11:26:37			
S		Partition		System		6.4	6.4	Feb/21/2020 11:26:37			
5	-	Make Supout if	6	user-manager		6.4	6.4 6.4	Feb/21/2020 11:26:37			
ute		Manual									
Ş	-	Manual	12 3	ame (1 ealactad)							
-	9	New WINBOX	1310	enis (i selected)							

Bước 4. Thiết lập chức năng NTP Server trên Router MikroTik.



[admin@MikroTik] >
/system ntp server set enabled=yes

```
[admin@MikroTik] > /system ntp server print
enabled: yes
broadcast: no
multicast: no
manycast: yes
broadcast-addresses:
[admin@MikroTik] >
```



N)	C ⁴	Safe Mode	•	Session: 4C:5E:0C:17:F0:3E
	🄏 Qı	uick Set		
	ĵ C/	APsMAN		
) ee Int	terfaces		
	ĴΨ	fireless		
	📲 Bri	idge		
	🚅 PF	PP		
	°t¦s Me	esh		
	255 IP		Þ	
	🖉 М	PLS	Þ	
	ve IP	√6	P .	NTP Server
	X Ro	outing	Þ	✓ Enabled OK
	e Sy	/stem	P	Broadcast Cancel
	👳 Qı	ueues		Mulucast Apply
	File File	es		
		xg		
	25 R/	ADIUS	N	
ŏ			12	
nB	IN INC	ew Terminal		
Ň	<i>Do</i>			
Š		-0		
5	🦢 Га	aruuon aka Supout ri	;	
ute		anual		
Į				
	a Ive	ew willbox		

Kích hoạt chức năng NTP Client trên Cisco Switch.

hostname CiscoSwitch ntp server 192.168.1.1 clock timezone Vietnam +7

Kiểm tra thời gian và trạng thái đồng bộ hóa thời gian trên Cisco Switch.

```
CiscoSwitch# show ntp status

Clock is synchronized, stratum 5, reference is 192.168.1.1

nominal freq is 119.2092 Hz, actual freq is 119.2092 Hz, precision is 2**18

reference time is E232F5D2.A73850BB (19:02:26.653 Vietnam Sat Apr 4 2020)

clock offset is 0.1454 msec, root delay is 115.66 msec

root dispersion is 5.74 msec, peer dispersion is 0.06 msec

CiscoSwitch#
```

```
CiscoSwitch# show ntp associations

address ref clock st when poll reach delay offset disp

*~192.168.1.1 162.159.200.123 4 38 64 377 0.5 0.15 0.1

* master (synced), # master (unsynced), + selected, - candidate, ~ configured

CiscoSwitch#
```

```
CiscoSwitch# show clock
19:12:23.310 Vietnam Sat Apr 4 2020
CiscoSwitch#
```

Phần 13.12. Xóa cấu hình và khởi động lại Router MikroTik với cấu hình trắng.



6	Safe Mode	e Session: 4C:5E:0C:17:
*	Quick Set	
Î	CAPsMAN	
Jan	Interfaces	
Î	Wireless	
동안 같은	Bridge	
1	PPP	
°t8	Mesh	
255	IP	1
27	MPLS	1
<u>v6</u>	IPv6	1
*	Routing	1
0	System	Auto Upgrade
9	Queues	Certificates
	Files	Clock
	Log	Console
2	RADIUS	Disks
×	Tools	[▶] Health
5	New Terminal	History
*	Dot1X	Identity
-	LCD	LEDs
	Partition	License
	Make Supout.r	f Logging
2	Manual	NTP Client
6	New WinBox	NTP Server
		Note
		Packages
		Password
		Ports
		Reboot
		Reset Configuration
		Resources


Phần 13.13. Tính năng IP Scan cho phép quét danh sách địa chỉ IP và MAC của các thiết bị trên hạ tầng mạng.



Safe Mode	Session: 4C:5E:0C:17:F0	:3E					
🄏 Quick Set							
CAPsMAN							
Interfaces							
Wireless	IP Scan (Running						×
Bridge	Interface:	ether1			Ŧ	Start	
🚅 PPP	Address Bange:	172 16 1 1-172 16 1 254			_	Stop	
°t <mark>8 Mesh</mark>	Address Hunge.	172.10.1.1 172.10.1.204				Stop	- 1
255 IP						Close	
MPLS N						New Window	v
👳 IPv6 🛛 🗅	Address	A MAC Address	Time (ms)	DNS	SNMP	Netbios	-
Routing	172.16.1.211	00:50:56:B7:00:D1	1			SRV_SOFT	•
en c i b	172.16.1.221	B4:36:E3:07:7A:43	11				
see System	172.16.1.222	C4:34:6B:56:78:32	0			PC_CAMERA	
Queues	172.16.1.231	F4:CE:46:3C:92:9E	1		client-office	CLIENT-OFFI	
	172.16.1.232	00:25:B3:F6:2B:E1	1		NPIF62BE1	NPIF62BE1	
Files	172.16.1.236	30:E1:71:B9:23:C9	0		DEVB923C9		
E Log	172.16.1.240	00:50:56:B7:5E:9F	0				
A RADIUS	172.16.1.241	00:1F:27:88:4E:41	0				
	172.16.1.242	00:0C:29:C8:38:95	0			BKSERVER/	
🗙 Tools 🔹 🗅	BTest Server	00:50:56:6B:07:91	0				
New Terminal	Bandwidth Test	00:90:8F:1C:F5:48	2				
	Dahawidin resi	00:50:56:84:16:DF	0				
Dot1X	Email	00:C0:FF:13:1B:D7	0		Storage HP P		
E LCD	Flood Ping	00:24:50:18:57:41	0				_
Partition	Graphing	0C:27:24:25:C5:42	U				•
Make Supout.rif	IP Scan		_	_	_	_	
0 🕜 Manual	MAC Server						
New WinBox	Netwatch						
	Packet Sniffer						_

Phần 14. Công nghệ dự phòng Gateway VRRP trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản và VRRP trên Cisco Router.
- Bước 2. Cấu hình cơ bản trên Router MikroTik.

- Bước 3. Cấu hình VRRP trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản và VRRP trên Cisco Router.

```
hostname CiscoRT
interface g0/0
 ip address 192.168.1.2 255.255.255.0
 vrrp 1 ip 192.168.1.3
 vrrp 1 priority 100
 vrrp 1 preempt
 vrrp 1 authentication 123456
 ip nat inside
 no shutdown
 exit
interface g0/1
 ip address dhcp
 ip nat outside
 no shutdown
 exit
ip route 0.0.0.0 0.0.0.0 dhcp
ip access-list extended NetTraffic
 10 permit ip 192.0.0.0 0.255.255.255 any
 exit
route-map Internet1
 match ip address NetTraffic
 match interface g0/1
 exit
ip nat inside source route-map Internet1 interface g0/1 overload
line vty 04
 privilege level 15
 no login
 transport input telnet
 exit
no ip domain-lookup
ip dhcp excluded-address 192.168.1.1 192.168.1.9
ip dhcp pool LAN
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.3
 dns-server 8.8.4.4
```

exit

Bước 2. Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
```

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1

Bước 3. Cấu hình VRRP trên Router MikroTik.

```
[admin@MikroTik]>
/interface vrrp add name=vrrp1 interface=ether2 vrid=1 priority=120 version=2 preemption-mode=yes
authentication=simple password="123456"
/ip address add address=192.168.1.3/32 interface=vrrp1
```

```
[admin@MikroTik] > /interface vrrp print
Flags: X - disabled, I - invalid, R - running, M - master, B - backup
# NAME INTERFACE MAC-ADDRESS VRI PRI INTERVAL V V3..
0 RM vrrp1 ether2 00:00:5E:00:01:01 1 120 1s 2 ipv4
[admin@MikroTik] >
```

```
[admin@MikroTik] > /interface vrrp print detail
Flags: X - disabled, I - invalid, R - running, M - master, B - backup
0 RM name="vrrp1" mtu=1500 mac-address=00:00:5E:00:01:01 arp=enabled
arp-timeout=auto interface=ether2 vrid=1 priority=120 interval=1s
preemption-mode=yes authentication=simple password="123456" on-backup=""
on-master="" version=2 v3-protocol=ipv4
[admin@MikroTik] >
```

6	Safe Mode	Sessio	on: 19	2.168.1.1													
20	Quick Set																
Î (CAPsMAN																
िल्ला	Interfaces																
٦	Wireless																
32 E	Bridge	Interfa	ce List														
E F	PPP	Interf	ace	Interface L	st	Ether	net	EoIP Tunne	el IP	Tunnel	GRE Tunn	el VLAN	VRRP	Bon	ding	LTE	
°t8 I	Mesh	+ •	-	X	6		7	Detect Ir	nternet							Fin	d
255	IP 🗅		EoIP	Tunnel					Acti	ual MTU	L2 MTU	Tx			Rx		•
<u>v6</u>	IPv6 ▷			nnel						1500) 1580			0 bps			16.4 k
	MPLS N		one iu							1500) 1580		128.8	kbps			4.1 k
			GRE	lunnel						1500	1580		43	0 bps			368
× 1	Routing 1°		VLAN	1						1500) 1580			0 bps			ŏ
	System ♪		VRRP	н						1500	1580			0 bps			0
A	Queues		Bond	lina						1500) 1580			0 bps			0
	Files		Daida							1500	1580			0 bps			0
			Бпад	e						1500	1580			0 bps			0
	LOG		Mesh	1						1500) 1580			0 bps			Ő
× 24	RADIUS		6to4	Tunnel						1500	1580			0 bps			0
	Tools 🗅		IPIPv	6 Tunnel						1500) 1580			0 bps			0
i 🔤 1	New Terminal		EoIPv	/6 Tunnel													•
ا 📮 🗧	LCD		GRE6	Tunnel													
8 🍋 F	Partition	-	VPLS						_	_	_	_	_	-	-	_	
0	Make Supout.rif		Traffi	c Eng Inte	rfac	e											
301	Manual		PPP (Server													
R OI	New WinBox		PPP	Client													
			РРТР	Server Bi	ndin	ng											



×.	Safe Mode	Session: 192.168.1.1		= 🔒
	Auick Set			
	CAPsMAN			
	Interfaces			
	🗊 Wireless			
	Sig Bridge			
	PPP			
	°t¦8 Mesh			
	IP ►	ARP	Address / Network Interface ▼ D ⊕ 172 16 1 169/ 172 16 1 0 ether1	
	👳 IPv6 🗈	Accounting	+ 192.168.1.1/24 192.168.1.0 ether2	
	🖉 MPLS 🛛 🗅	Addresses	宁192.168.1.3 192.168.1.3 vmp1	
	😹 Routing 💦 🕅	Cloud		
	iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	DHCP Client		
	🙊 Queues	DHCP Relay		
	Files	DHCP Server		
	Log	DNS		
×	🧟 RADIUS	Firewall		
B	🎇 Tools 🗈 🕅	Hotspot		
Vin	🔚 New Terminal	IPsec	2 items (1 selected)	
	📮 LCD	Kid Control	Sitems (1 Selected)	
ç	🕭 Partition	Neighbors		
Į į	📙 Make Supout.rif	Packing		
Ī	😧 Manual	Pool		
	Sew WinBox	Routes		
		SMB		
K	Safe Mode	Session: 192.168.1.1	1	
K	Carl Safe Mode	Session: 192.168.1.1	1	a
K	Safe Mode Cello Safe Mode Quick Set CAPsMAN	Session: 192.168.1.1		
K	Quick Set	Session: 192.168.1.1	1	
×.	Safe Mode Quick Set CAPsMAN Im Interfaces Virieless	Session: 192.168.1.1	1	
K	Safe Mode Quick Set CAPsMAN Im Interfaces Wireless Sig Bridge	Session: 192.168.1.1	Address List	
	Safe Mode Cuick Set CAPsMAN Interfaces Wireless Sig Bridge PPP	Session: 192.168.1.1	Address List	
K)	Safe Mode CAPSMAN CAPSMAN Im Interfaces Signifies	Session: 192.168.1.1	Address List	
ĸ	Safe Mode CAPSMAN CAPSMAN Im Interfaces Wireless Sig Bridge Im PP C Mesh Im IP No C	Session: 192.168.1.1	Address List	
ĸ	Safe Mode Safe Mode CAPsMAN CAPsMAN Im Interfaces Wreless Sig Bridge Sig Bridge Si	Session: 192.168.1.1	Address List	
ĸ	Safe Mode Safe Mode CAPSMAN CAPSMAN Minetraces Switch Sw	Session: 192.168.1.1	Address List	
ĸ	Safe Mode Safe Mode CAPSMAN CAPSMAN Mineless Signal Bridge Signal Bridge S	Session: 192.168.1.1	Address List	
K	Image: Constraint of the sector of the s	Session: 192.168.1.1	Address List Address <192.168.1.3 Address: 192.168.1.3 OK Network: 192.168.1.3 Cancel Interface: vrrp1 Disable Disable	
K	Image: Constraint of the sector of the s	Session: 192.168.1.1	Address List Address <192.168.1.3 Address: 192.168.1.3 OK Network: 192.168.1.3 Cancel Interface: vrrp1 Disable Comment	
ĸ	Image: Safe Mode	Session: 192.168.1.1	Address List Address (192.168.1.3) Address: 192.168.1.3 OK Network: 192.168.1.3 Cancel Interface: vrrp1 V Disable Comment Copy	
K.	Safe Mode CAPSMAN CAPSMAN CAPSMAN Iminerfaces CAPSMAN Iminerfaces Iminerface	Session: 192.168.1.1	Address List Address <192.168.1.3 Address: 192.168.1.3 Address: 192.168.1.3 Address: 192.168.1.3 Cancel Interface: vrrp1 Disable Comment Copy Remove	
Sox Sox	Safe Mode Cuick Set CAPsMAN Iminterfaces CAPsMAN Iminterfaces Imin	Session: 192.168.1.1	Address List	
in Box	Safe Mode Cuick Set CAPSMAN CAPSMAN Im Interfaces CAPSMAN Im Interfaces Im PPP Carlow Parlow	Session: 192.168.1.1	Address List Address < 192.168.1.3> Address < 192.168.1.3 Address: 92.168.1.3 OK Address: 92.168.1.3 OK Cancel Interface: Vmp1 V Disable Comment Copy Remove enabled	
WinBox	Safe Mode CAPSMAN C	Session: 192.168.1.1	Address List Address < 192.168.1.3> Address < 192.168.1.3 Address: 92.168.1.3 OK Address: 92.168.1.3 OK Cancel Interface: VTP1 V Disable Comment Copy Remove enabled 3 items (1 selected)	
DS WinBox	Image: Safe Mode	Session: 192.168.1.1	Address List	
arOS WinBox	Image: Safe Mode Image: CAPsMAN Ima	Session: 192.168.1.1	Address List Address < 192.168.1.3 Address < 192.168.1.3 OK Address: 92.168.1.3 OK Address: 92.168.1.3 OK OK Adply Disable Conment Copy Remove enabled 3 items (1 selected)	
	Image: Safe Mode	Session: 192.168.1.1	Address List	

Kiểm tra VRRP trên Router MikroTik.

	6	Call Safe Mode	Session: 192.168	.1.1							I	ì
		A Quick Set										1
		CAPsMAN										
		Interfaces										
		 Wireless 										
		Bridge	Interface List									ĸ
		PPP	Interface Interfa	ace List Ethernet	EoIP Tunnel IP	Tunnel	GRE Tunnel	VLAN	VRRP	Bonding	LTE	
		°t¦8 Mesh	+ - 0	× @ 7							Find	٦
		255 IP	Name			мти	Actual MTU	L2 MTU	Tx		Rx -	-
		ve IPv6 ►	RM ≪≫vrrp1	VRRP		1500	1500	1580	D		424 bps	
		Ø MPLS										
		😹 Routing 🛛 🗅										
		💮 System										
		Queues										
		Files										
		E Log										
	×	🥵 RADIUS										
c	8	🄀 Tools 🛛 🗅										
:	/In	New Terminal	•									
-	\leq	🗐 LCD	1 item out of 13									
ò	ö	🕭 Partition										
	þ	📑 Make Supout.rif										
	on	😧 Manual										
C	Y	Sin New WinBox										
	5	C ⁴ Safe Mode	Session: 192.168	.1.1							a A	2
F	_											
		A Quick Set									-	
		🔏 Quick Set		Interface <vrrp1></vrrp1>		1			_			
		Auick Set		Interface <vrrp1> General VRRP</vrrp1>	Scripts Status	Traffic			(DK	-	
		Auick Set CAPsMAN Im Interfaces Vireless		Interface <vrrp1> General VRRP Last Link Down Tr</vrrp1>	Scripts Status ime: Mar/13/202	Traffic 20 10:07:	23		Ca			
		CAPsMAN CAPSMA	Interface List	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202	Traffic 20 10:07: 20 10:07:	23		Ca Ar	DK DK		×
		Quick Set CAPsMAN CAPsMAN Im Interfaces Wireless Bridge PPP	Interface List	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status ime: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Ap	DK DK pply	LTE	×
		Quick Set CAPsMAN Im Interfaces Stringe PP Carteria PPP Carteria Content	Interface List Interface Interfa	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status me: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis	DK DK Incel pply sable	LTE Find	×
		Quick Set CAPsMAN CAPsMAN Im Interfaces Bridge PP C Beidge PP C Mesh PP N P	Interface List Interface Interfa	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status ime: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Ca Dis Corr	DK DK pply sable	LTE Find Rx N	×
		Quick Set CAPsMAN CAPsMAN Interfaces Vireless Bridge PPP C Mesh IP IP IP IPv6 N	Interface List Interface Interface Name RM @vrp1	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Corr	DK Incel sable opy	LTE Find Rx 432 bps	×
		Quick Set CAPSMAN Im Interfaces Im Inten	Interface List Interface Interface Name RM ŵvrrp1	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Ca Dis Com Com	DK DK Incel sable nment opy move	LTE Find 432 bps	×
		Quick Set Interfaces Interfaces Interfaces Interfaces Wireless Bridge PPP % Mesh IP N IPv6 N ✓ MPLS N X Routing N	Interface List Interface Interfa Name RM �vrp1	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Com Ca Rer	DK DK Incel sable nment opy move prch	LTE Find 432 bps	×
		Quick Set Interfaces Interfaces Interfaces Wireless Bridge Bridge Bridge IP IP </th <th>Interface List Interface Interfa Interface Name RM �vmp1</th> <th>Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1></th> <th>Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1</th> <th>Traffic 20 10:07: 20 10:07:</th> <th>23</th> <th></th> <th>Ca Ca Dis Corr Ca Ca</th> <th>DK DK nncel sable nment opy move xrch</th> <th>LTE Find Rx 432 bps</th> <th>×</th>	Interface List Interface Interfa Interface Name RM �vmp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Ca Dis Corr Ca Ca	DK DK nncel sable nment opy move xrch	LTE Find Rx 432 bps	×
		Quick Set	Interface List Interface Interfa Interface Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Con Cor To	DK ncel pply sable nment opy move prch	LTE Find Rx 432 bps	×
		Quick Set CAPSMAN Im Interfaces ♪ Wireless >> Bridge Im Interfaces ♪ Wireless >> Bridge IP PP >*1° Mesh IP IP IP V6 >> MPLS >> Routing >> System P Queues IFies	Interface List Interface Interfa Interface Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Corr Ca Tc	DK Incel pply sable mment opy move prch	LTE Find Rx 432 bps	×
		Quick Set 2 CAPsMAN Im Interfaces 2 Wireless 36 Bridge 11 PPP 12 IP 12 IP 12 IP 12 IP 12 IP 12 System 12 Files 12 Log	Interface List Interface Interfa Interface Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Af Dis Com Rer Tc	DK Incel pply able ment opy prch	LTE Find Rx 432 bps	×
	X	Quick Set 2 CAPsMAN Im Interfaces 2 Wreless 36 Bridge 97 Bridge 98 PPP 92 IP 92 IP 92 IP 93 Routing 94 Routing 95 System 95 Queues 95 Log 96 RADIUS	Interface List Interface Interfa Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Corr Ca Rer Tc	DK Incel pply sable ment opy move prch	LTE Find Rx 432 bps	×
	BOX	Quick Set 2 CAPsMAN Im Interfaces 2 Wreless Bridge IP PP 10 Mesh IP IP MPLS MPLS IP Gueues IP Files IP Log ADIUS	Interface List Interface Interfa Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tri Last Link Up Tri Link Dow</vrrp1>	Scripts Status me: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07:	23		Ca Dis Corr Ca Rer Tc	DK incel sable ment opy move prch	LTE Find Rx ¥ 432 bps	×
	VinBox	Quick Set 2 CAPsMAN Immediates 2 2 Wireless 3 Bridge 4 PPP 10 Mesh 2 IPv6 4 PV6 4 Routing 4 System 5 Files 10 Log 4 ROUIUS 7 Tools 10 New Terminal	Interface List Interface Interfa Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tri Last Link Up Tri Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Ca Dis Com Cc Rer Tc	DK Incel pply sable ment opy move prch	LTE Find 432 bps	×
	5 Winbox	Quick Set	Interface List Interface Interface Name RM �vrrp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status ime: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Com CC Rer Tc	DK Incel pply able nment opy prch	LTE Find 432 bps	×
	ros Winbox	Quick Set	Interface List Interface Interface Name RM ŵvrrp1	Interface <vrrp1> General VRRP Last Link Down Tr Last Link Up Tr Link Dow</vrrp1>	Scripts Status ime: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Com CC Rer Tc	DK Incel pply able nment ppy move prch	LTE Find 432 bps	×
	terOS WinBoX	Quick Set CAPsMAN Immediates	Interface List Interface Interface Name RM ŵvmp1	Interface <vrrp1> General VRRP Last Link Down Ti Last Link Up Ti Link Dow</vrrp1>	Scripts Status ime: Mar/13/202 ime: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Com Cc Rer Tc	DK Incel pply able mment opy move xrch	LTE Find 432 bps	×
	outerOS WinBox	Quick Set	Interface List Interface Interface Name RM ŵvmp1	Interface <vrrp1> General VRRP Last Link Down Tri Last Link Up Tri Link Dow</vrrp1>	Scripts Status me: Mar/13/202 me: Mar/13/202 vns: 1	Traffic 20 10:07: 20 10:07:	23		Ca Dis Com Cc Rer Tc	DK Incel pply aable mment opy move	LTE Find Rx \ 432 bps	×

Safe Mode	Session: 192.168	.1.1			🔳 🛅
Quick Set		Interface <vrrp1></vrrp1>			
		General VRRP Scripts Status	Traffic	ОК	
Wireless		Tx/Rx Rate: 432 bps	/ 917.4 kbps	Cancel	
퉕륿 Bridge	Interface List	Tx/Rx Packet Rate: 1 p/s	/ 165 p/s	Apply	
📑 PPP	Interface Interf) LTE
°t% Mesh	+ - 🗸	FP Tx/Rx Rate: 0 bps	/ 917.4 kbps	Disable	Find
255 IP 🗅	Name	FP Tx/Rx Packet Rate: 0 p/s	/ 165 p/s	Comment	Rx 🔻
vi lPv6 ►	RM ∰vrrp1	Tx/Rx Bytes: 108.2 KiB	/ 61.2 MiB	Сору	432 bps
🖉 MPLS 🛛 🗅		Ty/Py Packate: 1966	/ 102 094	Remove	
🔀 Routing 🛛 🗅		TX/ HX Fackets. 1 500	/ 102 034	Torch	
💮 System 🗅		Tx/Rx Drops: 0			
🙊 Queues		Tx/Rx Errors: 0	/ 0		
Files					
E Log			- 1010000, 10 0 . 00000000000000000000000		
🔀 🥵 RADIUS		Tx: 432 bps			
🖁 🎇 Tools 🛛 🗅		Rx: 917.4 kbps			
🗧 🔤 New Terminal	•				+
n ICD	1 item out of 13 (1		- Martin I. I. J. Millel Hill Hill		
🏹 🕗 Partition					
👩 🗋 Make Supout.rif		Rx Packet: 1 p/s			
B 🛛 Manual					
🕰 🍥 New WinBox		enabled running	slave maste	er	

Kiểm tra VRRP trên Router Cisco.

CiscoRT# show vrrp brief								
Interface	Grp	Pri Time	Own Pre State	Master addr	Group addr			
Gi0/0	1	100 3609	Y Backup	192.168.1.1	192.168.1.3			
CiscoRT#								

```
CiscoRT# show vrrp

GigabitEthernet0/0 - Group 1

State is Backup

Virtual IP address is 192.168.1.3

Virtual MAC address is 0000.5e00.0101

Advertisement interval is 1.000 sec

Preemption enabled

Priority is 100

Authentication text, string "123456"

Master Router is 192.168.1.1, priority is 120

Master Advertisement interval is 1.000 sec

Master Down interval is 3.609 sec (expires in 3.561 sec)

CiscoRT#
```

Phần 15. Cấu hình các dịch vụ mở rộng trên Router MikroTik.Phần 15.1. Cấu hình dịch vụ DNS Proxy và DNS Server trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Thiết lập DNS Server & Proxy trên Router MikroTik.
- Bước 3. Thiết lập DHCP Server cấp IP LAN của Router MikroTik đóng vai trò là DNS Server.
- Bước 4. Thiết lập các dòng Static DNS Entries trên Router Router MikroTik.
- Bước 5. Thiết lập Firewall Rule chỉ cho phép lưu lượng DNS tới Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Thiết lập DNS Server & Proxy trên Router MikroTik.

Router MikroTik có thể vừa đóng vai trò là DNS Server, vừa có thể đóng vai trò là DNS Client. Khi các máy tính khai báo DNS trỏ tới IP của Router MikroTik, Router MikroTik sẽ tiếp tục truy vấn DNS Server mà ta khai báo trên thiết bị rồi hồi đáp ngược trở về cho các máy tính người dùng.

```
[admin@MikroTik]>
/ip dns set server=8.8.4.4,8.8.8.8 allow-remote-requests=yes
```

Safe Mode	Session: 4C:5E:0C:17:F0:3E			= 🔒
CAPsMAN				
훯룷 Bridge		DNS Settings		
PPP		Servers:	8.8.4.4	♦ ОК
행 Mesh (型) IP ► (型) IP√6 ► (⊘) MPLS ►	ARP Accounting Addresses	Dynamic Servers:	8.8.8.8 172.16.0.17 8.8.8.8	Cancel Apply Static
Image: Routing N Image: System N Image: Open constraints N Image: Open constraints N	Cloud DHCP Client DHCP Relay	Max UDP Packet Size:	Allow Remote Requests 4096	Cache
Files	DHCP Server DNS	Query Server Timeout: Query Total Timeout:	2.000	s s
Mark RADIUS	Firewall Hotspot IPsec	Max. Concurrent Queries: Max. Concurrent TCP Sessions:	20	
CD Partition Make Supout.rif Manual	Kid Control Neighbors Packing Pool	Cache Size: Cache Max TTL: Cache Used:	2048 KB	GB
New WinBox	Routes SMB SNMP			

Kiểm tra DNS Cache trên Router MikroTik.



Ю	0	Safe Mode	•	Session: 4C:5E:00	C:17:F0:3E						a
	***	Quick Set									
	Î	CAPsMAN									
	1	Interfaces									
	 	Wireless									
	-	Bridge									
	275 111	DDD	-	DNS	Cache					×	
	0-0	Mark	-		Elush Casha						
	- 6	Mesn	_		Flush Cache				Find		
	255	IP		N	ame 🛆	Туре	Data	TTL		•	
	¥6	IPv6	N		a-0019.a-msedge.net	Α	204.79.197.222		00:00:14	+	
	-		÷	() () () () () () () () () ()	a-9999.a-msedge.net	Α	204.79.197.254		00:01:00		
	40	MPLS		· · · · · · · · · · · · · · · · · · ·	a-9999.dc-msedge.net	Α	131.253.33.254		00:00:55		
	20	Routing	\mathbb{N}	()	a-ring.a-9999.a-msedge.net	CNAME	a-9999.a-msedge.net		00:01:00		
		riodang	÷		azureedge.mdc.akamaiz	CNAME	a1879.dscw14.akamai.net		00:45:48		
	633	System			cdn.content.prod.cms.ms	CNAME	e10663.dscg.akamaied		00:10:50		
		Queues			chat2-wpa.chat.zalo.me	Α	49.213.114.134		00:27:24		
	*	Quotoo	_		fp-as.azureedge.net	CNAME	fp-as.akstd.azureedge.net		00:03:37		
		Files			mobile-gtalk.l.google.com	Α	74.125.200.188		00:00:00		
		Log			mtalk.google.com	CNAME	mobile-gtalk.l.google.com		05:54:49		
	L	209	_		nhaccuatui.com	Α	123.30.134.68		00:13:51		
	22	RADIUS			p4-ctl.chat.zalo.me	Α	49.213.114.122		00:45:39		
	<u>s</u>	Tools	\mathbb{N}		p4-msg.chat.zalo.me	Α	49.213.114.121		00:37:18		
â			-		profile-wpa.chat.zalo.me	Α	49.213.114.128		00:43:49		
m	۶.	New Terminal			gos.talk.zing.vn	Α	49.213.114.87		00:01:52	+	
/in	-	LCD		20 ite	ms	1					
\leq	٩	Partition		<u>r</u>							
0 S		Make Supout.ri	f								
er	0	Manual									
th		New WinBox									
Ro		Exit									

Bước 3. Thiết lập DHCP Server cấp IP LAN của Router MikroTik đóng vai trò là DNS Server.

```
[admin@MikroTik]>
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=192.168.1.1
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 4. Thiết lập các dòng Static DNS Entries trên Router Router MikroTik.

```
[admin@MikroTik]>
/ip dns static add name=www.youtube.com address=192.168.1.1
/ip dns static add name=www.facebook.com address=192.168.1.1
```

[adm:	in@MikroTik] > /ip	dns static print	
Flag	s: D - dynamic, X -	disabled	
#	NAME REGEXP	ADDRESS	TTL
0	www.y	192.168.1.1	1d
1	www.f	192.168.1.1	1d
[adm:	in@MikroTik] >		

```
[admin@MikroTik] > /ip dns static print detail
Flags: D - dynamic, X - disabled
0 name="www.youtube.com" regexp="" address=192.168.1.1 ttl=1d
1 name="www.facebook.com" regexp="" address=192.168.1.1 ttl=1d
[admin@MikroTik] >
```

[admin@MikroTik] > /ip	dns cache all print	
Flags: S - static, N -	negative	
# NAME TYPE	DATA	TTL
0 S www.yout A	192.168.1.1	1d
1 S 1.1.168 PTR	www.youtube.com	1d
2 S www.face A	192.168.1.1	1d

```
3 S 1.1.168.... PTRwww.facebook.com1d4wdcp.mic... CNAMEwd-prod-cp.trafficmanager.net10m49s5wd-prod-... CNAMEwd-prod-cp-as-southeast-2-fe.southeastasia....2m39s6wd-prod-... A13.67.75.2000s[admin@MikroTik] >
```



Safe Mode	Session: 4C:5E:0C:17:F0:3E	
🔏 Quick Set		
I CAPSMAN		
Interfaces		
Wireless		
퉕룳 Bridge		
📑 PPP		
°t\$ Mesh		
255 IP 🗅	# Name Regexp Address TTL (s) 🔻	
👳 IPv6 🛛 🗅	0 • www.youtube 192.168.1.1 1d 00:00:00	
🖉 MPLS 🗈 🗅	1 WWW.Idceboo 132.106.1.1 10.00.00	
🔀 Routing 🛛 🗅		
🎲 System 🗅		
🙊 Queues		
Files		
📄 Log		
🧟 RADIUS		
🗙 💥 Tools 🛛 🗅		
🔒 🔳 New Terminal		
E 🗐 LCD	2 items	
Nartition		
👸 🗋 Make Supout.rif		
👩 🔮 Manual		
🗟 🔘 New WinBox		
🕰 🌉 Exit		

Lúc này người dùng đầu cuối sẽ không thể truy cập tới Facebook hoặc Youtube.

0	www.youtube.com × +	
	< > C 88 A www.youtube.com	
\bigcirc		
~		
~		
	This site can't be reached	
0	www.youtube.com refused to connect.	
	Try:	
Q	✓ Checking the connection	
	✓ <u>Checking the proxy and the firewall</u>	
\geq	ERR CONNECTION REFUSED	
	Check your internet connection.	
38	Check any cables and reboot any routers, modems, or other	
	network devices you may be using.	
\heartsuit	Allow Opera to access the network in your firewa	ll or
F	antivirus settings.	
	If it is already listed as a program allowed to access the netv	vork, try
J	removing it from the list and adding it again.	
55	lf you use a proxy server	
~~	Check your proxy settings or contact your network administr	rator to
	make sure the proxy server is working. If you don't believe y	ou
	should be using a proxy server: Go to the Main menu > Sett	ings >
	change proxy settings > LAIN Settings and deselect Use a server for your LAN".	proxy

Bước 5. Thiết lập Firewall Rule chỉ cho phép lưu lượng DNS tới Router MikroTik.

Thiết lập Firewall Rule chặn tất cả các lưu lượng phân giải tên miền gửi tới bất kỳ DNS Server nào ngoài môi trường Internet, điều này yêu cầu các End User bắt buộc phải trỏ DNS Server tới IP của Router MikroTik thì mới phân giải được tên miền.

```
[admin@MikroTik] >
/ip firewall filter add chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
/ip firewall filter add chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
```

```
[admin@MikroTik] > /ip firewall filter print
Flags: X - disabled, I - invalid, D - dynamic
0 chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
log=no log-prefix=""
1 chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
log=no log-prefix=""
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall filter print detail
Flags: X - disabled, I - invalid, D - dynamic
0 chain=forward action=drop protocol=tcp in-interface=ether2 dst-port=53
    log=no log-prefix=""
1 chain=forward action=drop protocol=udp in-interface=ether2 dst-port=53
    log=no log-prefix=""
[admin@MikroTik] >
```



×	Safe Mode	Session:	4C:5E:0C:17:F0:3E			a
Г	Muick Set		Firewall Rule <53>			
	I CAPsMAN		General Advanced E	Extra Action Statistics		ОК
	Interfaces		Chain:	forward	Ŧ	Cancel
	Wireless		Src. Address:		-	Apply
	and ge		Det Address:		•	- CPP-J
	PPP	Firewall	DSI: Address.].	Disable
	°t% Mesh	Filter Ru	Protocol:	□ 6 (tcp) ₹	•	Comment
	<u>에 면접</u>	+ -	Src. Port:		-	Сору
		#	Dst. Port:	53		Remove
	Routing	0	Any, Port:		-	Reset Counters
	System		In Interface:	ether?		Reset All Counters
	Queues] —	
	Files		Out. Interface:		•	
	Log		In. Interface List:		•	
	A RADIUS		Out. Interface List:		-	
 >	🖌 🔨 Tools					
8	🔚 New Terminal		Packet Mark:		•	
lin	📮 LCD		Connection Mark:		•	
2	🕗 Partition	•	Routing Mark:		•	
ļč	🔁 🗋 Make Supout.rif	2 items (Routing Table:		-	
ģ	😧 Manual				1_	
Ī	Solution New WinBox		Connection Type:] ▼	
6	🖳 Exit		Connection State:		•	
Ľ	Safe Mode	Session:	4C:5E:0C:17:F0:3E			🔳 🛅
	Carl Safe Mode	Session:	4C:5E:0C:17:F0:3E New Firewall Rule			
	Quick Set	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E	Extra Action Statistics		ОК
	CAPsMAN	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop	Extra Action Statistics	Ŧ	OK
	CAPsMAN CAPsMAN Im Interfaces Wireless	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced F Action: drop	Extra Action Statistics	₹	OK Cancel
	CAPSMAN CAPSMA	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop Log	Extra Action Statistics	T	OK Cancel Apply
K	Safe Mode Calculate Set Calculate Set Calculate Set Calculate Set Set Calculate Set Set Set Set Set Set Set Se	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop Log Prefix:	Extra Action Statistics	₹	Cancel Disable
K	Safe Mode CAPsMAN CAPsMAN Interfaces Signature Rindge PPP Carlowesh	Session: Firewall	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop Log Prefix:	Extra Action Statistics	₹	Cancel Disable Comment
Ľ	Safe Mode Carlot Set Carlot	Session: Firewall Filter Ru	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop Log Prefix:	Extra Action Statistics		Cancel Cancel Apply Disable Comment Copy
Ľ	Safe Mode Safe Mode CAPsMAN CAPsMAN Interfaces Wreless Soft Bridge Soft Bri	Session: Firewall Filter Ru	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop Log Prefix:	Extra Action Statistics] •	Cancel Cancel Apply Disable Comment Copy Remove
	Year Safe Mode A Quick Set 2 CAPsMAN Image: CAPsMAN Image:	Session: Frewal Filter Ru #	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced Action: drop Log Log	Extra Action Statistics] •	Cancel Apply Disable Comment Copy Remove Reset Counters
	Year Safe Mode Image: CAPsMAN	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced Action: drop Log Log	Extra Action Statistics		Cancel Cancel Disable Comment Copy Remove Reset Counters Reset All Counters
	Safe Mode Image: CAPsMAN Image: CAPsM	Session: Firewall Filter Ru #	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced Action: drop Log Log	Extra Action Statistics		Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters
	Image: Safe Mode Ima	Session:	4C:5E:0C:17:F0:3E New Firewall Rule General Advanced E Action: drop	Extra Action Statistics	₹	Cancel Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters
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Phần 15.2. Cấu hình tính năng Dynamic DNS trên Router MikroTik.

status: updated

[admin@MikroTik] >



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in Box	C4 Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	
1 MinBov	C4 Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	
	C4 Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	
HarOC Min Box	C4 Safe Mode Image: CAPSMAN	Session: 4C:5E:0C:17:F0:3E	

Kiểm tra mã Serial Number của thiết bị Router MikroTik.

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Phần 15.3. Chặn tất cả người dùng không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- **Bước 2.** Cấu hình DHCP Server trên Router MikroTik cấp thông tin Norton DNS cho các End User.
- **Bước 3.** Cấu hình Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.
- **Bước 4.** Khảo sát kết quả chặn truy cập tới các WebSite có nội dung đồi trụy.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Cấu hình DHCP Server trên Router MikroTik cấp thông tin Norton DNS cho các End User.



```
[admin@MikroTik]>
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-
server=199.85.126.30,199.85.127.30
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 3. Cấu hình Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.

Thiết lập Address Lists chứa danh sách các Norton ConnectSafe DNS.

- Nên sử dụng NortonDNS sau: 199.85.126.20 & 199.85.127.20.

```
[admin@MikroTik]>
/ip firewall address-list add list=NortonDNS address=199.85.126.30/199.85.127.30
[admin@MikroTik] > /ip firewall address-list print
Flags: X - disabled, D - dynamic
# LIST ADDRESS CREATION-TIME
0 NortonDNS 199.85.126.30-255.255.254.255 apr/09/2020 18:54:07
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall address-list print detail
Flags: X - disabled, D - dynamic
0 list=NortonDNS address=199.85.126.30-255.255.254.255
creation-time=apr/09/2020 18:54:07
[admin@MikroTik] >
```

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	🎉 Routing 🛛 🗅	Timeout: Apply	
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Thiết lập Firewall Filter Rule trên Router MikroTik chặn tất cả lưu lượng truy cập DNS ngoài Internet ngoại trừ danh sách các IP của Norton DNS.



```
[admin@MikroTik] > /ip firewall filter print
Flags: X - disabled, I - invalid, D - dynamic
0 chain=forward action=drop protocol=tcp dst-address-list=!NortonDNS
in-interface=ether2 dst-port=53 log=no log-prefix=""
1 chain=forward action=drop protocol=udp dst-address-list=!NortonDNS
in-interface=ether2 dst-port=53 log=no log-prefix=""
[admin@MikroTik] >
```

Lúc này, máy tính sử dụng DNS không phải của Norton sẽ không thể phân giải được tên miền.

```
C:\Users\buipham>nslookup
DNS request timed out.
    timeout was 2 seconds.
Default Server: UnKnown
Address: 8.8.4.4
> google.com
Server: UnKnown
Address: 8.8.4.4
DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
   timeout was 2 seconds.
DNS request timed out.
   timeout was 2 seconds.
DNS request timed out.
   timeout was 2 seconds.
*** Request to UnKnown timed-out
>
```

```
C:\Users\buipham>nslookup
Default Server: UnKnown
Address: 199.85.126.30
> google.com
Server: UnKnown
Address: 199.85.126.30
Non-authoritative answer:
Name: google.com
Addresses: 2607:f8b0:4007:801::200e
216.58.217.206
```

>

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Bước 4. Khảo sát kết quả chặn truy cập tới các WebSite có nội dung đồi trụy.



```
> www.ixxx.com
Server: UnKnown
Address: 199.85.126.30
Non-authoritative answer:
Name: www.ixxx.com
Addresses: 156.154.176.30
156.154.175.30
```

>

```
C:\Users\buipham>nslookup
Default Server: UnKnown
Address: 199.85.126.30
> www.fuq.com
Server: UnKnown
Address: 199.85.126.30
Non-authoritative answer:
Name: www.fuq.com
Addresses: 156.154.176.30
156.154.175.30
>
```





Phần 15.4. Chặn User cụ thể không được phép truy cập tới các Website có nội dung đồi trụy sử dụng Norton DNS Server.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Thiết lập DHCP Static cấp IP tĩnh cho PC.
- **Bước 3.** Thiết lập Address List chứa danh sách Source IP muốn chuyển hướng lưu lượng DNS tới Norton DNS Server.
- Bước 4. Cấu hình tính năng Destination-NAT chuyển hướng lưu lượng DNS tới Norton DNS Server.
- Bước 5. Kiểm tra kết quả chuyển hướng lưu lượng DNS tới Norton DNS Server.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Thiết lập DHCP Static cấp IP tĩnh cho PC.

```
[admin@MikroTik] > /ip dhcp-server lease print
Flags: X - disabled, R - radius, D - dynamic, B - blocked
# ADDRESS MAC-ADDRESS H SE.. R STATUS LAST-SEEN
0 192.168.1.100 14:18:77:CA:57:3A D DH.. bound 2m44s
[admin@MikroTik] >
```

```
[admin@MikroTik]>
/ip dhcp-server lease make-static 0
```

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Bước 3. Thiết lập Address List chứa danh sách Source IP muốn chuyển hướng lưu lượng DNS tới Norton DNS Server.



```
[admin@MikroTik] > /ip firewall address-list print detail
Flags: X - disabled, D - dynamic
0 list=NortonDNS address=199.85.126.20-255.255.254.255
creation-time=apr/09/2020 18:54:07
1 list=SrcAddrRedirectDNS address=192.168.1.100
creation-time=apr/11/2020 15:05:56
[admin@MikroTik] >
```

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	°t <mark>8</mark> Mesh	New Firewell Address List	
	😇 IP 🗈 🗅		
	🖉 MPLS 🛛 🗅	Name: SrcAddrRedirectDNS OK	
	👳 IPv6 🛛 🗅	Address: 192.168.1.100 Cancel	
	😹 Routing 🛛 🗅	Timeout: Apply	
	💮 System 🗅	Creation Time:	
	룢 Queues	Disable	
	📄 Files	Comment	
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Bước 4. Cấu hình tính năng Destination-NAT chuyển hướng lưu lượng DNS tới Norton DNS Server.



```
[admin@MikroTik] > /ip firewall nat print
Flags: X - disabled, I - invalid, D - dynamic
0 chain=srcnat action=masquerade out-interface=ether1
1 chain=dstnat action=dst-nat to-addresses=199.85.126.20 to-ports=53
protocol=udp src-address-list=SrcAddrRedirectDNS dst-port=53 log=no
log-prefix=""
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip firewall nat print detail
Flags: X - disabled, I - invalid, D - dynamic
0 chain=srcnat action=masquerade out-interface=ether1
1 chain=dstnat action=dst-nat to-addresses=199.85.126.20 to-ports=53
    protocol=udp src-address-list=SrcAddrRedirectDNS dst-port=53 log=no
    log-prefix=""
[admin@MikroTik] >
```

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			Dst. Port: 53	Remove	
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	፵ IPv6 ▷		Connection Rate:			
	🍂 Routing 🛛 🗅		Per Connection Classifier:]▼	Reset Counters	
	💮 System 🗅		Src MAC Address:	- -	Reset All Counters	
	👰 Queues					
	Files		Out. Bridge Port:	•		
	Log		In. Bridge Port:	•		
	A RADIUS		-			
×	🗙 Tools 🛛 🗅		In. Bridge Port List:			
B	New Terminal		Out. Bridge Port List:	•		
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	C Safe Mode Image: CAPSMAN <	Session: 4C:5E:0C:17: Firewal Filter Rules NAT N Action Cr 0 #I mas sro	F0:3E New NAT Rule General Advanced Action: dst-nat Log Log Prefix: To Addresses: 199.85.126.20 To Ports: 53	 ▼ ▲ 	OK Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
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	Image: Control of the sector of the sect	Session: 4C:5E:0C:17: Fiter Rules NAT N Action Ct 0 #1 mas srd	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: Log Log Prefix: To Addresses: 199.85.126.20 To Ports:	▼ ↓ ↓	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	■ <u></u>
	Image: Control of the section of t	Session: 4C:5E:0C:17: Fitewal Filter Rules NAT N Action Ct 0 #I mas sro	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: Log Log Prefix: To Addresses: 199.85.126.20 To Ports:	 ▼ ▲ 	OK Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
	Image: Control of the section of t	Session: 4C:5E:0C:17: Fitewal Fiter Rules NAT N Action Ct 0 #I mas sro	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat Log Log Prefix: To Addresses: 199.85.126.20 To Ports: 53	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	∎ ि ×
X	Image: Control of the sector of the sect	Session: 4C:5E:0C:17: Fiter Rules NAT N P P P P P P P P P P P P P P P P P P P	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat Log Log Prefix: To Addresses: 199.85.126.20 To Ports: 53	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
1Box	Image: Control of the sector of the sect	Session: 4C:5E:0C:17: Fiter Rules NAT N P P V X # Action Ct 0 # mas sro	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
VinBox	Image: Control of the sector of the sect	Session: 4C:5E:0C:17: Fiter Rules NAT N P P P P P P P P P P P P P P P P P P P	F0:3E New NAT Rule General Advanced Log Log Log Prefix: To Addresses: 199.85.126.20 To Ports:	↓ ↓ ↓	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
S WinBox	Image: Control of the control of t	Session: 4C:5E:0C:17: Fiter Rules NAT N Fiter Rules NAT N Action Ct 0 #I mas sro	F0:3E New NAT Rule General Advanced Log Log Log To Addresses: 199.85.126.20 To Ports: 53	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
-OS WinBox	Image: Control of the sector of the sect	Session: 4C:5E:0C:17: Fiter Rules NAT N Fiter Rules NAT N Action Ct 0 =I mas srd	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	
terOS WinBox	Cafe Mode CAPsMAN Interfaces CAPsMAN Interfaces Vireless Bridge PPP Mesh IPV6 Routing Files Log RADIUS Yools New Terminal Dot1X Partition Make Supout.rfl	Session: 4C:5E:0C:17: Fiter Rules NAT N Fiter Rules NAT N Action Cr 0 =I mas srd	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat	•	Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	t In
outerOS WinBox	Cafe Mode CAPsMAN Interfaces CAPsMAN Interfaces Vireless Bridge PPP Mesh IPV6 Routing Files Log RADIUS Yools New Terminal Dot1X Partition Make Supout.rif Manual	Session: 4C:5E:0C:17: Fiter Rules NAT N # Action Ct 0 # mas sro	F0:3E New NAT Rule General Advanced Extra Action Statistics Action: dst-nat	•	Cancel Cancel Apply Disable Comment Copy Remove Reset Counters Reset All Counters	

Bước 5. Kiểm tra kết quả chuyển hướng lưu lượng DNS tới Norton DNS Server. Khi End User truy cập tới Website có nội dung đồi trụy thì ngay lập tức sẽ bị chuyển hướng tới giao diện cảnh báo Website bị block.



Thống kê lưu lượng DNS đã bị chuyển hướng trên Router MikroTik.

5	Ca Safe Mode Session: 4C:5E:0C:17:F0:3E								
	🔏 Quick Set	Firewall NAT Rule <53>							
	2 CAPsMAN	Filter Rules NAT N	General Adv	anced Extra	Action Statis	tics	ОК		
	Interfaces	+ - × ×	Bytes:	13.4 KiB			Cancel	₹	
	🗊 Wireless	# Action Ch	Packets:	196			Apply	ıt In 🔻	
	Bindge	0 ≓∥mas sro 1 -∥*dst ds		0.1			Disable		
			Rate:	U bps			Disable		
	°të Mesh		Packet Rate:	0 p/s			Comment		
	₽ <u>55</u> IP						Сору		
	Ø MPLS						Remove		
	ve IPv6 ►								
	🔀 Routing 🛛 🗅						Reset Counters		
	🛞 System 🗈						Reset All Counters		
	🙊 Queues								
	Files								
	📄 Log								
	A RADIUS								
	🎇 Tools 🛛 🗅								
×	🔚 New Terminal								
B	∢i> Dot1X								
/in	📮 LCD		Rate:						
	🕗 Partition								
0]] Make Supout.rif								
e l	🕢 Manual	•						+	
out	New WinBox	2 items (1 selected)							

Phần 16. Cấu hình IPv6 trên Router MikroTik.

Phần 16.1. Gán địa chỉ IPv6 trên cổng giao tiếp Interface của Router MikroTik.



Cấu hình địa chỉ IPv6 trên ISP.

hostname ISP				
sdm prefer dual-ipv4-and-ipv6 routing				
exit				
reload				
show sdm prefer				
ipv6 unicast-routing				
interface vlan 1				
ip address 203.0.1.1 255.255.255.0				

ipv6 enable ipv6 address 2001:1::1/64 no shutdown exit

ipv6 route 2001:2::/64 2001:1::2

Gán địa chỉ IPv6 trên cổng giao tiếp ether2 của Router MikroTik.










Lúc này, PC1 vừa có thể ping tới Router MikroTik và ISP bằng IPv4 lẫn IPv6.

Phần 17. Nâng cấp RouterOS trên Router MikroTik.

Phần 17.1. Tìm hiểu tổng quan về các gói cài đặt trên Router MikroTik.

Phần 17.2. Kiểm tra thông tin RouterOS Version hiện tại trên Router MikroTik.

Safe Mode	Auto Upgrade	
Auick Set	Certificates	
CAPsMAN	Clock	
Interfaces	Console	
Wireless	Disks	
Stage Bridge	Drivers	
📑 PPP	Health	
🛫 Switch	History	
°t¦8 Mesh	Identity	
≊ IP ►	LEDs	
🖉 MPLS 🗈 🗈	License	
😹 Routing	Logging	
💮 System 🗈	Packages	
🙊 Queues	Password	
Files	Ports	
E Log	Reboot	
🧟 Radius	Reset Configuration	
< 🄀 Tools 🛛 🗅	Resources	
🖥 🔚 New Terminal	Routerboard	
🔜 MetaROUTER	SNTP Client	
Nartition	Scheduler	
Make Supout.rif	Scripts	
🛛 😯 Manual	Shutdown	
🔘 New WinBox	Special Login	
	Users	

Ю	Call Safe Mode	Session: 192.168.88.	1					— 🛅
	🔏 Quick Set							
	CAPsMAN							
	Interfaces							
	Wireless							
	and Bridge							
	📑 PPP							
	🛫 Switch	Package List						
	°t¦8 Mesh	Check For Upo	dates Enab	Disable	Uninst	all Unschedule	Downgrade	Check Installation
	255 IP 🗅	Name 🛆	Version	Build Time		Scheduled		
	🖉 MPLS 🗈 🗅	erouteros-mipsbe	6.34.4	Mar/24/2016 1	3:13:08			
	Routing	advancedt	6.34.4 6.34.4	Mar/24/2016 1 Mar/24/2016 1	3:13:08			
	All Cuntom	a hotspot	6.34.4	Mar/24/2016 1	3:13:08			
	see System	∃ ipv6	6.34.4	Mar/24/2016 1	3:13:08			
	🖤 Queues	🖨 mpls	6.34.4	Mar/24/2016 1	3:13:08			
	Files	🖨 ppp	6.34.4	Mar/24/2016 1	3:13:08			
	[""] .	routing	6.34.4	Mar/24/2016 1	3:13:08			
	Log	security	6.34.4	Mar/24/2016 1	3:13:08			
	🥵 Radius	🗃 system	6.34.4	Mar/24/2016 1	3:13:08			
	Se Taola	🖨 wireless-cm2	6.34.4	Mar/24/2016 1	3:13:08			
õ	× TOOIS	🗧 wireless-fp	6.34.4	Mar/24/2016 1	3:13:08			
m	🔚 New Terminal							
Vin	🛃 MetaROUTER							
	🕭 Partition	12 items						
Ő] Make Supout.rif							
E	😧 Manual							
no	New WinBox							

Hoặc thông qua phần mềm Winbox kết nối tới Router MikroTik ta cũng có thể kiểm tra được RouterOS Version của thiết bị.

) ad	min@192.168.88.1	1 (MikroTik) - WinBox	v6.34.4 on RB	951G-2HnD (mip	sbe)			_		×
5	◊ ◊ Safe Mode Session: [192.168.88.1] ■										
	2	Quick Set									
	Î	CAPsMAN									
)	Interfaces									
	ŝ	Wireless									
	20	Bridge									
		PPP									
		Switch	Package List								
	°T8	Mesh	Check For Up	dates Enab	ble Disable	Uninst	all Uns	chedule	Downgrade	Check I	nstallation
	255	IP N	Name /	Version	Build Time	5	Scheduled				
	10	MPIC N	🗧 routeros-mipsbe	6.34.4	Mar/24/2016 1	3:13:08					
	\leq	MILO	advanced t	6.34.4	Mar/24/2016 1	3:13:08					
	×,	Routing D	🗃 dhcp	6.34.4	Mar/24/2016 1	3:13:08					
	683	System	hotspot	6.34.4	Mar/24/2016 1	3:13:08					
		0	e ipv6	6.34.4	Mar/24/2016 1	3:13:08					
	2	Queues	1 mpis	6.34.4	Mar/24/2016	3:13:08					
		Files	= ppp	6.34.4	Mar/24/2016 1	3:13:08					
		Log		6.34.4	Mar/24/2016 1	3.13.00					
		Detter	System	6 34 4	Mar/24/2016 1	3.13.08					
	30	Radius	System Wireless-cm2	6.34.4	Mar/24/2016 1	3:13:08					
×	\times	Tools 🗅	🗃 wireless-fp	6.34.4	Mar/24/2016 1	3:13:08					
B	2	New Terminal									
Vin	2	MetaROUTER									
	٩	Partition	12 items								
Ö		Make Supout.rif									
le l	•	Manual									
out	0	New WinBox									

Phần 17.3. Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik.

Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik thông qua phần mềm Winbox.

- Đảm bảo Router MikroTik có kết nối truy cập Internet.

Caller Safe Mode Auto Upgrade Certificates	
A Quick Set Certificates	
CAPsMAN Clock	
Interfaces Console	
͡ ∭ireless Disks	
Drivers Drivers	
Health	
T Switch History	
°Te Mesh Identity	
LEDs	
2 MPLS N License	
K Routing Logging	
Bystem Packages	
Queues Password	
Ports	
Reboot	
Reset Configuration	
Tools Resources	
New Terminal Routerboard	
MetaROUTER SNTP Client	
A Partition Scheduler	
And A Support iff Scripts	
Manual Shutdown	
Special Login	
Users	

5	0	Safe Mode	Ses	sion: 192.168.88.	1								= 🔒
	1	Quick Set											
	Î	CAPsMAN											
		Interfaces											
	î	Wireless											
		Bridge											
		PPP	Pack	kage List									
		Switch	T	Check For Up	dates	Enab	le	Disable	U	ninstall	Unschedule	Downgrade	Check Installation
	0	Mesh	Na	ame /	Version		Build	d Time		Sch	eduled		
	255	IP N	8	routeros-mipsbe	6.34.4		M	ar/24/2016	13:13:	08	cualcu		
	100	MPIS		advancedt	6.34.4		M	lar/24/2016	13:13:	08			
	~	MI LU		dhcp	6.34.4		M	lar/24/2016	13:13:	:08			
	R	Routing		hotspot	6.34.4		M	ar/24/2016	13:13:	:08			
	603	System		🗗 ipv6	6.34.4		M	lar/24/2016	13:13:	:08			
	000	-		1 mpls	6.34.4		M	lar/24/2016	13:13	:08			
	-	Queues		8 ppp	6.34.4		M	lar/24/2016	13:13:	:08			
		Files		Brouting	6.34.4		M	ar/24/2016	13:13:	08			
	[Security	6.34.4		M	lar/24/2016	13:13:	:08			
		Log		🗃 system	6.34.4		M	ar/24/2016	13:13:	:08			
	n.	Radius		🖨 wireless-cm2	6.34.4		M	ar/24/2016	13:13:	08			
×	×	Tools N	-	Swireless-tp	6.34.4		M	ar/24/2016	13:13:	:08			
R	24	New Terminal											
/in		MetaROUTER	12 #	ame									
5	0	Partition		cino	_	_	-	_	-	_	_	_	_
0.0		Make Supout.rif											
fer	9	Manual											
no	0	New WinBox											



Kiểm tra và tải RouterOS phiên bản mới nhất cho Router MikroTik trực tiếp tại trang chủ.

WikroTik Routers and Wire	× +				⇒ _ □ >
< > C ==	mikrotik.com/download				$\triangleright \bigcirc $
Mikro tik	Home About	Buy Jobs	Hardware Sof	ware Support	Training Account
Software	Downloads	Changelogs	Download archive	RouterOS The I	Dude Mobile app
RouterOS 🔊					8
	6.43.14 (Lo	ng-term)	6.44.2 (Stable)	6.45bet	a27 (Testing)
MIPSBE	CRS1xx, CRS2x PowerBox, PWF Groove, Metal, S	ox, DISC, FiberBox, hA R-Line, QRT, RB9xx, S) Sextant, RB7xx	P, hAP ac, hAP ac lite, LDF, I KTsq, cAP, hEX Lite, RB4xx, v	.HG, ItAP mini, mANTBox, m vAP, BaseBox, DynaDish, R	hAP, NetBox, NetMetal, B2011, SXT, OmniTik,
Main package					
Extra packages	B			Ē	
SMIPS	hAP mini, hAP li	te			
Main package	B			Ē	
Extra packages					
TILE	CCR				
Main package					
Extra packages				Ē	
The Dude server					

https://mikrotik.com/download

Firmware của RouterOS tải về thành công.

routeros-mipsbe-6.44.2.npk 4/11/2019 9:40 AM NPK File 11,638 KB

Phần 17.4. Tiến hành nâng cấp RouterOS cho Router MikroTik.

Tiến hành kéo thả **routeros-mipsbe-6.44.2.npk** (RouterOS) vào Work Space của WinBox để nâng cấp Firmware.



Safe Mode	Session: 192.168.88.1		🔳 🛱
CAPSMAN CAPSMAN CAPSMAN CAPSMAN Captor CAPSMAN Captor Cap	File List File Name auto-befi autosupi backupi bk backu bk backu pub Budding routeros-mini- bk backupi	Restore Upload / Type Size sbe (2733.0 KiB of 11.4 MiB at 8	Find Creation Time ▼ ar/25/2019 09:31:02 b/25/2019 17:24:04 b/25/2019 13:34:19 b/26/2019 11:37:30 ar/05/2019 14:26:14 b/26/2019 14:26:14 Cancel b/25/2019 17:23:54
Cueues Cueues Files Cueues A Radius Cueues Cueues Cueue	€ routeros: ⊡skins € user-manager-6.44.2-mipsbe.npk	directory package 8	pr/1/2019 09:43:52 Jan/01/1970 07:00:01 48.1 KiB Apr/11/2019 09:09:49
Mew Terminal MetaROUTER Partition Make Support of Manual	9 items 19.6 MiB	of 128.0 MiB used	84% free
Rew WinBox			

Hoặc cũng có thể nâng cấp RouterOS cho thiết bị bằng cách truy cập vào giao diện File List.

CAPSMAN Interfaces CAPSMAN Interfaces Wreless Switch Switch	ĸ	Safe Mode	Session: 192.168.88.1				
CAPSMAN Iminiferaces Wrieless Solution PPP Solution PPP Solution Pier Name Pier PP Solution Pier Name Pier PP Pier Name Pier Pier Pier Pier Pier Pier Pier Pier		Auick Set					
Image: Interfaces Image: Wireless Image: Bidge Image: PPP Image: Switch Image: Bidge Image: Bidge: Bidge Image: Bidge: Bidge: Bidge Image: Bidge: Bidge		CAPsMAN					
Wireless Wireless Bridge PPP Switch Mesh Mesh PIP Mesh PIP Mesh PIP Mush PIP		Interfaces					
Image: PPP Switch Image: PPP Switch Image: PPP <		Wireless					
File List Image: Switch Image: Switch<		Ster Pridage					
Switch Switch <td></td> <td>and bridge</td> <td>File List</td> <td></td> <td></td> <td></td> <td>×</td>		and bridge	File List				×
SWitch If le Name Type Size Creation Time Image: Creation Time Image: IP Image: Creation Time Image: Creation Ti		PPP	🖃 🍸 🖹 🚷 Backup R	estore Upload		Find	
IP I IP I IP I IP I IP III IP IIII IP IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		Switch	File Name	Туре	Size	Creation Time	-
IP IP IP <td></td> <td>°t¦8 Mesh</td> <td>auto-before-reset.backup</td> <td>backup</td> <td>18.3 KiB</td> <td>Mar/25/2019 09:31:02</td> <td></td>		°t¦8 Mesh	auto-before-reset.backup	backup	18.3 KiB	Mar/25/2019 09:31:02	
Implesting Implesting Implesting I		255 IP	autosupout.rif	.rif file	479.7 KiB	Feb/25/2019 17:24:04	
WirL3 Image: Constraint of the sector of			backup2vlananddnsnoip.backup	backup	21.0 KiB	Feb/26/2019 13:34:19	
Routing P System Imo-ip_ddns_update-ippbx.ddns.net.txt the directory Pation Log Radius Tools Mar/05/2019 14:26:14 Impub I		WIFLD I	🖹 bk.backup	backup	28.7 KiB	Feb/26/2019 11:37:30	_
System Image: System Queues Generation Files Image: System Image: System Image: System Image: S		🐹 Routing 🛛 🗅	no-ip_ddns_update-ippbx.ddns.net.txt	.txt file	19 B	Mar/05/2019 14:26:14	_
		🛞 System 🗈	pub	directory		Feb/25/2019 17:23:54	_
Codedes C			Skins	directory	040 1 1/20	Jan/01/19/00/:00:01	- 100
Files Log Adus Tools MetaROUTER Make Support rif Manual New WinBox		Queues	User-manager-6.44.2-mipsbe.ripk	раскаде	040.1 ND	Apr/11/2015/05:05:45	- 100
Image: Construction of the construc		📄 Files					
Image: Second state in the second s		E Log					
		🧟 Radius					
Image: Second	×	🗙 Tools 🗈 🗈					
MetaROUTER Stems 18.1 MB of 128.0 MB used 85% free	B	🔚 New Terminal					_
Partition Make Supout rf Manual New WinBox	/in	🔜 MetaROUTER	8 items 18.1 MiB of	128.0 MiB used	85	% free	
Make Supout rf Manual New WinBox	8	🕭 Partition					
Manual Second	C	📑 Make Supout.rif					
S New WinBox	PL	😧 Manual					
		🔘 New WinBox					

🕲 Upload File		\times
\leftarrow \rightarrow \checkmark \uparrow \clubsuit > This PC > Downloads > \checkmark \heartsuit	Search Downloads	P
Organize 👻 New folder		?
Fictures A Name	Date modified	^
CneDrive		
📃 This PC		
3D Objects		- 1
E. Desktop		
🔮 Documents		
🖶 Downloads		
👌 Music		
Pictures	4/11/2019 9·40 ΔM	
Videos	4/11/2015 5140 4141	
Lindows-SSD (C		~
Michael V K		>
File name: routeros-mipsbe-6.44.2.npk		~
	Open Cancel	

Safe Mode	Session: 192.168.88.1			— (
🔏 Quick Set				
CAPsMAN				
Interfaces				
Wireless				
Sig Bridge	Ele List			
PPP				
🕎 Switch		Restore Upload		Find
°te Mesh	File Name	∠ Type Size	Creation Time	▼
	Uploading Files		Mar/25/2019 (Feb/25/2019)	J9:31:02 17:24:04
E IF	B backup2		Feb/26/2019	13:34:19
MPLS P	bk.backu Uploading routeros-mips	be (691.1 KiB of 11.4 MiB	at 376.97 kb) Feb/26/2019	11:37:30
🔀 Routing 🛛 🗅	🖹 no-ip_ddr		Mar/05/2019	14:26:14
All Suntam	Dub		Cancel Feb/25/2019	17:23:54
- System	Grouteros₁		Apr/11/2019 (09:47:59
Queues	Skins	directory	Jan/01/1970 (07:00:01
Files	User-manager-6.44.2-mipsbe.npk	package	848.1 KiB Apr/11/2019 (J9:09:49
E Log				
🧟 Radius				
🗙 🎇 Tools 🛛 🗅				
🔏 🕅 New Terminal				
E MetaROUTER	9 items 18.2 MiB	of 128.0 MiB used	85% free	
Nartition				
👸 🗋 Make Supout.rif				
🖸 🕜 Manual				
🗟 🔘 New WinBox				

ĸ	Safe Mode	Session: 192.168.88.1
	Quick Set	
	Bridge	File List
	Image: Switch ℃ Mesh Image: System ▷	File Name / Type Size Creation Time ■ auto-before-reset backup backup 18.3 KB Mar/25/2019 09:31 02 ■ auto-before-reset backup backup 18.3 KB Mar/25/2019 09:31 02 ■ auto-before-reset backup backup 21.0 KB Feb/25/2019 17:24:04 ■ backup2vlananddnsnoip backup backup 21.0 KB Feb/26/2019 11:37:30 ■ no-ip_ddns_update-ippbx.ddns.net.txt thfile 19.8 Mar/05/2019 11:37:30 ■ no-ip_ddns_update-ippbx.ddns.net.txt thfile 19.8 Mar/05/2019 11:27:34 ■ outeros-mipsbe-6.44.2.npk package 11.4 MiB Apr/11/2019 09:48:14 ■ skins directory Jan/01/1970 07:00:01 ■ user-manager-6.44.2.mipsbe.npk package 848.1 KB Apr/11/2019 09:09:49
MinterOS WinBox	Radius Cools Cools	9 items (1 selected) 29.4 MiB of 128.0 MiB used 76% free

Phần 17.5. Tiến hành khởi động lại Router MikroTik.

Tiến khành khởi động lại thiết bị Router MikroTik.





Phần 17.6. Cài đặt các gói Extra packages cho Router MikroTik.

Phần 17.6.1. Tìm hiểu tổng quan về các gói Extra packages trên Router MikroTik. Kiểm tra các gói Packages và chức năng của từng gói.

- Static Route no extra package is needed: system package là đủ.

Package	Features
advanced-tools (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	Advanced ping tools (flood-ping, ping-speed), Netwatch, ip-scan, SMS tool, Wake-on-LAN
calea (mipsle, mipsbe, ppc, x86, mmips, arm)	Data gathering tool for specific use due to "Communications Assistance for Law Enforcement Act" in USA
dhcp (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	Dynamic Host Control Protocol client and server
gps (mipsle, mipsbe, ppc, x86, mmips, arm)	Global Positioning System devices support
hotspot (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	HotSpot captive portal server for user management
ipv6 (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	IPv6 addressing support
Ite (mipsbe)	Required package only for SXT LTE (RBSXTLTE3-7), which contains drivers for the built-in LTE interface.
mpls (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	Multi Protocol Labels Switching support
multicast (mipsle, mipsbe, ppc, x86, mmips, arm, smips)	Protocol Independent Multicast - Sparse Mode; Internet Group Managing Protocol - Proxy
ntp (mipsle, mipsbe, ppc, x86, mmips, arm)	Network protocol server, also includes simplistic client. NTP client is also built into the system package and functions well without this package installed.

https://wiki.mikrotik.com/wiki/Manual:System/Packages

Kiểm tra các gói Package cho Router MikroTik.

5	Cafe Mode	Session: 192.168.88.	I									— 🙃
	Guick Set											
2	CAPsMAN	Auto Upgrade										
		Certificates										
3	Wireless	Clock										
50	Pridae	Console										
29		Disks										
	= Switch	History										
	Mash	Identity	- 1									
200		LEDs	- 1									
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		License	- 1									
		Logging	- 1									
		Packages										
89	9 System	Password	-1									
2		Ports	- 1									
	Files	Reboot	- 1									
		Reset Configuration	- 1									
ŏ	A RADIUS	Resources	-1									
ē×		Bouterboard	-1									
	New Terminal	SNTP Client	-1									
S	MetaROUTER	Scheduler	-1									
Q 4	Partition	Scrinte	-1									
E L	Make Supout.rif	Shutdown	-1									
B	Manual	Special Login	-1									
<u> </u>	New WinBox		- 8									
5	Call Safe Mode	Session: 192.168.88.	1									
Â	Quick Set											
Ĵ	CAPSMAN											
30	Interfaces											
Ĵ	Wireless											
1	Bridge											
	PPP											
	Switch	Package List										
9	8 Mesh	Check For Up	lates	Enabl	e	Disable	U	ninsta	II Unschedule	Downg	rade	Check Installation
25	≦IP ト	Name /	Version		Buil	d Time		S	cheduled			
4	MPLS N	@routeros-mipsbe	6.44.2		ŀ	pr/01/2019	12:47	:57				
×	Routing	advancedt dhcp	6.44.2		F	Apr/01/2019	12:47 12:47	:57 :57				
6	System	@ hotspot	6.44.2		ŀ	pr/01/2019	12:47	:57				
9	Queues	🖨 ipv6	6.44.2		ł	Apr/01/2019	12:47	:57				
	Files	@ppp	6.44.2		ł	pr/01/2019	12:47	:57				
	Log	a routing	6.44.2		F	Apr/01/2019	12:47	:57				
$\times \mathscr{A}$	RADIUS	a system	6.44.2		F	pr/01/2019	12:47	:57				
8 ×	Tools	a wireless	6.44.2		ł	Apr/01/2019	12:47	:57				
lin 🛛	New Terminal	user-manager	0.44.2		F	pr/01/2019	12:4/	.37				
5	MetaROUTER											
SO 🖌	Partition	12 items										
er l	Make Supout.rif	12 ICHIS	-	_	_	_			_	-	-	
out	Manual											
2	New WinBox											

Phần 17.6.2. Cài đặt gói user-manager trên Router MikroTik.

Sử dụng gói user-manager của MikroTik để quản lý tập trung người dùng truy cập hệ thống Hotspot, gói user-manager cũng kiêm tính năng của một RADIUS Server. Truy cập trang <u>http://www.mikrotik.com/download</u> rồi chọn phiên bản phù hợp với thiết bị và version đang dùng và download gói **Extra packages** về.

MikroTik Routers and Wire X	+				Ţ	_ □	×
< > C 🔠 🔒 mikr	rotik.com/download					$\triangleright \bigcirc$	₹
Mikro Tik	Home About	Buy Jobs	Hardware So	ftware Supp	ort Train	ing Accour	nt
Software	Downloads	Changelogs	Download archive	RouterOS	The Dude	Mobile app	Ŀ,
RouterOS 🔊						?	
	0 40 44 //						
	6.43.14 (Lon	g-term)	6.44.2 (Stable)	6.4	15beta27 (T	esting)	
MIPSBE	CRS1xx, CRS2xx, PowerBox, PWR-L Groove, Metal, Sex	DISC, FiberBox, hAF ine, QRT, RB9xx, SX xtant, RB7xx	P, hAP ac, hAP ac lite, LDF, Tsq, cAP, hEX Lite, RB4xx,	LHG, ItAP mini, mAN wAP, BaseBox, Dyna	TBox, mAP, NetE IDish, RB2011, S	Box, NetMetal, XT, OmniTik,	
Main package					1		
Extra packages			Ē		1		
SMIPS	hAP mini, hAP lite						
Main package					1		
Extra packages					1		
TILE	CCR						
Main package					1		
Extra packages					1		
The Dude server					1		
🖀 all packages-mip	sbe-6.44.2.zip	4/11/	2019 9:04 AI	M Wi	inRAR Z	IP archive	

- Tải gói Extra packages tương ứng với thiết bị RB951G-2HnD.

Sau khi download về chúng ta giải nén và upload file **user-manager-6.44.2-mipsbe.npk** lên **File List** và reboot lại router để cài đặt.

-	N	^			C:
📌 Quick access	Name		Date modified	Type	Size
- Deskton	🖌 📄 advanced-to	ools-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	101 K
	calea-6.44.2	-mipsbe.npk	4/4/2019 10:35 AM	NPK File	21 K
Downloads	dhcp-6.44.2	-mipsbe.npk	4/4/2019 10:35 AM	NPK File	185 K
/ Documents	🧖 📄 gps-6.44.2-ı	mipsbe.npk	4/4/2019 10:35 AM	NPK File	53 K
E Pictures	hotspot-6.4	4.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	185 KI
a OneDrive	ipv6-6.44.2-	mipsbe.npk	4/4/2019 10:35 AM	NPK File	233 KI
	lcd-6.44.2-m	nipsbe.npk	4/4/2019 10:35 AM	NPK File	57 K
狊 This PC	lte-6.44.2-m	ipsbe.npk	4/4/2019 10:35 AM	NPK File	1,945 K
📙 3D Objects	mpls-6.44.2	-mipsbe.npk	4/4/2019 10:35 AM	NPK File	97 K
늘 Desktop	multicast-6.4	44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	73 K
📔 Documents	ntp-6.44.2-r	nipsbe.npk	4/4/2019 10:35 AM	NPK File	261 K
Downloads	openflow-6.	44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	77 K
Music	ppp-6.44.2-	mipsbe.npk	4/4/2019 10:35 AM	NPK File	305 K
Distance	routing-6.44	I.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	121 K
E Pictures	security-6.44	4.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	317 K
🔚 Videos	system-6.44	.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	7,492 K
🐛 Windows-SSD (:) tr069-client-	6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	137 K
🧼 Network	ups-6.44.2-r	mipsbe.npk	4/4/2019 10:35 AM	NPK File	65 K
	user-manag	er-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	849 KI
	wireless-6.44	4.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File	2.693 KE

K)	Safe Mode	Session: 192.168.88.1				6
	Quick Set CAPsMAN Interfaces Wireless Bridge PPP	File List				
	🛫 Switch	File Name	A Type	ad Size	Creation Time	
	°t¦8 Mesh	auto-before-reset backup	backup	18.3 KiB	Mar/25/2019 09:31:02	
	255 IP	autosupout.rif	.rif file	479.7 KiB	Feb/25/2019 17:24:04	
		🖹 backup2vlananddnsnoip.backup	backup	21.0 KiB	Feb/26/2019 13:34:19	
	W MPLS	B bk.backup	backup	28.7 KiB	Feb/26/2019 11:37:30	
	😹 Routing 🛛 🗅	🖹 no-ip_ddns_update-ippbx.ddns.net	.txt .txt file	19 B	Mar/05/2019 14:26:14	
	All Sustem	pub	directory		Feb/25/2019 17:23:54	
	Ser System	skins	directory		Jan/01/1970 07:00:01	
Box	Gueues Files Log Radius Tools New Terminal					
.5		7 items 17.3 Mi	B of 128.0 MiB used	86	% free	
	Partition					
C	Aake Supout.rif					
ter	Manual					
B	New WinBox					

← → • ↑ 📜 > This PC > Windows-SSD (C:) > Users > ThienAnCS > Downloads > all_packages-mipsbe-6.44.2

Supload File		~
		~
\leftarrow \rightarrow \checkmark \uparrow \blacksquare « Dow \rightarrow all_packages-mipsbe \checkmark \eth	Search all_packages-mip	psbe 🔎
Organize 🔻 New folder		
🗄 Documents 🖈 ^ Name	Date modified	Туре ^
E Pictures * mpls-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
CoeDrive multicast-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
ntp-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
This PC openflow-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
3D Objects ppp-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
Desktop routing-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
Documents Documents Security-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
Downloads	4/4/2019 10:35 AM	NPK File
tr069-client-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
ups-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
Pictures user-manager-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File
Videos wireless-6.44.2-mipsbe.npk	4/4/2019 10:35 AM	NPK File 🗸
🛀 Windows-SSD (C 🗸 <		>
File name: user-manager-6.44.2-mipsbe.npk		~
	Open	Cancel

Ŋ	Safe Mode	Session: 192.168.88.1
	🔏 Quick Set	
	CAPsMAN	
	Interfaces	
	Wireless	
	Bridge	
	PPP	
	🕎 Switch	Find
	ore Meeh	File Name / Type Size Creation Time 🔻
		■ auto-before-reset.backup backup 18.3 KiB Mar/25/2019 09:31:02
	IP D	autosupout.mt .nt Tile 4/3./ KiB Feb/25/2019 17:24:04
	🖉 MPLS 💦 🗅	Dackup zvlanahodnsholp.backup backup 21.0 NB reb/26/2019 13:34:19 bk backup 29 7 k/9 Esh /36/2019 11:37:20
	Routing	Dackup 20.7 ND 160/20/2013 11:37:30
		Doub directory Feb/25/2019 17:23:54
	In System ■	Skins directory Jan/01/1970 07:00:01
	🙊 Queues	Buser-manager-6.44.2-mipsbe.npk package 848.1 KiB Apr/11/2019 09:09:49
	📄 Files	
	📄 Log	
	🧟 Radius	
×	🄀 Tools 🛛 🗎	
B	New Terminal	
/in	MetaROUTER	8 items (1 selected) 18.1 MiB of 128.0 MiB used 85% free
1	🕭 Partition	
00	📑 Make Supout.rif	
ler	😧 Manual	
out	Sew WinBox	

Khởi động lại thiết bị sau khi import các Package thành công vào Router MikroTik.

Safe Mode	Session: 192.168.88.1	
Auick Set		
CAPsMAN	Auto Upgrade	
Interfaces	Certificates	
 Wireless 	Clock	
📲 🖁 Bridge	Console	
📑 PPP	Disks	
🛫 Switch	History	
°t <mark>8</mark> Mesh	Identity	
255 IP N	LEDs	
🖉 MPLS 🗈 🗅	License	
😹 Routing 🛛 🗅	Logging	
💮 System 🗅	Packages	
Queues	Password	
Files	Ports	
E Log	Reboot	
A RADIUS	Reset Configuration	
💥 Tools 🔹 🗅	Resources	
📰 New Terminal	Routerboard	
MetaROUTER	SNTP Client	
netition 🕗	Scheduler	
📑 Make Supout.rif	Scripts	
😧 Manual	Shutdown	
S New WinBox	Special Login	
	Users	

Kiểm tra trong System - Package đã có gói user-manager vừa cài đặt chưa.

Safe Mode	Auto Upgrade	•
A Quick Set	Certificates	
CAPsMAN	Clock	
Interfaces	Console	
î Wireless	Disks	
Bridge	Drivers	
PPP	Health	
 ∰ Switch	History	
°t¦8 Mesh	Identity	
255 IP	LEDs	
Ø MPLS	License	
🐹 Routing	Logging	
🛞 System 🗅	Packages	
Queues	Password	
Files	Ports	
E Log	Reboot	
🥵 Radius	Reset Configuration	
🗙 🄀 Tools 🔹 🗈	Resources	
🖁 🔤 New Terminal	Routerboard	
MetaROUTER	SNTP Client	
Partition	Scheduler	
Make Supout.rif	Scripts	
👿 😯 Manual	Shutdown	
🗧 💿 New WinBox	Special Login	
	Users	

5	0	Safe Mode	S	ession: 192.168.88.	1								= 🔒
	1	Quick Set											
	Î	CAPsMAN											
)	Interfaces											
	ŝ	Wireless											
	22	Bridge											
		PPP	Pa	ackage List									
		Switch	5	Check For Up	dates	Enable		Disable	Unin	stall	Unschedule	Downgrade	Check Installation
	°tô	Mesh		Namo (Version		D. il	d Time		Sab	adulad		
	255	IP		Prouteros-mipsbe	6.44.2		A	pr/01/2019	12:47:57	SCH	eduled		
	m	MPLS	N	advanced t	6.44.2		A	pr/01/2019	12:47:57	1			
	×		N.	🗃 dhcp	6.44.2		A	pr/01/2019	12:47:57	1			
	24	Routing	P2	hotspot	6.44.2		A	pr/01/2019	12:47:57	1			
		System		eripv6	6.44.2		A	pr/01/2019	12:47:57				
		Queues		e mpis	6.44.2		P	pr/01/2015	12:4/:5/				
	-	Dise		E ppp	6.44.2		-	pr/01/2019	12.47.57	,			
		Flies		a security	6.44.2		A	pr/01/2019	12:47:57	,			
		Log		System	6.44.2		A	pr/01/2019	12:47:57	1			
~	and.	RADIUS		@ wireless	6.44.2		A	pr/01/2019	12:47:57	1			
Bo)	×	Tools		🖨 user-manager	6.44.2		A	pr/01/2019	12:47:57	'			
/in	2	New Terminal											
5		MetaROUTER	10	h-16									
0S	1	Partition	12	tems	_		_		_	_			
ter		Make Supout.ri	F										
Inc	9	Manual											
Ř	0	New WinBox											

Truy cập vào WebPage bằng gói user-mananger.

- HyperLink: http://192.168.88.1/user

Phần 18. Cấu hình tính năng WiFi trên Router MikroTik.

Phần 18.1. Cấu hình Router MikroTik phát SSID đầu tiên.

Router MikroTik phát SSID với tên mặc định là "MikroTik-448DC3" tương ứng với với MAC-Identifier của thiết bị với WiFi Password là rỗng.

CAPsMAN	Wireless				Internet	
Interfaces	Network Name:	Mikm Tik 449DC2				C Statio C Auto
🚊 Wireless	TVELWOIK INdille.	MIKIO TIK-440DC3			Address Acquisition.	
📲 🖁 Bridge	Frequency:	auto	•	MHz	IP Address:	192.168.2.21
📑 PPP	Band:	2GHz-B/G/N		₹	Netmask:	255.255.255.0 (/2
🕎 Switch	Country:	no_country_set		₹	Gateway:	192.168.2.1
⁰t <mark>8</mark> Mesh	MAC Address:	64:D1:54:44:8D:C3				
IP N		Use Access List (ACL)	1		MAC Address:	64:D1:54:44:8D:E
🖉 MPLS 🛛 🗅						 Firewall Router
😹 Routing 🛛 🗅	WiFi Password:				Local Network	
∰ System ト	- Guest Wireless Netwo	rk —			IP Address:	192.168.88.1
Queues	Guest Network:			-	Netmask	255 255 255 0 (/)
Files					Houndar.	DHCP Server
E Log	- Wireless Clients				DUCR Seaves Bennes	102 109 09 10 10
🥵 Radius	MAC Address	∠ In ACL Last IP	Uptime	Sig▼	DHCF Server Hange.	132.100.00.10-13
🎇 Tools 🛛 🗅						
New Terminal						
E MetaROUTER				-	VPN	
🕭 Partition						VPN Access
📑 Make Supout.rif					VPN Address:	642e07a954bf.sn
🔁 Manual				_	System	
New WinBox	•			•	-,	Check For



Hiệu chỉnh chuẩn không dây Band trên Router MikroTik.

Quick Set	Home AP F Qui	ck Set					
CAPSMAN						AL 282 - 52	
Interfaces	- Wireless					- Internet	
📜 Wireless	Network Nam	e: Mikro	Tik-448DC3			Address Acquisition:	C Static C Autom
Bridge	Frequence	y: auto			▼ MHz	IP Address:	192.168.2.21
PPP	Ban	d: 2GHz	-B/G/N		Ŧ	Netmask:	255.255.255.0 (/24
🕎 Switch	Count	2GHz y: 2GHz	-B -only-G			Gateway	192 168 2 1
°t <mark>8</mark> Mesh	MAC Addres	S: 2GHz	-B/G			catonay.	102.100.2.1
255 IP	1	2GHz	-B/G/N			MAC Address:	64:D1:54:44:8D:BE
Ø MPLS	r						✓ Firewall Router
😹 Routing	MiFi Passwor	d:			•	- Local Network	
System	- Guest Wireless Net	work —				IP Address:	192,168,88,1
Queues	Guest Networ	k:			•	Netmaek	255 255 255 0 (/24
Files						Neuridan.	
Log	- Wireless Clients -					DUCD C D	
🥵 Radius	MAC Address	∠ In A	CL Last IP	Uptime	Sig ▼	DHCP Server Range:	192.168.88.10-192.
🔀 Tools	DU.F4.0D.A5.5C.5	J NO	132.100.00.23	00.01.10	-42		V NAT
New Terminal							
						- VPN	
🕭 Partition							VPN Access
📑 Make Supout.ri						VPN Address:	642e07a954bf.sn.m
😧 Manual						- System	
S New WinBox	•				•		Check For U

Giám sát và hiệu chỉnh các tham số settings tương ứng với mạng không dây phát ra của Router MikroTik.

5	Q	Safe Mode	е	Session: 19	2.168.88.1								
	🔏 Q.	uick Set											
	<u>î</u> C/	APsMAN											
	jes Int	terfaces											
	ĴW	/ireless	_										
	Star Br	idge	_	Wireless Tal	bles							1	
	📬 Pi	PP		Interfaces	Nstreme Dua	al Access List	Registration	Connect	t List Security	/ Profiles	Channels		
	🛫 Sv	witch		+ -	✓ ×		CAP	canner	Freq. Usage	Align	ment Wi	reless Sniffer	Wirele
	°t¦8 M	esh		Name	1	Туре	L2	MTU Tx	t i	F	λx	T	x Packet
	255 IP		\triangleright	RS 🚸wl	an1	Wireless (Athe	eros AR9	1600		0 bps		0 bps	
	🖉 М	PLS	\triangleright										
	😹 Ro	outing	$\[\]$										
	🎲 Sy	ystem	$\[\]$										
	👰 Qı	ueues											
	📄 Fil	les											
	E Lo	og											
	🧟 Ra	adius											
×	×та	ools	Þ										
B	🔚 Ne	ew Terminal		•									
Vin	🛃 М	etaROUTER		1 item out o	f 7 (1 selected)							
>	🕭 Pa	artition											
ò	📑 M	ake Supout.ri	f										
ter	🛛 M	anual											
no	🔘 Ne	ew WinBox											

5	Safe Mode	Sessio	n: 192.168.88.1			a
Â	Quick Set		Interface <wlan1></wlan1>			
Ĵ.	CAPsMAN		General Wireless H1	HT MCS WDS Nstreme Status Traffic		ок
)	Interfaces		Mode:	ap bridge	.	Cancel
	Wireless Didee	Wireles	Band:	2GHz-B/G/N	.	Apply
29		Interfa	Channel Width:	20/40MHz Ce	T	
	Switch		Frequency:	auto	MHz	Disable
े भ	Mesh		SSID:	Mikro Tik-448DC3		Comment Packet (
255	IP ♪	RS ·	Scan List:	default 두	Adva	anced Mode
	MPLS N		Wireless Protocol:	802.11	₹	Torch
2	Routing D		Security Profile:	default	T	Scan
	System		Bridge Mode:	enabled	∓ Fre	q. Usage
2	Queues					Align
	Files		VLAN Mode:	no tag		Sniff
0	Badius		VLAN ID:	1		incoper
\times	Tools		Default AP Tx Rate:		bps Reset	Configuration
8	New Terminal		Default Client Tx Rate:	•	bps	
/in	MetaROUTER	1 item		Defects Antheopticate	_	
2	Partition	<u></u>				
õ	Make Supout.rif			Hide SSID		
e el	Manual					
00	New WinBox					

- Giám sát lưu lượng trao đổi thông qua môi trường mạng không dây.

Ю	Cafe Mode	Session: 192.168.88.1	= 🙃
	🄏 Quick Set	Interface <wlan1></wlan1>	
	CAPsMAN	General Wireless HT HT MCS WDS Nstreme Status Traffic	ОК
	Interfaces	Tx/Rx Rate: 2.3 kbps / 616 bps	Cancel
	Wireless	Tx/Rx Packet Rate: 2 p/s / 1 p/s	
	Bridge	Wirele	Apply
	📑 PPP	Interfa FP Tx/Rx Rate: 0 bps / 616 bps	Disable
	🕎 Switch	FP Tx/Rx Packet Rate: 0 p/s / 1 p/s	Comment
	°t <mark>°</mark> Mesh		Packet (
	255 IP N	RS Tx/Rx Bytes: 121.2 KiB / 50.0 KiB	Advanced Mode
	🖉 MPLS 🛛 🗅	Tx/Rx Packets: 1012 / 281	Torch
	😹 Routing 🛛 🗅	Tx/Rx Drops: 0 / 0	Scan
	∰ System ト	Tx/Rx Errors: 0 / 0	Freq. Usage
	👰 Queues		Alian
	📄 Files		Align
	📄 Log		Sniff
	🧟 Radius		Snooper
×	🎇 Tools 🛛 🗅		Reset Configuration
B	📰 New Terminal		
Vin	🖳 MetaROUTER	1 item	
>	🕗 Partition		
õ] Make Supout.rif		
ter	😧 Manual	Tx: 2.3 kbps	
DO	New WinBox	Rx: 616 bps	

Phần 18.2. Hiệu chỉnh chuẩn bảo mật mạng không dây trên Router MikroTik.



	Safe Mode	Session: 192.1	68.88.1						II 🔒
	🎢 Quick Set		Interface <wlan1></wlan1>						
	CAPsMAN		General Wireless H	HT HT MCS	WDS Nst	reme Status	Traffic		ОК
	Interfaces		Mode	ap bridge				₹	Cancel
	© Wireless	Wireless Table	Band	: 2GHz-B/G/N	N			Ŧ	Apply
	Bridge	Interfaces N	Channel Width:	: 20/40MHz C)e			Ŧ	Арріу
	E PPP		Frequency	auto			₹	MHz	Disable
	Switch		SSID	MikroTik-44	RDC3				Comment
		RS &wlan	Soon List:	default			I		Advanced Mode
			Wireless Preteopl	. 002.11				_ ▼ ∓	Torch
	Routing		Wireless Protocol.	. 002.11					Soan
	itilitie System ►		Security Profile:	Sec Wift Profil	e			•	Scan
	Queues		Bridge Mode:	: enabled				₹	Freq. Usage
	Files		VLAN Mode:	no tag				∓	Align
	Eog		VLAN ID:	: 1					Sniff
×	🥵 Radius								Snooper
Bo	🄀 Tools 🗈		Default AP Tx Rate:	:			•	bps	Reset Configuration
Nin	New Terminal	•	Default Client Tx Rate:	:			•	bps	
- 0	MetaROUTER	1 item out of 7		✓ Default Au	uthenticate				
ç	Partition			✓ Default For	orward				
te	Make Supout.rif			Hide SSI	0				
Į į	Manual								
Ľ	Wew WinBox								

Phần 18.3. Hiệu chỉnh công xuất phát dBm trên Router MikroTik.

Ľ	Safe Mode Session:	192.168.88.1		
	Auick Set	Interface <wlan1></wlan1>		
	CAPsMAN	General Wireless HT HT MC	S WDS Nstreme Status Traffic	ок
	Interfaces	Mode: ap bridge		∓ Cancel
	Wireless	Band: 2GHz-B/	G/N	
	Bridge Wireless	able Channel Width: 20/40Mb	h Co	Apply
	PPP Interface	N Channel Width. 20/40MP	12 Ce	Disable
	🛒 Switch 🚽 ⊏	, Frequency: auto	•	Comment
	°t; Mesh Nar	sSID: MikroTik	448DC3	
	5 IP 🖻 RS 🚸	vlan ¹ Scan List: default		∓ ♦ Advanced Mode
	Ø MPLS	Wireless Protocol: 802.11		∓ Torch
	🔀 Routing	Security Profile: SecWifiP	rofile	Scan
	∰ System ▷	Bridge Mode: enabled		Freq. Usage
	Queues			Align
	Files	VLAN Mode: no tag		₹
	Log	VLAN ID: 1		Shim
	Radius			Snooper
¢	🔏 🄀 Tools 🗈	Default AP Tx Rate:		Reset Configuration
	🗧 🔤 New Terminal 🗼	Default Client Tx Rate:	•	bps
1	MetaROUTER 1 item out	of 7	h Authoritanta	
ł	Partition		t Authenticale	
	🔲] Make Supout.rif			
	🗧 🔃 Manual	_ Tide c		
d	🖉 🍥 New WinBox			
ľ				

	Safe Mode	Session: 192.	168.88.1			🔳 🗇	
Γ	🔏 Quick Set		Interface <wlan1></wlan1>				
	CAPsMAN		General Wireless Da	ata Rates Advanced HT HT MCS WDS		OK	
	Interfaces		Mode:	ap bridge		General	
	🚊 Wireless		Band:	2GHz-B/G/N	~	Wireless	
	퉕ઢ Bridge	Wireless Table:	Chappel Width:	20/40MHz Co		Data Rates	
	📑 PPP	Interfaces N				Advanced	
	🛫 Switch	+ ▼ □	Frequency:	auto		нт	
	°t¦8 Mesh	Name	SSID:	MikroTik-448DC3		HT MCS	
	IP N	RS @wlan	Radio Name:	64D154448DC3	1	WDS	
	Ø MPLS		Scan List:	default		Nstreme	
	😹 Routing 🗈		Wireless Protocol:	802.11		Tx Power	
	∰ System ♪		Security Profile:	SecWifiProfile		Current Tx Power	
	🙊 Queues					Status	
	Files		Frequency Mode:	manual-txpower	Traffic		
	Log		Country:	no_country_set	Ŧ		
ž	Radius		Antenna Gain:	0	dBi	Snooper	
B	🗙 Tools 🗈					Reset Configuration	
Nir	New Terminal	•	DFS Mode:	none			
5	MetaROUTER	1 item out of 7	Proprietary Extensions:	post-2.9.25	₹		
Q	Partition		WMM Support:	disabled	₹		
te l	Make Supout.rif		Bridge Mode:	enabled	₹		
0	🥶 Manual						
Ω.	New WinBox		VLAN Mode:	no tag	₹		

5	C ⁴ Safe Mode	Session: 192.1	68.88.1							= 🔒
	🔏 Quick Set		Interfac	e <wlan< th=""><th>1></th><th></th><th></th><th></th><th></th><th></th></wlan<>	1>					
	CAPsMAN		WDS	Nstren	ne Tx Pow	er Current	Tx Power	Status Traffic	:	
	Interfaces		- Curre	ent Tx P	owers					
	Wireless		Rat	e 🛆	Tx Power	Real Tx P	Total Tx		-	Cancel
	St Bridge	Wireless Table	1Mt	ops	26dBm	26dBm	29dBm	1		Apply
		Interfaces N	2Mb	ops	26dBm	26dBm	29dBm	1		
			5.5	Mbps	26dBm	26dBm	29dBm	1		Disable
	🛫 Switch	╋╸━	GMB	lbps	25dBm 27dBm	25dBm 27dBm	28dBm 20dBm	1		Comment
	°t¦8 Mesh	Name	901	ns	27dBm	27dBm	30dBm	1		
	255 IP	RS «>wlan	121	lbps	27dBm	27dBm	30dBm	1		Simple Mode
			181	lbps	27dBm	27dBm	30dBm	1		
	WPLS P		241	lbps	27dBm	27dBm	30dBm	1		Torch
	🌌 Routing 🛛 🗅		361	lbps	25dBm	25dBm	28dBm	1		Scan
	🍪 System 🗈		48N	lbps	23dBm	23dBm	26dBm	1		
			541		22dBm 27dBm	22dBm 27dBm	25dBm	1		Freq. Usage
	gueues		HT	20-0	2/dBm	2/dBm	29dBm	1		Alian
	Files		HT	20-2	26dBm	26dBm	29dBn	1		
	E Log		HT	20-3	26dBm	26dBm	29dBm	1		Sniff
	A Dadius		HT	20-4	26dBm	26dBm	29dBm	1		Second
lă			HT	20-5	26dBm	26dBm	29dBm	1		Shooper
ы	🔀 Tools 🛛 🗅		HT	20-6	23dBm	23dBm	26dBm	1		Reset Configuration
<u> </u>	New Terminal		HT	20-7	20dBm	20dBm	23dBm	1		
$ \geq$		•	HT4	40-0	26dBm	26dBm	29dBm	1		
S		1 item out of 7	HT4	40-1	26dBm	26dBm	29dBm	1		
Ö	🥭 Partition		HI4	10-2	26dBm	26dBm	29dBm	1		
L L	🗋 Make Supout.rif		HT	10-3	26dBm	26dBm	29dBn	1		
μ	Manual		HT	40-5	25dBm	25dBm	28dBn	1		
ō			HT4	40-6	23dBm	23dBm	26dBm	1		
R	Sew WinBox		HT4	40-7	20dBm	20dBm	23dBm	1		

- Hiệu chỉnh Tx Power thủ công.

	Safe Mode	Session: 192.1	168.88.1						a
	🎢 Quick Set		Interface <wlan1></wlan1>						
	CAPsMAN		WDS Nstreme	Tx Power	Current Tx Power	Status	Traffic		ОК
	Interfaces		Tx Power Mode:	default				Ŧ	Cancel
	Wireless	Wireless Table		all rates fixe card rates	ed				Apply
	Bindge	Interfaces N		default manual					
	Switch	₽- =							Disable
	°t¦8 Mesh	Name							Comment
	255 IP N	RS 🚸wlan							Simple Mode
	🖉 MPLS 🛛 🗅								Torch
	😹 Routing 🛛 🗅								Scan
	iiii System ▷								Freq. Usage
	Queues								Align
									Sniff
×	A Radius								Snooper
Bo	🔀 Tools 🗈 🗈								Reset Configuration
Vin	📰 New Terminal	•							
	MetaROUTER	1 item out of 7							
ç	Partition								
Ite	Make Supout.rif								
Rol	New WinBox								
Route	Make Supout.rif Manual New WinBox								

Safe Mode S	Session: 192.168.88.1					a
🔏 Quick Set	Interface <wl< td=""><td>an1></td><td></td><td></td><td></td><td></td></wl<>	an1>				
CAPsMAN	WDS Nstr	eme Tx Power C	urrent Tx Power	Status Traffic		ОК
Interfaces	Tx Power M	ode: manual			∓	Cancel
Wireless	- Tx Powers					
Bridge	1Mbps:	0	dBm 2Mbps:	19	dBm	Apply
PPP I	5.5Mbps:	1	dBm 11Mbps:	19	dBm	Disable
I Switch	fr▼ □ □ 6Mbps:	8	dBm 9Mbps:	19	dBm	Comment
°t¦ Mesh	Name 12Mbps:	9	dBm 18Mbps:	19	dBm	
	24Mbps	10	dDm 20Mbaa	10		Simple Mode
MPLS P	24IVIDPS:	10	abm 36Mbps:	19	GBM	Torch
🐹 Routing 🗈	48Mbps:	11	dBm 54Mbps:	19	dBm	Scan
titiki System ►	HT20-0:	12	dBm HT20-1:	17	dBm	Freg. Usage
Rueues	HT20-2:	13	dBm HT20-3:	17	dBm	Alian
Files	HT20-4:	14	dBm HT20-5:	17	dBm	C-#
Log	HT20-6:	15	dBm HT20-7:	17	dBm	Snitt
Radius	HT40-0:	16	dBm HT40-1:	17	dBm	Snooper
	HT40.2	17	dBm HT40.3	17	dBm	Reset Configuration
New Terminal	•	17	ubiii 11140-5.	17		
MetaROUTER 1	item out of 7 H140-4:	18	dBm H140-5:	1/	dBm	
🏹 🕗 Partition	HT40-6:	19	dBm HT40-7:	17	dBm	
👩 🛄 Make Supout.rif						
🗟 😳 Manual						
🗠 🔘 New WinBox						



- Hiệu chỉnh công xuất phát Tx Power:
 - o Giá trị Tx Power mặc định là: 17

5	Call Safe Mode	Session: 192.1	168.88.1							a
	🔏 Quick Set		Interface	<wlan1></wlan1>						
	CAPsMAN		WDS	Nstreme	Tx Power	Current Tx Power	Status	Traffic		ОК
	Interfaces		Tx Pow	er Mode:	card rates				₹	Cancel
	Wireless		1	x Power:	19				dBm	
	📲 🖁 Bridge	Wireless Table								Apply
	📑 PPP	Interfaces N								Disable
	🛫 Switch	+								Comment
	°t¦8 Mesh	Name								
	IP D	RS «wian								Simple Mode
	🖉 MPLS 🛛 🗅									Torch
	🔀 Routing 🛛 🗅									Scan
	∰ System ►									Freq. Usage
	Queues									Alian
	Files									C#
	Log									Shint
X	🥵 Radius									Snooper
ĕ	💥 Tools 🛛 🗅									Reset Configuration
-i-	New Terminal	•								
	MetaROUTER	1 item out of 7								
Ŏ	🕭 Partition									
te	🔋 Make Supout.rif									
DO	😧 Manual									
Ř	New WinBox									

Safe Mode	Session: 192.168.88.1	= 🙃
🔏 Quick Set	Interface <wlan1></wlan1>	
CAPsMAN	WDS Nstreme Tx Power Current Tx Power Status Traffic	ОК
	Tx Power Mode: default	Cancel
	Wireless Table	Apply
	Interfaces N	Disable
🕎 Switch		Disable
°t¦8 Mesh	Nar	Comment
IP D	RS 🚸 RouterOS WinBox Error	Simple Mode
🖉 MPLS 🛛 🗅	Couldn't change Interface <wlan1> - tx-power-mode not supported (6)</wlan1>	Torch
🔀 Routing 🗅		Scan
∰ System ♪		Freq. Usage
Queues		Align
Files		Sniff
E Log		Spooper
Tools		Boost Configuration
New Terminal		Reset Conliguration
MetaROUTER	1 item out of 7	
😚 🤚 Partition		
👌 🗋 Make Supout.rif		
🔁 🔮 Manual		
🗠 🔘 New WinBox		

- Giá trị Tx Power mặc định là 17:

5	Safe Mode	Session: 192.168.88.1	
	🄏 Quick Set	Interface <wlan1></wlan1>	
	CAPsMAN	WDS Nstreme Tx Power Current Tx Power Status Traffic	ОК
		Tx Power Mode: all rates fixed ▼	Cancel
	Wireless	Wireless Table Tx Power: 19 dBm	Apply
	DDD	Interfaces N	
	Switch		Disable
	°t <mark>8</mark> Mesh	Name	Comment
	IP N	S (#>wlan	Simple Mode
	🖉 MPLS 🗈 🗅		Torch
	😹 Routing 🛛 🗅		Scan
	⊕ System ►		Freq. Usage
	Queues		Align
			Sniff
J	A Radius		Snooper
BO	🗶 Tools 🔹 🗅		Reset Configuration
/in	🔚 New Terminal		
5	MetaROUTER	1 item out of 7	
õ	Partition		
Itel	Ake Supout.rif		
SoL	💓 Manual		
ш	New WinBox		

Safe Mode	Session: 192.	168.88.1								🔲 🗇
Quick Set		Interface <wlan1< th=""><th>></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></wlan1<>	>							
CAPsMAN		WDS Nstreme	e Tx Power	Current	Tx Power	Status	Traffic			OK
🛲 Interfaces		- Current Tx Po	wers							UK
🗊 Wireless		Rate 🛆 T	x Power R	eal Tx P	Total Tx				•	Cancel
and ge Bridge	Wireless Table	1Mbps	19dBm	19dBm	22dBm	1				Apply
📑 PPP	Interfaces N	5.5Mbps	19dBm	19dBm	22dBm 22dBm	1				Disable
🕎 Switch	+ -	11Mbps	19dBm	19dBm	22dBm	1				Comment
°t <mark>8</mark> Mesh	Name	6Mbps 9Mbps	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1				Comment
IP N	S 🚸wlan	12Mbps	19dBm	19dBm	22dBm	1				Simple Mode
🖉 MPLS 🗈 🗈		18Mbps 24Mbps	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1			-	Torch
🐹 Routing 🗈 🗈		36Mbps	19dBm	19dBm	22dBm	1				Scan
🎲 System 🗅		48Mbps 54Mbps	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1			-	Erra Usaas
🙊 Queues		HT20-0	19dBm	19dBm	22dBm					rreq. Usage
Files		HT20-1	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1				Align
E Log		HT20-2	19dBm	19dBm	22dBm	1				Sniff
🗙 🧟 Radius		HT20-4	19dBm 19dBm	19dBm	22dBm	1				Snooper
🔏 🌿 Tools 🔹 🗅		HT20-5 HT20-6	19dBm	19dBm	22dBm 22dBm	1				Reset Configuration
🚝 New Terminal		HT20-7	19dBm	19dBm	22dBm	1				
MetaROUTER	1 item out of 7	HT40-0 HT40-1	19dBm	19dBm	22dBm 22dBm	1				
8 🏓 Partition		HT40-2	19dBm	19dBm	22dBm	1				
😈 🗋 Make Supout.rif		H140-3 HT40-4	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1			-	
🕇 🕢 Manual	-	HT40-5	19dBm	19dBm	22dBm	1				
🖉 🔘 New WinBox		HT40-6 HT40-7	19dBm 19dBm	19dBm 19dBm	22dBm 22dBm	1			-	
Safe Mode	Session: 192.	168.88.1 Interface <wlan1< th=""><th>></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></wlan1<>	>							
CAPsMAN	Session: 192.	Interface <wlan1 WDS Nstreme</wlan1 	> Tx Power	Current	Tx Power	Status	Traffic			ОК
Call Safe Mode Safe Mode Call Safe Mode Call Safe Mode Call Safe Mode Call Safe Mode Interfaces	Session: 192.	168.88.1 Interface <wlan 1<br="">WDS Nstreme Tx Power Mode</wlan>	> Tx Power : all rates fix	Current 1	Tx Power \$	Status	Traffic		Ŧ	OK
Carl Safe Mode Safe Mode CAPsMAN Im Interfaces Wireless	Session: 192.	168.88.1 Interface <wlan1 WDS Nstreme Tx Power Mode Tx Power</wlan1 	> Tx Power : all rates fix r: 23	Current 1	Tx Power \$	Status	Traffic		₽	OK Cancel
Carl Safe Mode Safe Mode Guick Set CAPsMAN Imm Interfaces Wireless Wireless Bridge mode	Session: 192.	168.88.1 Interface <wlan 1<br="">WDS Nstreme Tx Power Mode Tx Power</wlan>	> Tx Power : all rates fix r: 23	Current ⁻	Tx Power	Status	Traffic		∎ dBm	OK Cancel Apply
Carl Safe Mode Safe Mode Guick Set CAPsMAN Imm Interfaces Wireless Bidge Bidge PPP	Session: 192.	Interface <wlan1 WDS Nstreme Tx Power Mode Tx Power</wlan1 	> Tx Power all rates fix 7: 23	Current T	Tx Power 5	Status	Traffic		dBm	OK Cancel Apply Disable
Carl Safe Mode Carls Man Carls Man Interfaces Wireless Bidge PPP Switch Wich	Session: 192.	Interface <vvlan 1<br="">WDS Nstreme Tx Power Mode Tx Power</vvlan>	> Tx Power all rates fix r: 23	Current T	Tx Power	Status	Traffic		₹ dBm	Cancel OK Apply Disable Comment
Carl Safe Mode Carls Man Carls	Session: 192.	Interface <vvlan 1<br="">WDS Nstreme Tx Power Mode Tx Power</vvlan>	> Tx Power all rates fix 7: 23	Current ⁻	Tx Power S	Status	Traffic		dBm	Comment Simple Mode
Image: Safe Mode Image: CAPsMAN Image	Session: 192.	168.88.1 Interface <vilan 1<br="">WDS Nstreme Tx Power Mode Tx Power</vilan>	> Tx Power :: <mark>all rates fix</mark> r: 23	Current *	Tx Power S	Status	Traffic		dBm	Cancel OK Cancel Apply Disable Comment Simple Mode Torch
Image: Safe Mode Image: CAPsMAN Image	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power all rates fix T: 23	Current ¹	Tx Power 5	Status	Traffic] ₹ dBm	Cancel Cancel Cancel Disable Comment Simple Mode Torch Scan
Image: Safe Mode Image: CAPsMAN Image	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tal rates fix Tal rates fix	Current ¹	Tx Power 3	Status	Traffic		Ĵ₹ dBm	Cancel Cancel Cancel Disable Comment Simple Mode Torch Scan Fren Usage
Image: Safe Mode Image: Gamma Gamma Image: Gamma Gamma Image: Gamma Ima	Session: 192.	168.88.1 Interface «vian 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tal rates fix Tal rates fix Tal rates fix	Current *	Tx Power	Status	Traffic		₽	Cancel Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Alton
Image: Safe Mode Image: CAPsMAN Image	Session: 192.	If68.88.1 Interface «wian 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power all rates fix T: 23	Current *	Tx Power	Status	Traffic		∎∎	Cancel Cancel Cancel Comment Simple Mode Torch Scan Freq. Usage Align Co#
Image: Safe Mode Image: CAPsMAN Image	Session: 192.	If68.88.1 Interface cwlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tail rates fix T: 23	Current [*]	Tx Power	Status	Traffic		∎ ∎	Cancel Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff
 Safe Mode CAPsMAN Interfaces Wireless Bidge PPP Switch Switch Mesh IP MPLS System System Files Log Redus 	Session: 192.	If68.88.1 Interface cwlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tail rates fix T: 23	Current [*]	Tx Power S	Status	Traffic	•••	€	Cancel Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper
Image: Safe Mode	Session: 192.	Iterface (Wan 1) WDS Nstreme Tx Power Mode Tx Power	> Tx Power all rates fix 7. 23	Current [*]	Tx Power S	Status	Traffic	•••] ▼ dBm	Cancel Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration
Image: Safe Mode Image: Safe Mode Image: CAPsMAN Ima	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power all rates fix 7. 23	Current ¹	Tx Power S	Status	Traffic		∎€	Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration
Image: Safe Mode Image: CAPsMAN Ima	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power all rates fix 7: 23	Current ¹	Tx Power \$	Status	Traffic		₽	Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration
Image: Safe Mode Image: CAPsMAN	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power 1 al rates fix 7 23	Current ¹	Tx Power \$	Status	Traffic		₽	Cancel Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration
Safe Mode Safe Mode CAPsMAN Interfaces Wireless Wireless Bidge PPP Wireless PPP Wireless Pig Bidge PPP Wireless Pig Bidge PPP Pig Mesh Pig IP Pig Acueues Files Log Radius Partition MetaROUTER Partition Make supout.rff	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tal rates fix Tal rates fix Tal rates fix	Current ¹	Tx Power	Status	Traffic		∎∎	Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration
Safe Mode Safe Mode	Session: 192.	168.88.1 Interface «wlan 1 WDS Nstreme Tx Power Mode Tx Power	> Tx Power Tal rates fix Tal rates fix Tal rates fix	Current ¹	Tx Power \$	Status	Traffic		đBm	Cancel Apply Disable Comment Simple Mode Torch Scan Freq. Usage Align Sniff Snooper Reset Configuration

5	Safe Mode	Session: 192.1	168.88.1							a
	🔏 Quick Set		Interfac	ce <wlan< th=""><th>11></th><th></th><th></th><th></th><th></th><th></th></wlan<>	11>					
	CAPsMAN		WDS	Nstrer	me Tx Pow	er Current	Tx Power	Status Traffic		01
	🛲 Interfaces		- Curr	ent Tx F	owers					UK
	Wireless		Rat	e 🛆	Tx Power	Real Tx P	Total Tx		-	Cancel
	Bridge	Wireless Table	1M	bps	23dBm	23dBm	26dBm	n		Apply
		Interfaces N	2M	bps	23dBm	23dBm	26dBm	n		
	PPP		5.5	Mbps	23dBm	23dBm	26dBm	n		Disable
	🛫 Switch	+- -	111	Mbps	23dBm	23dBm	26dBm	n		Connect
	°⊺° Mesh	Name	6M	bps	23dBm	23dBm	26dBm	n		Comment
		S &wlan	9M	bps	23dBm	23dBm 22dBm	26dBm 26dBm	n		Simple Mede
	ESS IP		121	Mbpe	23dBm	23dBm	26dBr	0		Simple Mode
	🖉 MPLS 🛛 🗅		24	Mbps	23dBm	23dBm	26dBn	n		Torch
	🔀 Routing		361	Mbps	23dBm	23dBm	26dBm	n		
	(9) Contract (9)		481	Mbps	23dBm	23dBm	26dBm	n		Scan
	System		541	Mbps	22dBm	22dBm	25dBm	n		Freg. Usage
	Queues		HT	20-0	23dBm	23dBm	26dBm	n		
	Files		HT	20-1	23dBm	23dBm	26dBm	n		Align
	[11] .		HT	20-2	23dBm	23dBm	26dBm	n		Sniff
	Log		HT	20-3	23dBm	23dBm	26dBm	n		
\times	🥵 Radius		HI	20-4	23dBm	23dBm	26dBm	n		Snooper
Q	Toole		HI	20-5	23dBm	23dBm	26dBm	n		
멷				20-6	230Bm	230Bm	200 Bri	n		Reset Configuration
÷	New Terminal	•	нт	40-0	23dBm	23dBm	26dBm	0		
\geq	🔜 MetaROUTER	1 item out of 7	HT	40-1	23dBm	23dBm	26dBm	n		
S	Partition		HT	40-2	23dBm	23dBm	26dBm	n		
5			HT	40-3	23dBm	23dBm	26dBm	n		
ø	🛃 Make Supout.rif		HT	40-4	23dBm	23dBm	26dBm	n		
E I	Manual		HT	40-5	23dBm	23dBm	26dBm	n		
2	New Wie Dev		HT	40-6	23dBm	23dBm	26dBm	n		
<u>ш</u>	Wew WinBox		HT	40-7	20dBm	20dBm	23dBm	n		

Phần 18.4. Cấu hình tính năng Wifi Hotspot trên Router MikroTik.

Tính năng Wifi Hotspot yêu cầu người dùng truy cập vào mạng không dây lẫn có dây bắt buộc phải đăng nhập bằng tài khoản xác thực trước khi có thể truy cập ra ngoài Internet.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Đảm bảo gói UserManager đã được cài đặt để Router MikroTik có thể đóng vai trò RADIUS Server.
- Bước 3. Thiết lập dải IP Pool chứa dải địa chỉ IP sẽ cấp phát cho các phiên kết nối WiFi Hotspot.
- Bước 4. Thiết lập Hotspot Server Profile trên Router MikroTik.
- Bước 5. Thiết lập Hostpot Server trên Router MikroTik.
- Bước 6. Thiết lập Hotspot User Profile trên Router MikroTik.
- Bước 7. Thiết lập Hotspot User trên Router MikroTik.
- Bước 8. Khảo sát quá trình truy cập WiFi Hotspot trên máy tính có dây.
- **Bước 9.** Giám sát danh sách End User đang truy cập dịch vụ WiFi Hotspot trên Router MikroTik.
- Bước 10. Thiết lập tính năng WiFi Hotspot Bypassed trên Router MikroTik.
- Bước 11. Thống kê lưu lượng WiFi Hotpot User.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

[admin@MikroTik]>

```
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

Bước 2. Đảm bảo gói UserManager đã được cài đặt để Router MikroTik có thể đóng vai trò RADIUS Server.

Có thể không cần cài đặt gói này nếu không sử dụng Database RADIUS Server trong suốt quá trình thiết lập WiFi Hotspot trên Router MikroTik.



5	Safe Mode	Session: 192.168.8	8.1					a
× 1	Quick Set							
1	CAPsMAN							
1	Interfaces							
Ĵ	Wireless							
30	🖁 Bridge							
	PPP							
	Switch	Package List						
°t	8 Mesh	Check For U	Ipdates Ena	ble Disable	Uninstall	Unschedule	Downgrade	Check Installation
255	IP N	Name	/ Version	Build Time	Sche	duled		
4	MPLS N	@routeros-mipsb	e 6.44.2	Apr/01/2019 1	12:47:57			
2	Routing 🗈	advanced t	6.44.2 6.44.2	Apr/01/2019 1 Apr/01/2019 1	12:47:57 12:47:57			
69	<mark>} System</mark> ∖	a hotspot	6.44.2	Apr/01/2019 1	12:47:57			
9	Queues	∃ipv6	6.44.2 6.44.2	Apr/01/2019 1	12:47:57			
	Files	€ mpis € ppp	6.44.2	Apr/01/2019 1	12:47:57			
	Log	a routing	6.44.2	Apr/01/2019 1	12:47:57			
\times	RADIUS	a system	6.44.2	Apr/01/2019	12:47:57			
8 🗙	Tools 🗅	e wireless	6.44.2	Apr/01/2019 1	2:47:57			
lin ∎	New Terminal	usermanager	0.44.2	Apr/01/2013	2.41.31			
	MetaROUTER							
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D C	Manual							
r (0	New WinBox							
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-								
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-				Mikrotik User Man	ager			
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\triangleright								
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Ē								

Bước 3. Thiết lập dải IP Pool chứa dải địa chỉ IP sẽ cấp phát cho các phiên kết nối WiFi Hotspot. Định nghĩa dải IP Pool sẽ cấp xuống cho các thiết bị đầu cuối DHCP Client.



/ip dhcp-server add name=DHCP.LAN interface=ether2 address-pool=HotspotLAN disabled=no

Bước 4. Thiết lập Hotspot Server Profile trên Router MikroTik.

[admin@MikroTik] >

/ip hotspot profile add name="HotspotServerProfile" hotspot-address=192.168.1.1 dnsname="hotspot.mobile24h.class" html-directory=hotspot rate-limit="512k/30M"

[admin@MikroTik] > /ip hotspot profile print Flags: * - default 0 * name="default" hotspot-address=0.0.0.0 dns-name="" html-directory=hotspot html-directory-override="" rate-limit="" http-proxy=0.0.0.0:0 smtp-server=0.0.0.0 login-by=cookie,http-chap http-cookie-lifetime=3d split-user-domain=no use-radius=no 1 name="HotspotServerProfile" hotspot-address=192.168.1.1 dns-name="hotspot.mobile24h.class" html-directory=hotspot html-directory-override="" rate-limit="512k/30M" http-proxy=0.0.0.0:0 smtp-server=0.0.0.0 login-by=http-chap split-user-domain=no use-radius=no

[admin@MikroTik] >

Safe Mode	Session: 4C:5E:0C:17:F0:	E
🔏 Quick Set		
CAPsMAN		
Interfaces		
🤶 Wireless		
퉕룷 Bridge		
📑 PPP		
°t¦o Mesh	Anr	
255 IP 🗅	Accounting	
🖉 MPLS 🗈 🗈	Addresses	
👳 IPv6 🗈	Cloud	
🔀 Routing 🗈	DHCP Client	
∰ System ト	DHCP Relay	
Queues	DHCP Server	
Files	DNS	
E Log	Firewall	
A RADIUS	Hotspot	
🗸 🔀 Tools 🗈	IPsec	
Rew Terminal	Kid Control	
S Dot1X	Neighbors	
	Packing	
Partition	Pool	
Make Supout rif	Routes	
B Manual	SMB	
New WinBox	SNMP	
	Services	

Ø	C	Safe Mode	e Session: 4C:5E:0C:17:F0:3E	ì
	2	Quick Set		
	Î	CAPsMAN		
]	Interfaces		
	ŝ	Wireless		
	50 27 50	Bridge	Hotspot	3
	¢۵	PPP	Servers Server Profiles Users User Profiles Active Hosts IP Bindings Service Ports Walled Garden	٦
	°T	Mesh		1
	255	IP		
	0	MPLS	Name / DNS Name HTML Directory Rate Limit (x/ tx)	
	<u>v6</u>	IPv6		1
	23	Routing		
	633	System		
	9	Queues		
		Files		
		Log		
	æ	RADIUS		
	×	Tools		
×	2.	New Terminal		
R	«¦>	Dot1X		ł
/in	-	LCD	1 item	
	٩	Partition		
ļ		Make Supout.r	f	
E	•	Manual		
out	0	New WinBox		

Rate Limit on a Hotspot Server Profile:

- Usage Rate Limit at this hotspot server profile, it will automatically limit the total traffic on the network Hotspot Mikrotik.

5	C ⁴ Safe Mode	Session: 4C:5E:0C:	7:F0:3E	— 🔒
	Aurick Set CAPsMAN Interfaces			
	🗊 Wireless		Hotspot Server Profile <hotspotserverprofile></hotspotserverprofile>	
	월륨 Bridge	Hotspot	General Login RADIUS OK	
	📑 PPP	Servers Server Pr	Name: HotspotServerProfile Cancel	d Garden
	°t¦8 Mesh	+ - 7	Hotspot Address: 192.168.1.1	Find
		Name	DNS Name: hotspot.mobile24h.class	
		 HotspotServer default 	HTML Directory: hotspot	
	Routing		HTML Directory Override:	
	∰ System ►		Rate Limit (ry/ty): 512k/30M	
	Queues			
	Files		HTTP Proxy:	
	📄 Log		HTTP Proxy Port: 0	
	A RADIUS		SMTP Server:	
X	💥 Tools 🗈 🗈			
ğ	New Terminal			
Wii	Dot1X	2 items (1 selected)		
S	Partition			•
er O	Make Supout.rif	1 item (1 selected)	default	
pute	Manual			
R	New WinBox			

5	Safe Mode	Session: 4C:5E:0	C:17:F0:3E						
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	CAPsMAN								
	Interfaces								
	î Wireless								
	Bridge	Ourse List							
	PPP	Queue List							
	°T ^e Mesh	Simple Queues	Interface Queues Queue Tree	Queue Type	S	_			
	255 IP		🖄 🖆 🍸 🛛 00 Reset Co	ounters 00	Reset All Counters	5	Fil	nd	
		# Name	Target	Upload Max	x Limit Downloa	d Max Lim	it Packet Marks	To 🔻	
		0 D 🚊 hs-<	HotspotServer> ether2	512k	30M				
	Routing								
	Svetem								
	Filee								
	Toolo								
ŏ	New Terminal								
nB		•						•	
Ň		1 item	0 B queued		0 packets queued				
S		,							
5	Make Superit of								
۲	Make Supoul.III								
ĮŽ									
	Ivew Winbox								
Ю	Safe Mode	Session: 4C:5E:0	C:17:F0:3E					•	
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	CAPsMAN								
	Interfaces								
	🚊 Wireless								
	📲 Bridge	Oueue List							
	📑 PPP	Simple Queue <hs< th=""><th>-<hotspotserver>></hotspotserver></th><th></th><th></th><th></th><th></th><th></th></hs<>	- <hotspotserver>></hotspotserver>						
	°t¦8 Mesh	General Advance	ced Statistics Traffic Total	Total Statistics	s		OK		
	255 IP 🗅	Name:	hs- <hotspotserver></hotspotserver>						
	🖉 MPLS 🛛 🗅	Target	ether?				Сору		
	👳 IPv6 🗈 🗈	Det :					Remove		
	🎉 Routing 🛛 🗅	DSL.					Reset Counters		
	💮 System 🗈		Target Uplo	ad	Target D	ownload	Reset All Counte	rs	
	🙊 Queues	Max Limit:	512k	30M			Torch		
	Files	Burst							
	E Log	Burst Limit:	unlimited	unlimited					
	🥵 RADIUS	Burst Threshold:	unlimited	unlimited					
×	🎇 Tools 🛛 🗅	Burst Time:	0	0					
B	🔚 New Terminal								
/in	∢¦> Dot1X							•	
\leq	📃 LCD								
0	🕗 Partition	dynamic		enable	ed				
	Make Supout rif								
В									
oute	Manual								

Ю	Ca Safe Mode	Session: 4C:5E:0C:1	Gession: 4C:5E:0C:17:F0:3E								
	🎢 Quick Set										
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	Si Bridge	Oueue List									
	PPP	Simple Queue <hs-<+< th=""><th>HotspotServer>></th><th></th><th></th><th></th><th>쀠</th></hs-<+<>	HotspotServer>>				쀠				
	°t¦s Mesh	General Advanced	d Statistics Traffic	Total Total Statistics		OK					
	255 IP	Packet Marke:									
	Ø MPLS					Сору					
	 .∞ IPv6 ►		Targ	jet Upload	Target Download	Remove					
	🔀 Routing	Limit At: 512	2k	30M		Reset Counters					
	∰ System ►	Priority: 8		8		Reset All Counters					
	Queues	Bucket Size: 0.1	00	0.100		Tarah					
	Files	Ouever Size. U.1	uu ah dafaa h	0.100		Toich					
	E Log										
	A RADIUS	Parent: nor	ne								
×	🗶 Tools 🔹 🗅										
8	New Terminal										
in i	Dot1X						Ð				
$ \geq$	LCD										
SOS	Partition	dynamic		enabled							
er] Make Supout.rif	1 -		1			1				
E	🕢 Manual										
Ř	🔘 New WinBox										
	Safe Mode	Session: 4C:5E:0C:	17:F0:3E								
F	Auick Set										
	CAPsMAN										
	Interfaces										
	 Wireless 										
	Bridge										
	PPP	Simple Queue <hs-<l< th=""><th>HotspotServer>></th><th></th><th></th><th></th><th>P</th></hs-<l<>	HotspotServer>>				P				
	°t¦s Mesh	General Advance	d Statistics Traffic	Total Total Statistics		OK					
	IP N		т.	arget Uplead	Target Download						
	2 MPLS	Aug Dat	120 has	100 have	raiger Download	Сору					
	ve IPv6 ►	Avg. Rate:	1∠ö Dps	128 Dps		Remove					
	😹 Routing	Avg. Packet Rate:				Reset Counters					
	🛞 System 🗅	Queued Bytes:				Reset All Counters					
	🙊 Queues	Queued Packets				Torch					
	Files	guouou r donets.				loich					
	E Log	Bytes:	22.0 KiB	43.3 KiB							
	ARADIUS	Packets:	314	484							
×	🔀 Tools 🛛 🗅										
Bo	New Terminal	Dropped:									
	I wew remind	DCO 0									
/in	Dot1X	PCQ Queues:					<u> </u>				
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OS Win	Vew reminal Vew reminal Vew reminal	dynamic		enabled							
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Ŋ	0	Safe Mode	е	Session:	4C:5E:0C:1	7:F0:3	E						1	
	溢	Quick Set												
	ŝ	CAPsMAN												
]	Interfaces												
	ŝ	Wireless												
	50 275	Bridge		Hotspot									[IX
	¢	PPP		Servers	Server Pro	iles	Users	User Profile	s Active	Hosts	IP Bindinas	Service Ports	Walled Garden	
	°tô	Mesh											Find	
	255	IP	\triangleright			DNG					12.57.63		Find	
	0	MPLS	\triangleright	Name	/ tspotServer	DNS	o Name	HIML bil botspot	Directory	Rate	Limit (rx/tx)			
	v 6	IPv6	\triangleright	• 😭 def	ault	noto	potimot	hotspot						
	28	Routing	Þ											
		System	Þ											
		Queues												
	ň	Files												
		Log												
	<u>"A</u>	RADIUS												
	×	Tools	Þ											
\times		New Terminal												
B	«¦ >	Dot1X												
/in		LCD		2 items (1 selected)									
\leq	6	Partition												
00		Make Supout.r	if											
e l	0	Manual												
out	0	New WinBox												

Router MikroTik tự động khởi tạo dòng Static DNS entry.

Ŋ	Ce Safe Mod	le	Session: 4C:5E:0C:17:F0:	3E		
	嶺 Quick Set					
	🚊 CAPsMAN					
	Interfaces					
	🚊 Wireless					
	📲 🙀 Bridge			DNS Settings		
	📑 PPP		ARP	Senvere	8844	
	°t¦8 Mesh		Accounting	Jeivers.	0.0.4.4	
	IP	Þ	Addresses		₹.8.8.8	Cancel
	MPLS	Þ	Cloud	Dynamic Servers:	172.16.0.17	Apply
	vg IPv6	Þ	DHCP Client		8.8.8.8	Static
	減 Routing	Þ	DHCP Relay		✓ Allow Remote Requests	Cache
	System	Þ	DHCP Server	Max UDP Packet Size:	4096	
	🙊 Queues		DNS			
	Files		Firewall	Query Server Timeout:	2.000 s	
	Log		Hotspot	Query Total Timeout:	10.000 s	
	A RADIUS		IPsec		100	
	💥 Tools		Kid Control	Max. Concurrent Queries:	100	
X	New Terminal		Neighbors	Max. Concurrent TCP Sessions:	20	
ĕ	♦ Dot1X		Packing	Cache Size:	2048 KiB	
Nil	LCD		Pool	Cache May TTL:	74.00:00:00	
S	Partition		Routes	Cache Max 112.		
5	Make Supout.	rif	SMB	Cache Used:	DD NB	
Ite	💜 Manual		SNMP			
б	Sew WinBox		Services			
			Settings			



Thư mục lưu trữ liên quan đến tính năng WiFi Hotspot.

CAPsMAN	File List			_		<u>IN</u>
Interfaces	- 7 🗈 🛍	Backup Re	estore Upload		Find	
Wireless	File Name	Δ	Туре	Size	Creation Time	-
Bridge	auto-before-reset.back	kup	backup	38.9 KiB	Jan/01/1970 07:00:17	•
ang bridge	🖹 console-dump.txt		.txt file	945.5 KiB	Mar/02/2020 19:06:08	
🚅 PPP	🖹 ctryip.txt		.txt file	2 B	Jan/08/2020 05:07:52	
°T ^e Mesh	fail-over.backup		backup	38.6 KiB	Jan/15/2020 13:42:21	
	hostpot.backup		backup	29.5 KiB	Oct/11/2019 13:16:10	
l ⊫	hotspot		directory	1207 0	Oct/1//2019 09:48:45	
MPLS	hotspot/alogin.html		.ntmi nie	1307 B	Oct/17/2019 09:46:45	
vé IDvC	hotspot/errors txt		tyt file	2615 B	Oct/17/2019 09:48:43	
2 II V0	hotspot/envison icr		ico file	903 B	Oct/17/2019 09:48:49	
🙈 Routing	hotspot/img	5	directory	000 0	Oct/17/2019 09:48:49	
System	► E hotspot/img/log	obottom.png	.png file	3925 B	Oct/17/2019 09:48:49	
<u>م</u>	hotspot/login.html		.html file	3455 B	Oct/17/2019 09:48:49	i I
ueues	hotspot/logout.htm	l.	.html file	1813 B	Oct/17/2019 09:48:49	<u>, i</u>
Files	hotspot/lv		directory		Oct/17/2019 09:48:49	
E Log	42 items (1 selected)	90.7 MiB of	512.0 MiB used	82%	% free	
🧟 RADIUS						
🌾 Tools	1					
📧 New Terminal						
∢ ≱ Dot1X						
📮 LCD						
🕭 Partition						
Make Superite	if					
J Make Supout.						

Bước 5. Thiết lập Hostpot Server trên Router MikroTik.

```
[admin@MikroTik] >
/ip hotspot add name="HotspotServer" interface=ether2 address-pool=HotspotLAN
profile=HotspotServerProfile disable=no
```

```
[admin@MikroTik] > /ip hotspot print
Flags: X - disabled, I - invalid, S - HTTPS
# NAME INTERFACE ADDRESS-POOL PROFILE IDLE-TIMEOUT
0 HotspotSe... ether2 HotspotLAN HotspotServ... none
[admin@MikroTik] >
```

```
[admin@MikroTik] > /ip hotspot print detail
Flags: X - disabled, I - invalid, S - HTTPS
0 name="HotspotServer" interface=ether2 address-pool=HotspotLAN
profile=HotspotServerProfile idle-timeout=none keepalive-timeout=none
login-timeout=none ip-of-dns-name=192.168.1.1 proxy-status="running"
[admin@MikroTik] >
```

Ŋ	C4 Safe Mode	Session: 4C:5E:0C:17:F0:3E	
Γ	Auick Set		
	CAPsMAN		
	Interfaces		
	Wireless		
	퉕롩 Bridge	Hotspot	
	📑 PPP	Servers Sanver Profiles Lieure Lieur Profiles Active Hosts IP Bindings Sanvice Ports Walled Garden	
	°t¦8 Mesh		
	255 IP 🗅		
	🖉 MPLS 🛛 🗅	Name / Interface Address Pool Profile Addresses	
	👳 IPv6 🛛 🗅		
	🔀 Routing 🛛 🗅		
	System ▷		
	👰 Queues		
	Files		
	Log		
	A RADIUS		
	X Tools		
ŏ	New Terminal		
nB	Dot1X	0 items	
Ň			
S	Partition		
2	Marcal		
Ľ,			
0	S New Willbox		
Ю	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	🎢 Quick Set		
	🚊 CAPsMAN		
	Interfaces		
	🚊 Wireless		
	Bridge	Hotspot	
	📑 PPP	Servers Server Profiles Walled Garden	
	°t% Mesh		ind
		Name Interface: ether2 Cancel	•
	MPLS P	Address Pool: HotspotLAN F Apply	
	Prv6	Profile: HotspotServerProfile Disable	
	Svetem	Idle Timeout:	
	Cueues	Keenalive Timeout	
	Files		
		Login Timeout:	
		Addresses Per MAC:	
	💥 Tools 🗈 🗈	IP of DNS Name: 0.0.0.0	
×	New Terminal	Proxy Status	
B	«¦ ≱ Dot1X		
/in	🗐 LCD	0 items	
1	🖖 Partition		
00] Make Supout.rif		
वि	😝 Manual		

Lúc này thiết bị Router MikroTik tự động tạo ra các Firewall Rule và NAT Rule phục vụ cho tính năng WiFi Hotspot.

```
[admin@MikroTik] > /ip firewall filter print detail
Flags: X - disabled, I - invalid, D - dynamic
0 D chain=forward action=jump jump-target=hs-unauth hotspot=from-client,!auth
```

1 D chain=forward action=jump jump-target=hs-unauth-to hotspot=to-client,!auth
2 D chain=input action=jump jump-target=hs-input hotspot=from-client
3 D chain=input action=drop protocol=tcp hotspot=!from-client dst-port=64872-64875
4 D chain=hs-input action=jump jump-target=pre-hs-input
5 D chain=hs-input action=accept protocol=udp dst-port=64872
6 D chain=hs-input action=accept protocol=tcp dst-port=64872-64875
7 D chain=hs-input action=jump jump-target=hs-unauth hotspot=!auth
8 D chain=hs-unauth action=reject reject-with=tcp-reset protocol=tcp
9 D chain=hs-unauth action=reject reject-with=icmp-net-prohibited
10 D chain=hs-unauth-to action=reject reject-with=icmp-host-prohibited
<pre>11 X ;;; place hotspot rules here chain=unused-hs-chain action=passthrough [admin@MikroTik] ></pre>

[ad	lmi	<pre>M@MikroTik] > /ip firewall nat print detail</pre>
F.Ta	.gs	: X - disabled, I - invalid, D - dynamic
0	D	
1	D	chain=hotspot action=jump jump-target=pre-hotspot
2	D	chain=hotspot action=redirect to-ports=64872 protocol=udp dst-port=53
3	D	chain=hotspot action=redirect to-ports=64872 protocol=tcp dst-port=53
4	D	chain=hotspot action=redirect to-ports=64873 protocol=tcp hotspot=local-dst dst-port=80
5	D	chain=hotspot action=redirect to-ports=64875 protocol=tcp hotspot=local-dst dst-port=443
6	D	chain=hotspot action=jump jump-target=hs-unauth protocol=tcp hotspot=!auth
7	D	chain=hotspot action=jump jump-target=hs-auth protocol=tcp hotspot=auth
8	D	chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=80
9	D	chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=3128
10	D	chain=hs-unauth action=redirect to-ports=64874 protocol=tcp dst-port=8080
11	D	chain=hs-unauth action=jump jump-target=hs-smtp protocol=tcp dst-port=25
12	D	chain=hs-auth action=redirect to-ports=64874 protocol=tcp hotspot=http
13	D	chain=hs-auth action=jump jump-target=hs-smtp protocol=tcp dst-port=25
14	х	;;; place hotspot rules here chain=unused-hs-chain action=passthrough
15		chain=srcnat action=masquerade out-interface=ether1
16	D	chain=hs-unauth action=redirect to-ports=64875 protocol=tcp in-interface=ether2 dst-port=443

[admin@MikroTik] >

5	0	Safe Mode	Session	: 4C:5E:00	:17:F0:3E											a 🗎
-	 *a					_					_			_		
	λü	Cuick Set														
	ĩ	CAPsMAN														
]	Interfaces														
	ŝ	Wireless														
	50 275	Bridge														
	¢	PPP	Firewall													
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Bước 6. Thiết lập Hotspot User Profile trên Router MikroTik.

Session Timeout: Sau 2 phút thì người dùng đăng nhập thành công sẽ bị ngắt Internet, sau khi kết nối hết hạn End User có thể đăng nhập lại bằng đường dẫn HyperLink

http://hotspot.mobile24h.class/login để có thể tiếp tục truy cập Internet

 shared-users=2: cho phép End User đăng nhập tài khoản xác thực trên 2 thiết bị đầu cuối khác nhau dựa vào thông tin địa chỉ MAC.





The built-in limiter is Hotspot Mikrotik Bandwidth Limit method which uses rate-limit parameters in server-profile for limit total traffic on the network hotspot whereas if you want to limit per user can use the rate-limit on user-profile.



End User được áp chính sách HotspotUserProfile sẽ bị giới hạn định mức bandwidth là 3M/3M.

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End User có thể kiểm tra Session Timeout của mình.

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		Welcome	wifiuser01!						
Q		IP address:	192.168.1.100						
		bytes up/down:	44.5 KiB / 66.8 KiB						
\triangleright		connected / left:	1m40s / 20s						
_		status refresh:	21s						
88		lo	g off						
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Bước 7. Thiết lập Hotspot User trên Router MikroTik.

```
[admin@MikroTik] >
/ip hotspot user add server=HotspotServer name="wifiuser01" password="wifiuser01"
profile=HotspotUserProfile limit-uptime=30m limit-bytes-total=100000000
/ip hotspot user add server=HotspotServer name="wifiuser02" password="wifiuser02"
profile=HotspotUserProfile
```

```
[admin@MikroTik] > /ip hotspot user print detail
Flags: * - default, X - disabled, D - dynamic
0 * ;;; counters and limits for trial users
```

```
name="default-trial" uptime=0s bytes-in=0 bytes-out=0 packets-in=0
packets-out=0

server=HotspotServer name="wifiuser01" password="wifiuser01"
profile=HotspotUserProfile limit-uptime=30m limit-bytes-total=100000000
uptime=16m bytes-in=1258266 bytes-out=23734601 packets-in=12577
packets-out=18364
server=HotspotServer name="wifiuser02" password="wifiuser02"
profile=HotspotUserProfile uptime=0s bytes-in=0 bytes-out=0 packets-in=0
packets-out=0
[admin@MikroTik] >
```

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	📲 🖁 Bridge		Hotspot										
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Safe Mode	Session: 4C:5E:0C:17:F0:3E		a
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IPv6 ▷	* 🚱 Name: wifiuser01	Apply	00:00:00
😹 Routing 🗈	Password:	Disable	
i System ►	Address:	Comment	
Queues	MAC Address:	Conv	
Files	Profile: HotspotUserProfile	Сору	
	Routes:	Remove	
S RADIUS		Reset Counters	
New Terminal		Reset All Counters	
	1 item enabled		
Partition			
Make Supput if			
Manual			
New WinBox			

 Giới hạn thời gian truy cập Internet của End User là 30 phút, tổng dung lượng truy cập Internet (download & upload) là 100Mbps.

5	Ca Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	Quick Set		
	Wireless	Hotspot	
	°t° Mesh ≝ IP ⊘ MPLS ▷	Server Profiles Costs Hotspot User Image: Server Profiles Costs I Hotspot U	Find
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S WinB	LCD Partition	3 items (1 selected) enabled	
outerO	Make Supout.rif Manual New WinBox		

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Khi End User sử dụng hết 100Mbps tài nguyên thì sẽ không thể truy cập Internet được nữa.

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\triangleright	login wifiuser01								
-	ОК								
88									
\bigcirc	HOTSPOT GATEWAY								
F	powered by WIKCONNK								
	Powered by MikroTik RouterOS								
	user wifiuser01 has reached traffic limit								¥

Giới hạn thời gian truy cập Internet theo thời gian.

Ю	Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	Quick Set CAPsMAN Interfaces Vireless State Bridge		
Box	IP IP Queues IP IP Log IP Log IP Tools IP New Terminal 4< Dot1X	Server Profiles Users Hotspot User Hotspot User General Limit Statistics Limit Uptime: 100/30.00 Limit Bytes In: Limit Bytes Out: Limit Bytes Total: 100M Rese Res Res Res	OK Find OK Find Cancel ime Apply 00:00:00 Disable 00:00:00 Disable 00:00:00 Copy et Counters t All Counters et Counters
outerOS Win	LCD Partition Make Supout.rif Manual New WinBox	3 items (1 selected)	

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Kiểm tra các giới hạn Limit tương ứng với End User trên Router MikroTik.

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	👰 Queues		Idle Time: 00:00:01	
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Reset lại giới hạn truy cập Internet cho tất cả các End User.

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Bước 8. Khảo sát quá trình truy cập WiFi Hotspot trên máy tính có dây. Trước khi máy tính đăng nhập vào giao diện WiFi Hotspot.

```
C:\Users\buipham> ping 8.8.4.4
Pinging 8.8.4.4 with 32 bytes of data:
Reply from 192.168.1.1: Destination net unreachable.
```

```
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Ping statistics for 8.8.4.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
C:\Users\buipham>
```

```
C:\Users\buipham> ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Reply from 192.168.1.1: Destination net unreachable.
Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
C:\Users\buipham>
```

Khi người dùng truy cập vào trang google.com thì ngay lập tức sẽ chuyển sang giao diện WiFi Hotpot.

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(=	
	Powered by MikroTik RouterOS

Sau khi khai báo tài khoản xác thực thành công thì ngay lập tức người dùng có thể truy cập Internet.

```
C:\Users\buipham> ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Users\buipham>
```

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Bước 9. Giám sát danh sách End User đang truy cập dịch vụ WiFi Hotspot trên Router MikroTik.

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nBox	Image: CAPsMAN Image:	Hotspot User Profiles Active F MAC Address A D @ 14:18:77:CA:57	Hotspot Host <1 General Stati MAC Address: Address: To Address: Server: Bridge Port:	92.168.1.2> stics Traffic 14:18:77:CA:57:3A 192.168.1.2 192.168.1.10 HotspotServer unknown	C C C C C C C C C C C C C C C C C C C	K K Binding	Ist Cookies Find Rx Rate Tx ▼ :00:00 4.3 kbps 320 bp
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is WinBox	Image: CAPsMAN Image	Hotspot User Profiles Active F MAC Address A D @ 14:18:77:CA:57	Hotspot Host <1 General Stati MAC Address: Address: Server: Bridge Port:	92.168.1.2> stics Traffic 14:18:77:CA:57:3A 192.168.1.2 192.168.1.10 HotspotServer unknown	C C C C C C C C C C C C C C C C C C C	K Nove Binding	List Cookies Find Rx Rate Tx ▼ :00:00 4.3 kbps 320 bp
erOS WinBox	Image: CAPsMAN Image	Hotspot User Profiles Active F MAC Address A D @ 14:18:77:CA:57	Hotspot Host <1 General Stati MAC Address: Address: Server: Bridge Port:	92.168.1.2> stics Traffic 1 14:18:77:CA:57:3A 192.168.1.2 192.168.1.10 HotspotServer 1 unknown 1 bypassed	C O	K K Binding	List Cookies Find Rx Rate Tx ▼ :00:00 4.3 kbps 320 bp
uterOS WinBox	Image: CAPsMAN Image	Hotspot User Profiles Active F MAC Address A D @ 14:18:77:CA:57	Hotspot Host <1 General Stati MAC Address: Address: Server: Bridge Port:	92.168.1.2> stics Traffic 14:18:77:CA:57:3A 192.168.1.2 192.168.1.10 HotspotServer 100 unknown 100 bypassed 100	C O	K K Binding	List Cookies Find Rx Rate Tx ▼ :00:00 4.3 kbps 320 bp



End User cũng có thể tự mình kiểm tra thống kê lưu lượng đã sử dụng và có thể chủ động Log Off khỏi tính năng WiFi Hotpot bằng cách nhấn vào nút log off.

0	S mikrotik hotspot > status X + = ×
	< > C 🔠 🔀 Not secure hotspot.mobile24h.class/status 💿 🥑 > 🛇 💩 👘 🕹 🛱
-	
٩	
-	Welcome wifiuser01!
Q	IP address: 192.168.1.10
	bytes up/down: 1187.0 KiB / 7.1 MiB
\triangleright	connected: 18m49s
-	status refresh: 1m
88	log off
\odot	
F	

Bước 10. Thiết lập tính năng WiFi Hotspot Bypassed trên Router MikroTik.

[admin@MikroTik] > /ip hotspot ip-binding print						
Flags: X - disabled, P	- bypassed, B - blocked					
# MAC-ADDRESS	ADDRESS	TO-ADDRESS	SERVER			
<mark>0 P 14:18:77:CA:57:3A</mark>	192.168.1.100		HotspotS			
[admin@MikroTik] >						

```
[admin@MikroTik] >
/ip hotspot ip-binding add mac-address=14:18:77:CA:57:3A address=192.168.1.100
server=HotspotServer type=bypassed
```

Một số thiết bị đặc biệt không cần phải đăng nhập vào giao diện WiFi Hotspot nhưng vẫn có thể truy cập Internet như thông thường thì ta có thể kích hoạt tính năng Bypassed cho các thiết bị đó dựa vào MAC hoặc IP.

5	0	Safe Mode	e	Session: 4C:5	E:0C:17	:F0:3E							
	<u>/</u>	Quick Set											
	ŝ	CAPsMAN											
]	Interfaces											
	ŝ	Wireless											
	22	Bridge		Hotspot									
	¢	PPP		User Profiles	Active	Hosts	IP Bindings	Service Ports	Walled Garder	n Walled Ga	rden IP List	Cookies	
	°C	Mesh			/ 22	@	7					Eii	od I
	255	IP	\land	# MAC			Address	To Add	lace S	an /ar		11	
	47	MPLS	\triangleright	# MAC	Address		Address	TUAdd	1633 3	CIVCI			
	<u>v6</u>	IPv6	\triangleright										
	*	Routing	Þ										
	0	System	\triangleright										
	9	Queues											
		Files											
		Log											
	æ	RADIUS											
×	×	Tools	\triangleright										
R	>-	New Terminal											
/in	∢¦ ≯	Dot1X		0.5									
	-	LCD		0 items									
Ö	٩	Partition											
l b		Make Supout.r	if										
Dut	•	Manual											
Ř	0	New WinBox											

	Safe Mode	Session: 4C:5E:0C:17:F0:3E
	Quick Set CAPsMAN Im Interfaces C Wireless	
	äs Bridge en PPP	Hotspot Image: Constraint of the state of the stat
	Le Messi IP	Image: Server: New Hotspot IP Binding Image: Server: Find Image: MAC Address: Image: Server: OK Cancel Address: Image: Server: HotspotServer OK Image: Tope: bypassed Comment Copy Remove Copy Remove Copy
RouterOS WinBox	Kew Terminal Vew Terminal Vew Terminal Vew Terminal Extra constraints LCD Partition Make Support.rif Manual S New W/inBox	0 items



Lúc này, máy tính của End User được Bypassed sẽ không thể truy cập vào giao diện WiFi Hotspot được nữa.



Thiết lập tính năng Bypassed dựa vào địa chỉ IP.

5	C# Safe Mode	Session: 4C:5E:0C:17:F0:3E
F	Ar Quick Set	
	T Wireless	
	Bridge	
	ere Mesh	User Profiles Active Hosts IP Bindings Service Ports Walled Garden Walled Garden IP List Cookies
	255 IP	🛉 🖻 🖉 🖾 🚺 New Hotspot IP Binding 🔹 🔀 Find
		# MAC Address MAC Address:
	Routing	
	Sustem	To Address: Apply
		Server: HotspotServer Tible Disable
		Type: bypassed Type: Comment
		Kemove
	New Terminal	enabled
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		0 items
$ \geq$	Partition	
S	Make Supert of	
12	Marce Supoul.in	
Ηų		
	AND Moure Min Day	
ō	Sew WinBox	
l o	Safe Mode	Session: 4C:5E:0C:17:F0:3E
٥ ا	New WinBox	Session: 4C:5E:0C:17:F0:3E
٥ م	Safe Mode Comparison Carlow Set Carlow Set	Session: 4C:5E:0C:17:F0:3E
٥ ٩	New WinBox Safe Mode Guick Set CAPsMAN Interfaces	Session: 4C:5E:0C:17:F0:3E
	New WinBox Safe Mode Guick Set CAPsMAN Interfaces Wireless	Session: 4C:5E:0C:17:F0:3E
0	New WinBox Safe Mode Guick Set CAPsMAN Interfaces Wireless Sig Bridge	Session: 4C:5E:0C:17:F0:3E
0	New WinBox Safe Mode Guick Set CAPsMAN Interfaces Wireless Bridge PPP	Session: 4C.5E:0C.17:F0:3E
2	New WinBox Image: Safe Mode Image: Graph and G	Session: 4C:5E:0C:17:F0:3E
0	New WinBox Image: Safe Mode Image: Graph of the set of the	Session: 4C:5E:0C:17:F0:3E
5	New WinBox Image: CAPsMAN Image: CAPs	Session: 4C:5E:0C:17:F0:3E
0	New WinBox Image: Capsdan Image: Caps	Session: 4C:5E:0C:17:F0:3E
0	Safe Mode Image: CaPsMAN Image: CaP	Session: 4C:5E:0C:17:F0:3E
	Image: New WinBox Image: Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E
5	Safe Mode Image: CaPsMAN Image: CaP	Session: 4C:5E:0C:17:F0:3E
0	 New WinBox Safe Mode Guick Set CAPsMAN Interfaces Wireless Bridge PPP Mesh IP MPLS IPv6 Routing System System Files 	Session: 4C:5E:0C:17:F0:3E
	Safe Mode Image: CAPsMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E
0	 New WinBox Safe Mode Guick Set CAPsMAN Interfaces Wireless Bridge PPP Mesh IP Mesh IP MPLS IPv6 New MPLS IPv6 Routing System Files Log RADIUS 	Session: 4C:5E:0C:17:F0:3E
0	Safe Mode Image: CAPsMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E
x	Safe Mode Image: CAPsMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E
Box	New WinBox Image: Safe Mode Image: CAPsMAN Image:	Session: 4C:5E:0C:17:F0:3E
/inBox	Safe Mode Image: CAPsMAN	Session: 4C:5E:0C:17:F0:3E
5 WinBox	Safe Mode Image: CAPsMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E
OS WinBox	Safe Mode Image: CAPsMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E Hotspot User Profiles Active Hosts IP Bindings Service Ports Walled Garden Walled Garden IP List Cookies User Profiles Active Hosts IP Bindings Service Ports Walled Garden Walled Garden IP List Cookies Me MAC Address Address To Address Server I multiple Address I Point
terOS WinBox	Safe Mode Image: CAPSMAN Image: CAP	Session: 4C:5E:0C:17:F0:3E

Bước 11. Thống kê lưu lượng WiFi Hotpot User.

[admin@MikroTik] > /ip hotspot user print bytes file=netflow201907

W. Ousela Cot								
Quick Set	File List				_			×
CAPsMAN		Backup F	Restore	Upload			Find	
Interfaces	File Name	1	Туре		Size	Creation Time		-
Wireless	hotspot/xml		directory			May/30/2019	20:32:16	٠
Pridae	hotspot/xml/V	VISPAccessGa	xsd file		4251 B	May/30/2019	20:32:16	
	⊨ hotspot/xml/a	login.html	.html file		821 B	May/30/2019	20:32:16	
E PPP	⊟ hotspot/xml/e	rror.html	.html file		416 B	May/30/2019	20:32:16	
🛫 Switch	hotspot/xmi/fi hotspot/xmi/fi	ogout.ntmi	.ntmi file		361 B 707 D	May/30/2019 May/20/2019	20:32:16	
T [®] Mesh	hotspot/xml/te ■ hotspot/xml/te	agut html	html file		767 B 359 B	May/30/2013 May/30/2019	20.32.10	
	hotspot/xml/d	ogin.html	.html file		530 B	May/30/2019	20:32:16	
∰ IP	netflow201907.txt		.txt file		22.4 KiB	Jul/23/2019	14:43:21	
🖉 MPLS 🔋 🗅	💷 pub		directory			Jun/02/2019	21:54:04	
Routing	skins		directory			Jan/01/1970	07:00:01	
	um-before-migration.t	ar	.tar file		17.0 KiB	May/24/2019	14:50:18	
ge System	user-manager		directory			May/24/2019	14:50:11	
Queues	□ user-manager/log	jsqldb	file		6.0 KiB	May/24/2019	14:50:15	
🗍 Files	user-manager/sq		nie		80.0 NB	May/30/2019	17:38:21	+
Log		15.2 1410 0	120.014	buscu	04.			_
		-						
Safe Mode	Session: 1/2.16./3.25	3						
A Quick Set								
CAPeMAN	_							
Interfaces								
Wireless								
Wireless	-							
imm Interfaces	ARP							
Suitchard	ARP Accounting							
Wireless Bidge PPP Switch	ARP Accounting Addresses							
Interfaces Wireless Bridge PPP Switch % Mesh	ARP Accounting Addresses							
Construction Image: Interfaces Wireless Bridge PPP Switch Switch Image: IP	ARP Accounting Addresses Cloud							
Construction Image: Interfaces Construction Wireless Solution PPP Switch Construction Const	ARP Accounting Addresses Cloud N DHCP Client							
Construction Image: Interfaces Wireless Construction PP Switch Construction Construction P P P P P P P P P P P P P	ARP Accounting Addresses Cloud DHCP Client DHCP Relay							
Control of the former of the	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server							
Imm Interfaces Imm Interfaces Imm Interfaces Imm Bridge Imm PPP Imm Switch Imm IP Imm IP Imm IP Imm MPLS Imm System	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server DNS							
Image: Interfaces Image: Wireless Image: Bridge Image: PPP Image: Switch Image: Swi	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server DNS							
Construction Image: Interfaces Construction Constructi	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server DNS Firewall							
Construction Image: Interfaces Construction Constructi	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server DNS Firewall Hotspot							
Image: Interfaces Image: Wireless Image: Wireless Image: Bridge Image: PPP Image: Switch Image: PPP Image: Switch Image: PPP Image: PPP Image: Switch Image: PPP Image:	ARP Accounting Addresses Cloud DHCP Client DHCP Relay DHCP Server DNS Firewall Hotspot							

Sadmin@172.16.73.253 (MikroTik) - WinBox v6.44.3 on RB2011UiAS (mipsbe)

Session	Settings	Dashboard
36331011	Settings	Dushbourd

	Safe Mode	Session: 172.16.73.253					
CAPaMAN Server Profiles User Profiles Active Hosts IP Bindings Service Ports Waled Garden Waled Garden IP Link Cookies Wriekes Server Name Profile Uptime Spress Bytes Out Bytes Out Bites Description Spress Description Spress Description Bytes Out Bites Othatpot1 p027 default Spress Description Bytes Out Bites Othatpot1 p027 default Spress Description Bytes Out Bites Othatpot1 p027 default Spress Description Spress Description Bites Ontapot1 p022 default Spress Description Description Description Bites Ontapot1 p026 default Spress 244.6 MB 5.7 GB Secreption Bites Outapot1 p028 default 22d 212.8 MB 5.7 GB Secreption Bites Outapot1 p028 default 22d 212.8 MB 7 GB Secreption <	🚈 Quick Set	Hotspot					
Construct Construct <thconstruct< th=""> <thconstruct< th=""> <th< th=""><th></th><th>Servers Server Profiles Users Lis</th><th>er Profiles Active</th><th>Hosts IP Bindings</th><th>Service Ports</th><th>Walled Garden</th><th>Walled Garden IP List Cookies</th></th<></thconstruct<></thconstruct<>		Servers Server Profiles Users Lis	er Profiles Active	Hosts IP Bindings	Service Ports	Walled Garden	Walled Garden IP List Cookies
Interfaces Image Image <thimage< th=""> Image Image</thimage<>					Service Forta	Wallou Galderr	Valied Galderin Est Cookies
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PPP Construct p022 default 52d 13.30.26 298.3 9 MB 7.7 GB Swtch Potspot1 p027 default 45d 054.42 118 GB 17.7 GB Swtch Potspot1 p022 default 45d 054.42 118 GB 17.7 GB Swtch Potspot1 p022 default 37d 08.03.05 2909.4 MB 9.9 GB Swtch Potspot1 p022 default 33d 08.03.05 248.8 MB 6.5 GB PIP Potspot1 p026 default 33d 07.13.11 3370.06 MB 338.90.0 MB System Potspot1 p043 default 224 22.58 2146.0 MB 5.7 GB Potspot1 p054 default 22d 10.59.15 17.8 GB 17.0 GB Potspot1 p054 default 22d 10.59.13 13.3 3370.0 MB 339.0 MB Potspot1 p054 default 22d 10.24.10 120.3 MB 240.74 MB Potspot1 p054 default 22d 124.40 120.3 MB 240.	Bridge	Anotspot 1 p001	default	55d 05:33:56	2434.6 MiB	5.8 Gil	3
Image: Print Prin		Photspot1 p022	default	52d 13:30:26	2963.9 MiB	7.7 Gil	3
Switch @hotspot1 p042 default 45d 23.04.00 2909.4 MB 9.9 GB @ Meth @hotspot1 p026 default 36d 00:035 2466.9 MB 18.6 GB @ IP P @hotspot1 p026 default 36d 00:13.31 3370.6 MB 13.6 GB @ IP P @hotspot1 p026 default 25d 2028:58 2214.60 MB 5.7 GB @ Routing P @hotspot1 p054 default 22d 2028:58 2214.60 MB 5.7 GB @ Routing P @hotspot1 p054 default 22d 210:854 4.47 GB 4504.07 MB @ Routing P @hotspot1 p059 default 24d 21:83:9 1009.3 MB 2263.5 MB @ Cueues @ hotspot1 p000 default 14d 12:0:40 628.1 MB 2466.4 MB @ Log @ hotspot1 p007 default 14d 14:20:40 628.1 MB 2406.4 MB @ Log @ hotspot1 p067 default 12d 01:3:23 100 G	E PPP	Anotspot1 p027	default	49d 05:44:42	11.8 GiB	17.0 Gil	3
*** Mesh *** Offsport p052 default 37d 08:0305 2463: MB 6.3 GB *** Mesh *** Offsport p052 default 33d 08:035 2463: MB 136 GB *** Mesh *** Offsport p052 default 35d 05:13:11 3370.6 MB 13.6 GB *** MPLS *** Ontsport p023 default 22d 20:28:28 2146.0 MB 5.7 GB *** Offsport p054 default 22d 20:28:58 2146.0 MB 5.7 GB *** Ontsport p027 default 22d 10:59:16 735.1 MB 2407.4 MB *** Ontsport p059 default 21d 21:11:1 5.6 GB 9.3 GB *** Outsport p059 default 12d 12:91:00:2 9.5 GB 9.8 GB *** Outsport p009 default 12d 12:00:02 9.5 GB 9.8 GB *** Totiport p009 default 12d 10:25:02 9.5 GB 9.8 GB *** Totiport p007 default 12d 10:25:02 9.5 GB 9.8 GB *** Totiport p0161 default 12d 10:25:02 10.0 GB <	🛫 Switch	Photspot1 p042	default	45d 23:04:00	2909.4 MiB	9.9 Gil	3
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P P		hotspot 1 p026	default	36d 05:13:31	33/0.6 MiB	13.6 Git	3
WPLS Photspoil DP43 Default 206 2/20:36 2/14:0 Units 5.7 GiB 4504.6 MB Routing Photspoil p054 default 22d 2/20:36 2/14:0 Units 5.7 GiB 4504.6 MB System Photspoil p059 default 22d 2/20:36 2/14:0 Units 5.7 GiB 4504.6 MB Oueues Photspoil p053 default 22d 2/20:36 2/14:0 Units 5.7 GiB 4504.6 MB Oueues Photspoil p053 default 21d 2/21:42:0 1230.3 MB 1249.4 MB Dispoint p063 default 13d 2/1:12:1 5.6 GiB 9.3 GiB Oueues Photspoil p057 default 14d 14:20:40 628.1 MB 22d2:6 MB 6 GiB Mappint p057 default 12d 10:26:56 10.0 GiB 7.5 GiB 2235.7 MB 4.9 GiB Mappint p056 default 12d 10:26:56 10.0 GiB 7.5 GiB 22369.0 MB MetaROUTER	E I E	hotspot I p 182	default	350 17:18:08	/40.3 MiB	3890.0 Mit	5
Routing Normalization P024 Default 240 (2108-5) 4.7,000 P47,000 System Potspot1 p278 default 240 (250-5) 736,1100 P4074,4100 Public Potspot1 p209 default 210 (231-12) 5,6 GB 9.3 GB Public Public Public Public Public Public Public Public Public Public Public Public Public Public Public Public	🖉 MPLS 🗈 🗈	Photopot 1 p043	default	200 20:28:08	2146.0 MIB	0.7 Git 4504 C Mit	5
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System Protect Point Dist Dist Dist Queues Photspot1 p031 default 20 12:44:00 1230.3 MB 1849.4 MB Photspot1 p002 default 18d 21:18:39 1009.3 MB 2633.5 MB Photspot1 p002 default 14d 12:09:02 9.5 GiB 3.243.6 MB Photspot1 p009 default 14d 14:20:40 628.1 MB 3243.6 MB Photspot1 p007 default 14d 14:20:40 628.1 MB 3243.6 MB Photspot1 p057 default 14d 14:20:40 628.1 MB 3243.6 MB Photspot1 p056 default 12d 10:25.6 10.0 GiB 75 GiB Photspot1 p056 default 12d 04:19.04 5.7 GiB 2369.0 MB Photspot1 p056 default 12d 04:13.57 PS 2.1 MB 631.6 MB Photspot1 p039 default 12d 04:15.57 PS 2.1 MB 631.6 MB Photspot1 p005 default 10d 01:35.23		Apotspot1 p069	default	21d 23:11:21	5.6 GiB	9.3 Gil	2
Queues Patton Patton<	i System	Chotspot1 p031	default	20d 12:44:00	1230.3 MiB	1849 4 Mil	3
Files Photspot1 p002 default 17d 12:09:02 9.5 GiB 9.8 GiB Log Photspot1 p009 default 14d 21:37:47 3688.5 MB 3243.6 MB RADIUS Photspot1 p067 default 14d 14:20:40 628.1 MB 2406.4 MB RADIUS Photspot1 p057 default 14d 04:49:16 3025.2 MB 5.6 GiB Particion Photspot1 p056 default 12d 004:19:04 2235.7 MB 4.9 GiB Particion Photspot1 p056 default 12d 004:19:04 2335.7 MB 4.9 GiB Particion Photspot1 p056 default 12d 04:19:04 2335.7 MB 4.9 GiB Particion Photspot1 p005 default 10d 01:30:23 151.9 MB 754.8 MB Partition Photspot1 p005 default 10d 01:35:232 631.4 MB 1902.9 MB Partition Photspot1 p007 default 10d 01:36:32 6451.4 MB 1902.9 MB Partition <th>Queues</th> <th>Post</th> <th>default</th> <th>18d 21:18:39</th> <th>1009.3 MiB</th> <th>2633.5 Mil</th> <th>3</th>	Queues	Post	default	18d 21:18:39	1009.3 MiB	2633.5 Mil	3
Pries 009 default 14d 21:37:47 3688.5 MB 3243.6 MB Image: Log Image: Lo	Direction of the second	Rhotspot1 p002	default	17d 12:09:02	9.5 GiB	9.8 Gil	3
Log	Files	Photspot1 p009	default	14d 21:37:47	3688.5 MiB	3243.6 Mil	3
	E Log	Photspot1 p067	default	14d 14:20:40	628.1 MiB	2406.4 Mil	3
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Tiến hành xóa các dòng không cần thiết trước khi import vào Excel.

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4	p002		2w3d12h9m2s	10222011548	10525216792
5	p003		3d8h3m22s	1559859768	1425278651
6	p004		5d7h57m32s	1629857204	1595700679
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20	p018		2d2h55m3s	134452214	424879853
21	p019		29m25s	1464501	4194654
22	p020		1w3d5h36m38s	886145863	4814810386
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7		5	p003		3d8h3m22	1.56E+	09	1.43E+09
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9		7	p005		1w3d14h5	965704	36	6.62E+08
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Kết quả thống kê bằng file Excel.

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4	3	p042	6w3d23h4m	3,050,689,632.00	10,633,032,263.00		
5	4	p002	2w3d12h9m2s	10,222,011,548.00	10,525,216,792.00		
6	5	p069	3w23h11m21s	6,016,640,867.00	9,960,948,457.00		
7	6	p010	1w1d18h44	2,151,854,797.00	8,686,545,181.00		
8	7	p022	7w3d13h30	3,107,861,893.00	8,292,502,064.00		
9	8	p061	1w5d10h26	10,699,713,338.00	8,004,510,937.00		
10	9	p052	5w2d8h3m5s	2,588,811,422.00	7,385,786,616.00		
11	10	p001	7w6d5h33m56s	2,552,818,287.00	6,236,575,963.00		
12	11	p043	3w4d20h28	2,250,196,335.00	6,099,150,456.00		
13	12	p057	2w4h49m16s	3,172,200,213.00	6,036,358,315.00		
14	13	p078	1w2d7h28m15s	1,410,584,673.00	5,322,237,952.00		
15	14	p056	1w5d8h19m42s	297,349,154.00	5,238,146,316.00		

Phần 19. Cấu hình RADIUS Server trên Router MikroTik.

Phần 19.1. Cài đặt gói UserManager và các công cụ quản trị RADIUS Server trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Tìm hiểu tổng quan về gói cài đặt UserManager trên Router MikroTik.
- Bước 2. Tải gói cài đặt UserManager về máy tính của người quản trị.
- Bước 3. Tiến hành cài đặt gói UserManager lên Router MikroTik.
- Bước 4. Khởi động lại Router MikroTik sau khi cài đặt gói UserManager thành công.
- **Bước 5.** Kiểm tra gói phần mềm User Manager đã cài đặt thành công trên Router MikroTik.
- Bước 6. Kiểm tra dịch vụ RADIUS Server trên Router MikroTik.
- Bước 7. Kiểm tra và thay đổi mật khẩu đăng nhập RADIUS Server trên Router MikroTik.
- **Bước 8.** Backup Database RADIUS Server trên Router MikroTik và copy về máy tính của người quản trị.
- **Bước 9.** Upload Database của RADIUS Server từ máy tính của người quản trị và Restore lại Database của RADIUS Server trên Router MikroTik.
- Bước 10. Reset User Manager Database trở về mặc định Default.

Các bước thực hiện chi tiết:

Bước 1. Tìm hiểu tổng quan về gói cài đặt UserManager trên Router MikroTik.

User Manager Package Requirements

User Manager RADIUS Server (User Manager RADIUS Server Package - UserMan) installation must have below minimum requirements.

- MikroTik RouterOS and User Manager Package must have the same version.
- The router should have at least 32MB RAM and 2MB free HDD space.

Package List				
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🗃 dhcp	6.46.1	Dec/13/2019 12:44:23	8	
hotspot	6.46.1	Dec/13/2019 12:44:23	8	
a ipv6	6.46.1	Dec/13/2019 12:44:23	8	
🗃 mpls	6.46.1	Dec/13/2019 12:44:23	8	
🗃 ppp	6.46.1	Dec/13/2019 12:44:23	8	
routing	6.46.1	Dec/13/2019 12:44:23	8	
security	6.46.1	Dec/13/2019 12:44:23	8	
🗃 system	6.46.1	Dec/13/2019 12:44:23	8	
wireless	6.46.1	Dec/13/2019 12:44:23	8	
🗃 user-manager	6.46.1	Dec/13/2019 12:44:23	8	
12 items				

Bước 2. Tải gói cài đặt UserManager về máy tính của người quản trị.

Tải gói cài đặt user-manager-your_version.npk

https:/	//mikrotik.com/download							
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		6.43.16 (Long-term)	6.44.3 (Stable)	6.45be	ta50 (Testing)		
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Đối với Router MikroTik CCR1016 thì tải gói này
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ntp-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File NPK File	261 KB
openflow-6.44.3-mipsbe.npk	4/24/2019 9:54 AM		77 KB
ppp-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	305 KB
routing-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	121 KB
security-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	321 KB
system-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	7,492 KB
tr069-client-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	137 KB
ups-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	65 KB
🗹 📄 user-manager-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	849 KB
wireless-6.44.3-mipsbe.npk	4/24/2019 9:54 AM	NPK File	2,693 KB

Bước 3. Tiến hành cài đặt gói UserManager lên Router MikroTik.

Tiến hành cài đặt gói User Manager bằng dịch vụ FPT Server có sẵn trên Router MikroTik.

- Đảm bảo dịch vụ FTP Service đang được kích hoạt sẵn trên Router MikroTik.

Safe Mode	Session: B8:69:F4:8F:	00:5E				
🔏 Quick Set						
I CAPsMAN						
Interfaces						
🔔 Wireless	ARP					
📲 🕵 Bridge	Accounting					
📑 PPP	Addresses	16	^o Service List			
🛫 Switch	Cloud		🗸 🗶 👗			Find
° <mark>t</mark> ₿ Mesh	DHCP Client		Name 🗸	Port	Available From	Certificate
E IP	DHCP Relay		 api api-ssl 	8728		none
MPLS	DHCP Server		● ftp	21		none.
減 Routing	DNS		● ssh	22		
System	Firewall		 winbox 	8291		
Queues	Hotspot		• www	80		
Files	IPsec		WWW-SSI	443		none
E Log	Kid Control					
ARADIUS	Neighbors					
< 🔀 Tools	Packing					
🔳 New Terminal	Pool					
📮 LCD	Routes	8	items (1 selected)			
MetaROUTER	SMB					
le Partition	SNMP					
📜 🗋 Make Supout.rif	Services					
😧 Manual	Settings					
New WinBox	Socks					
	TETP					

 Từ máy tính của người quản trị admin, tiến hành truy cập vào FTP Service trên Router MikroTik bằng đường dẫn "ftp://192.168.88.1/" với username mặc định là admin, password là rỗng. Sau đó copy gói phần mềm User Manager lên thiết bị và cuối cùng là khởi động lại thiết bị.



ø	Call Safe Mode	Ses	sion: 4C:5E:0	C:17:F0:3F										
	🔏 Quick Set													
	CAPsMAN													
	🕅 Interfaces													
	🚊 Wireless													
	📲 🖁 Bridge													1
	📑 PPP		File List										×	
	° <mark>⊺</mark> 8 Mesh		- 7	B	Backup	R	estore	Upload				Find		
	255 IP		File Name			A	Туре		Size		Creation Time		-	
	👳 IPv6 🛛 🗅		auto-bef	ore-reset.bac	kup		backup			15.1 KiB	Jul/04/2019	16:44:29		
			skins	m migration to	ar.		directory tar file			17.0 KiP	Jan/01/19/0	16:05:50		
		-	Quser-mar	nager	1	directory			17.0 ND	Jul/22/2019	16:05:50			
	24 Routing	-	🖹 user-	manager/logs	sqldb		file			6.0 KiB	Jul/22/2019	16:05:49		
	iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		🖹 user-	manager/sqld	db		file			80.0 KiB	Jul/22/2019	16:05:50		
×	Queues Files Cog RADIUS Code Tools													
ß	New Terminal													
/inl	ECD		6 items		89.3 Mi	B of	512.0 Mil	B used		82	% free		_	
\$	🕭 Partition		1		1									1
0S] Make Supout.rif													
e	😧 Manual													
out	🔘 New WinBox													
Ř	🛃 Exit													

Bước 4. Khởi động lại Router MikroTik sau khi cài đặt gói UserManager thành công.

Đảm bảo trong file list không chứa các file hệ điều hành cũ và các gói user-manager phiên bản cũ rồi sau đó tiến hành reboot lại thiết bị

Ø	C* Safe Mode	Session: B8:69:F4:8F:D0:58	
	🔏 Quick Set		
	CAPsMAN		
	🖬 Interfaces		
	Wireless	Auto Upgrade	
	퉕롍 Bridge	Certificates	
	📑 PPP	Clock	
	🕎 Switch	Console	
	°t¦8 Mesh	Disks	
	255 IP 🗅	Health	
	🖉 MPLS 🛛 🗅	History	
	🚧 Routing 🛛 🗅	Identity	
	💮 System 🗅	LEDs	
	🙊 Queues	License	
	📄 Files	Logging	
	Eog	Packages	
	🧟 RADIUS	Password	
×	🎇 Tools 🛛 🗅	Ports	
B	🔚 New Terminal	Reboot	
/in	🖳 LCD	Reset Configuration	
	🛃 MetaROUTER	Resources	
Ö	😓 Partition	Routerboard	
<u>e</u>] Make Supout.rif	SNTP Client	
out	🕢 Manual	Scheduler	
Ř	🔘 New WinBox	Scripts	
		Shutdown	

		0			0 0			0
r)	Call Safe Mode	Session: B8:69:F4:8F:	D0:5E					
	🔏 Quick Set							
	CAPsMAN							
	Interfaces							
	🚊 Wireless	Auto Upgrade						
	Bridge	Certificates						
	📫 PPP	Clock						
	🕎 Switch	Console						
	°t¦8 Mesh	Disks						
	255 IP	Health						
	🖉 MPLS 🗈 🗈	History						
	🔀 Routing	Identity						
	System N	LEDs						
	Queues	License						
	Files	Logging						
	E Log	Packages	_					
	A RADIUS	Password						
_	🗶 Tools 🔹 🗅	Ports						
l 2	New Terminal	Reboot						
in	LCD	Reset Configuration						
3	MetaROUTER	Resources						
SC	Partition	Routerboard						
L U	🗋 Make Supout.rif	SNTP Client						
Lt p	Manual	Scheduler						
R	New WinBox	Scripts						
		Shutdown						
6	Cil Safe Mode	Session: B8:69:E4:8E	D0:5E					= A
		50330H. 00.00.14.01	.00.52					-
	Quick Set							
	I CAPSMAN							
	1 Wireless							
	Bindge							
	Switch							
	Mesh							
	MPLS P	Package List						
	Routing	Check For Up	latee Enak	le Disable	Uninetal	Unschedule	Downgrade	Check Installation
	System		Varian	Dudid Taxa	Cal	- dulad	Downgrade	Check Installation
	Queues	Prouteros-mipsbe	6.44.3	Apr/23/2019	12:37:03	eduled		
	Files	advanced t	6.44.3	Apr/23/2019	12:37:03			
		ancp Antspot	6.44.3	Apr/23/2019 Apr/23/2019	12:37:03			
	RADIUS	€ ipv6	6.44.3	Apr/23/2019	12:37:03			
Xe	K lools	e mpls	6.44.3 6.44.3	Apr/23/2019 Apr/23/2019	12:37:03 12:37:03			
JB	New Terminal	a routing	6.44.3	Apr/23/2019	12:37:03			
Nir		Security	6.44.3 6.44.3	Apr/23/2019 Apr/23/2019	12:37:03 12:37:03			
S	MetaROUTER	■ system	6.44.3	Apr/23/2019	12:37:03			
0	Partition	🗃 user-manager	6.44.3	Apr/23/2019	12:37:03			
te	Ake Supout.rif							
	6 B 14 1							
0	Manual							

Bước 5. Kiểm tra gói phần mềm User Manager đã cài đặt thành công trên Router MikroTik.

Bước 6. Kiểm tra dịch vụ RADIUS Server trên Router MikroTik.

Kiểm tra gói phần mềm User Manager đã được cài đặt thành công hay chưa thông qua đường dẫn http://192.168.88.1/user

Mikrotik User Manager
Login
Password
Log in

Đăng nhập vào đường dẫn <u>http://192.168.88.1/userman</u> với tài khoản username mặc định là admin, password là rỗng.

← → C ▲	Not se	cure 192.168.88.1/userm	an			☆	в	*
Mikro Tik	Add	Edit Generate						
Mikrotik User Manager								9
Routers		∇ Username	⊽ Till time	⊽ Total time left	∇ Actual pro	file		
Users	•					Per p	age [2)] 🔻
Sessions								
Customers								
Logs								
Payments								
Profiles								
Settings								
Reports								
0 A sessions								
0 A users								
Advanced search								
Maintenance								
Logout								

Bước 7. Kiểm tra và thay đổi mật khẩu đăng nhập RADIUS Server trên Router MikroTik.





[admin@MikroTik] > /tool user-manager customer print
Flags: X - disabled
0 login="admin" password="mobile24h"
access=own-routers,own-users,own-profiles,own-limits,config-payment-gw
backup-allowed=yes time-zone=-00:00 permissions=owner signup-allowed=no
paypal-allowed=no paypal-secure-response=no paypal-accept-pending=no
[admin@MikroTik] >

Mật khẩu user-manager không ảnh hưởng tới tiến trình đăng nhập vào Router MikroTik bằng phần mềm Winbox.

S WinBox v3.18 (Addresses)	_		×
File Tools			
Connect To: 4C:5E:0C:17:F0:3E Login: admin Password:	V Keep	Password In New W	findow
Add/Set Connect To RoMON Connect			
Managed Neighbors	ïnd	all	Ŧ
MAC Address Version Board Uptin MCEF-0017-0025 100.100 100.11 KiterTite CAC 4 (a) CCE10017-0025	1e		-

Nếu đăng nhập vào RADIUS Server bằng tài khoản admin mà không có mật mã vừa thiết lập thì sẽ không đăng nhập được.

0	✓ Mikrotik User Manager: Use × +	$\overline{}$	_		×
	く > C 器 ⊕ Not secure 192.168.1.1/use 🙆 🕑 ▷ ♡	ABP	0	1	ŧ
습					
-					
٩					
-					
Q	MikroTik				
\triangleright	Mixroik Üser Manager				
-	Login admin				
88					
\odot	Log in invalid user name or password				
F					
0					
¢3					



0	📡 Mikrotik User Mana	iger: Us∈ X	+			÷	_		\times
	< > C 88	🗍	t secure 19	92.168.1.1/use	6 🗸	$\triangleright \odot \mid $	P (*	4	##
		1							
	MikroTik Mikrotik User Manager	Add	Edit Ge	nerate					Q
_	Routers		Jsername	⊽ Till time	⊽ Tota	time left	∇ Actı	Jal pro	ofile
	Users						Per	page [2	20] ~
	Sessions								
9	Customers								
	Logs								
	Payments								
Q	Profiles								
D	Reports								
	0 A sessions								
-	0 A users								
88	Advanced search								
	Maintenance								
0	Logout								
Ē									
0									
ŝ									

Bước 8. Backup Database RADIUS Server trên Router MikroTik và copy về máy tính của người quản trị.

Mikro Tik	Database					
Mikrotik User Manager	Database size: 8	80.0 KiB				
Routers	In use: 1	100%				
llass	Last rebuild: 1	Never				
Users	Last backup: I	Never				
Sessions	Free disk space:4	420.9 MiB				
Customers	 Database back 	ups				
Logs	File name		Main DB	Log DB	Languages	
Payments	um-before-mi	igration.tar	Yes	Yes	No	
Profiles	Download	Load	D	elete		
Settings	 Upload backup 				·	
Reports	▲ Actual data bas	se			1	
0 A sessions	Save	Rebuild	Ret	ouild log		
0 A users						
Advanced search						
Maintenance						
Logout						
Mikro Tik Mikrotik User Manager	Database					
	Database size: 8	80.0 KiB				
Routers	In use:	100%				
Users	Last backup: 1	Never				
Sessions	Last restore: I	Never				
Customers	Free disk space:	420.9 MiB				
Customers	 Database back 	ups	_	I	1	1
Logs	File name		Main DB	Log DB	Languages	
Payments	um-before-m	igration.tar	Yes	Yes	No	
Profiles	Download	Load	0)elete		
Settings	 Upload backup Actual data backup 					
Reports		se			1	
0 A sessions				×]	
0 A users	Main db					
Advanced search	Log db					
Maintenance	Language	S				
Logout	Save					

inkrotik User Manager	Database siz	e: 8	80.0 KiB					
Deutere	In use:	1	100%					
Roulers	Last rebuild: Never							
Users	Last backup: 04/06/2020 15:09:11							
Sessions	Eree disk en:		420 0 MiB					
Customers	▼ Database I	back	ups					
Logs	File nan	ne			Mair	n DB	Log DB	Langu
Payments	um-befor	e-mi	igration.tar		Yes		Yes	No
Profiles	User_Mar	nage	r_2020_04_06	_080911.tar	Yes		Yes	No
Settings	Download		Load	Delete				
Reports	▼ Upload bac	ckup						
0 A sessions	Actual data	a bas	se					
	Save		Rebuild	Rebuild log				
Advanced search								
Mainten search								
Maintenance								
Logoui								
Aikro Tik likrotik User Manager	Database Database siz In use:	:e: 8	80.0 KiB 100%					
Routers Users Sessions	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa	:e: 8 1 1 : () : () : ()	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB	:09:11				
Routers Users Sessions Customers	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa ▼ Database I	e: 8 1 : (: f ace:4 back	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups	:09:11				
Aikrotik User Manager Routers Users Sessions Customers Logs	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa > Database I File nam	e: 8 1 f: (ace:4 back	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups	:09:11	Maii	n DB	Log DB	Langu
Routers Users Sessions Customers Logs Payments	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa ▼ Database I File nan □ um-befor	e: 8 r ace:4 back ne	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar	:09:11	Mai i Yes	n DB	Log DB Yes	Lang u No
Routers Users Sessions Customers Logs Payments Profiles	Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa ▼ Database l File nam □ um-befor ♥ User_Mar	e: 8 1 : (: f ace:4 back ne re-mi nage	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06	:09:11 _080911.tar	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Aikrotik User Manager Routers Users Sessions Customers Logs Payments Profiles Settings	Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa Database I File nam um-befor User_Mar Download	e: 8 1 ace:4 back ne nage	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar _Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Aikrotik User Manager Routers Users Sessions Customers Logs Payments Profiles Settings Reports	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa Database I File nan um-befor User_Mar Download Vupload bac	e: 8 1 ace:4 back ne re-mi nage	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar igration.tar <u>cr_2020_04_06</u> Load	:09:11 _080911.tar _Delete	Maiı Yes Yes	n DB	Log DB Yes Yes	Langu No No
Aikrotik User Manager Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa > Database I File nan Um-befor User_Mar Download > Upload back Ac	e: { i c (bace:4 back ne re-mi nage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar ir_2020_04_06 Load	:09:11 _080911.tar _Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users	Database Database siz In use: Last rebuild: Last restore: Free disk spa	e: { i ace:4 back ne re-mi nage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar _Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa > Database I File nam um-befor User_Mar Download > User_Mar Download > Ac Click her	e: 8 1 : ((: face:4 back back ne e-minage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar 	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search Maintenance	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa Database I File nam um-befor User_Mar Download VUpload bac Ac	e: { i f ace: - back ne e-mi nage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search Maintenance	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa Database I File nam um-befor User_Mar Download VUpload bac Ac	e: 8 i f cace:4 back ne re-mi nage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search Maintenance Logout	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa Database I File nan um-befor User_Mar Download VUpload bac Ac Click her	e: 8 1 : (Cace:+ back back back back back back back back	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar _Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search Maintenance Logout	Database Database siz In use: Last rebuild: Last backup: Last restore: Free disk spa > Database I File nan um-befor User_Mar Download > Upload bac Ac Click her	e: 8 1 : (i ace:+ back back ne re-mi nage ckup	80.0 KiB 100% Never 04/06/2020 15 Never 420.9 MiB ups igration.tar r_2020_04_06 Load	:09:11 _080911.tar _Delete	Main Yes Yes	n DB	Log DB Yes Yes	Langu No No

Bước 9. Upload Database của RADIUS Server từ máy tính của người quản trị và Restore lại Database của RADIUS Server trên Router MikroTik.

Xóa thử Backup Database của RADIUS Server trước khi Upload lại File này từ máy tính của người quản trị admin lên Router MikroTik.

18 KB

	1					
Mikro Tik	Database					
Mikrotik User Manager	Database size:	80.0 KiB				
Routers	Last rebuild:	Never				
Users	Last backup:	04/06/2020 15:	09:11			
Sessions	Last restore:	Never				
Customers	▲ Database bac	kups				
Logs	File name			Main DB	Log DB	Langu
Payments	um-before-m	nigration.tar		Yes	Yes	No
Profiles	User_Manage	er_2020_04_06_	_080911.tar	Yes	Yes	No
Settings	Download	Load	Delete			
Reports	 Upload backup Actual data backup 	p ase				
0 A sessions	Save	Rebuild	Rebuild log			
0 A users						
Advanced search						
Maintenance						
Logout						

- Xóa các tài khoản user trên RADIUS Server.

Mikro Tik	Add Edit Ge	nerate		
Mikrotik User Manager				9
Routers	□ ∇ Username	⊽ Till time	∇ Total time left	∇ Actual profile
Users	✓ subadmin01	Unlimited	Unlimited	TelnetProfile
Sessions	Subadmin02	Unlimited	Unlimited	TelnetProfile
Customers	•			Per page [20] ~
Logs				
Payments				
Profiles				
Settings				
Reports				
0 A sessions				
0 A users				
Advanced search				
Maintenance				
Logout				



Tiến hành Upload Database của RADIUS Server từ máy tính của người quản trị admin lên Router MikroTik.

Mikro Tik	Database				
Mikrotik User Manager	Database size:	80.0 KiB			
Routers	Last rebuild:	Never			
Users	Last backup:	04/06/2020 15	5:09:11		
Sessions	Last restore:	Never			
Customers	Free disk space ▲ Database bac	:420.9 MIB kups			
Logs	File name	M	ain DB	Log DB	Languages
Payments	um-before-n	nigration.tarYes	3	Yes	No
Profiles	Download	Load	D)elete	
Settings	Upload backu	p			-
Reports	Choose File No	o file chosen		Upload	
0 A sessions	Actual data ba	ase			1
0 A users	Save	Repuild	Rec	oulia loĝ	
Advanced search					
Maintenance					
Logout					

O Open								
\leftarrow \rightarrow \checkmark \bigstar This PC \Rightarrow Downloads								
Organize 🔻 New folder								
🖈 Quick access		Name	Date modified	Туре	Size			
🛄 Desktop	*	V Today (1)						
🖊 Downloads	*	User_Manager_2020_04_06_080911.tar	4/6/2020 3:11 PM	TAR File	18 KB			

Mikro Tik	Database					
Routers	Database size: In use:	80.0 KiB 100%				
Routers	Last rebuild:	Never				
Users	Last backup:	04/06/2020 15	:09:11			
Sessions	Last restore: Free disk space	Never 420 9 MiB				
Customers	▲ Database bac	kups				
Logs	File name	Ma	in DB	Log DB	Languages	
Payments	um-before-n	nigration.tarYes		Yes	No	
Profiles	Download	Load	D	elete		
Settings	 Upload backup 	p				
Reports	Choose File Us	er_Manage080	911.tar	Upload		
0 A sessions	Actual data ba	ase Debuild	Dok	wild log		
0 A users	Save	Rebuild	Rei	und log		
Advanced search						
Maintenance						
Logout						

Mikro Tik	Database								
Mikrotik User Manager	Database size:	80.0 KiB							
Routers	In use:	100% Never							
Users	Last backup: 04/06/2020 15:09:11								
Sessions	Last restore: Never								
Customers	Free disk space:	:419.5 MiB							
Logs	File name	Kups		Main DB	Log DB	Langu			
Payments	um-before-n	nigration.tar		Yes	Yes	No			
Profiles	User Manag	er 2020 04 06	080911.tar	Yes	Yes	No			
Settings	Download	Load	Delete		1				
Reports	 Upload backu 	p							
0 A sessions	Choose File Us	er_Manage0809	11.tar Uploa	d					
0 A users	Actual data ba	ase							
Advanced search	Save	Rebuild	Rebuild log						
Maintenance									
Logour									
MikroTik Mikrotik User Manager	Database Database size:	80.0 KiB							
Routers	In use:	100%							
Users	Last backup:	04/06/2020 15:	09:11						
Sessions	Last restore:	Never							
Customers	Free disk space:	419.5 MiB							
Logs	Eile name	kups		Main DR		Langu			
Payments	um-before-m	nigration.tar		Yes	Yes	No			
Profiles	✓User Manag	er 2020 04 06	080911.tar	Yes	Yes	No			
Settings	Download	Load	Delete						
Reports	 Upload backup 	p							
0 A sessions	Chc Load back	up		×					
0 A users	▲ Ac	1							
Advanced search	Main db								
Maintenance	Languag	es							
	Replace	existing languages							
Logour	Load								

Mikro Tik	Database					
Mikrouk Oser Manager	Database size:	80.0 KiB				
Routers	Last rebuild:	Never				
Users	Last backup:	Never				
Sessions	Last restore:	04/06/2020 1	5:49:10			
Customers	 Free disk space: Database back 	:419.3 MiB kups				
Logs	File name		Main DB	Log DB	Langu	
Payments	um-before-m	nigration.tar		Yes	Yes	No
Profiles	User_Manag	er_2020_04_0	5_080911.tar	Yes	Yes	No
Settings	Download	Load	Delete			
Reports	▲ Upload backup	p er Manage - 080	911 tar Unioa	d		
0 A sessions	Actual data ba	ase		•		
0 A users	Save	Rebuild	Rebuild log	1		
Advanced search						
Maintenance						
Logout						

Thông tin các tài khoản đã được khôi phục lại như cũ.

Mikro Tik	Ad	d Edit Ge	nerate		
Mikrotik User Manager					2
Routers		∇ Username	⊽ Till time	▽ Total time left	∇ Actual profile
Users		subadmin01	Unlimited	Unlimited	TelnetProfile
Sessions		subadmin02	Unlimited	Unlimited	TelnetProfile
Customers	•				Per page [20] ~
Logs					
Payments					
Profiles					
Settings					
Reports					
0 A sessions					
0 A users					
Advanced search					
Maintenance					
Logout					

Bước 10. Reset User Manager Database trở về mặc định Default.

Thông tin các tài khoản trên RADIUS Server trước khi Reset User Manager Database trở về mặc định Default.

MikroTik Mikrotik User Manager	Ad	d Edit Ge	nerate		
Deutere		∇Username	⊽ Till time	▽ Total time left	✓ Actual profile
Users		subadmin01	Unlimited	Unlimited	TelnetProfile
Sessions		subadmin02	Unlimited	Unlimited	TelnetProfile
Customers	•				Per page [20] ~
Logs					
Payments					
Profiles					
Settings					
Reports					
Advanced search					
Maintenance					
Logout					

```
[admin@MikroTik] >
/tool user-manager customer set admin password=mobile24h
```

Tiến hành Reset User Manager Database trên Router MikroTik.

```
[admin@MikroTik] > /tool user-manager database clear
Dangerous! Reset whole user-manager database (except logs)? [y/N]:
y
Resetting user-manager database
user-manager database cleared
[admin@MikroTik] >
```

```
[admin@MikroTik] > /tool user-manager database clear-log
Dangerous! Reset user-manager log database? [y/N]:
y
Resetting user-manager log database
user-manager log database cleared
[admin@MikroTik] >
```

Thông tin mật mã password đã thiết lập cho user quản trị RADIUS Server không còn hiệu lực, các tài khoản người dùng trong User Manager Database cũng không còn nữa.

0	Mikrotik User Manager	r: Use 🗙 🕂				÷	_		\times
	< > C ==	Not secure	192.168.1.1/use	0 🥹	ÞC	2 ABP	٢	1	₩
-									
٩						_			
—									
Q			Mikro Tik						
\triangleright			wikrouk oser wanager		_				
-		Password	admin						
88									
\odot			Log in						
F									
0									
ŝ									

Mikro Tik	Add	l Edit Ger	nerate		
Mikrotik User Manager					9
Routers		⊽ Username	∇ Till time	∇ Total time left	∇ Actual profile
Users	·				Per page [20] ~
Sessions					
Customers					
Logs					
Payments					
Profiles					
Settings					
Reports					
0 A sessions					
0 A users					
Advanced search					
Maintenance					
Logout					

Phần 19.2. Cấu hình RADIUS Server với vai trò xác thực tập trung các thiết bị mạng Cisco Device trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Cấu hình trên Cisco Router.
- Bước 3. Cấu hình trên Cisco Switch.
- Bước 4. Thiết lập RADIUS Server trên Router MikroTik.
 - o Bước 4.1. Truy cập vào giao diện RADIUS Server trên Router MikroTik.
 - Bước 4.2. Khởi tạo Telnet Profile trên RADIUS Server.
 - **Bước 4.3.** Khởi tạo các tài khoản quản trị thiết bị mạng trên RADIUS Server.
 - o Bước 4.4. Khai báo thông tin của RADIUS Client trên RADIUS Server.
- Bước 5. Khảo sát quá trình Telnet tới thiết bị mạng xác thực bằng giao thức RADIUS.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên Router MikroTik.

Cấu hình cơ bản trên Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
```

```
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
```

/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1 /ip route add dst-address=172.16.0.0/24 gateway=192.168.1.2

Bước 2. Cấu hình trên Cisco Router.

hostname CiscoRT interface g0/0 ip address 172.16.0.1 255.255.255.0 no shutdown exit interface g0/1 ip address 192.168.1.2 255.255.255.0 no shutdown exit ip route 0.0.0.0 0.0.0 192.168.1.1 aaa new-model aaa authentication login CISCO group radius local radius-server host 192.168.1.1 auth-port 1812 radius-server key mobile24h

username cisco privilege 15 password cisco

enable password cisco

line vty 0 4 login authentication CISCO transport input telnet exit

Bước 3. Cấu hình trên Cisco Switch.

Cấu hình trên Cisco Switch.

interface vlan 1

hostname CiscoSw

ip address 172.16.0.2 255.255.255.0 no shutdown exit ip default-gateway 172.16.0.1

aaa new-model aaa authentication login <mark>CISCO</mark> group radius local radius-server host 192.168.1.1 auth-port 1812 acct-port 1646 radius-server key mobile24h

username cisco privilege 15 password cisco enable password cisco

line vty 0 4 login authentication CISCO transport input telnet exit

Bước 4. Thiết lập RADIUS Server trên Router MikroTik.

Bước 4.1. Truy cập vào giao diện RADIUS Server trên Router MikroTik.

- Link: 192.168.1.1/userman



Bước 4.2. Khởi tạo Telnet Profile trên RADIUS Server.





-					
	Mikro Tik	^	Profiles Limitat	ion	5
	Mikrotik User Manager		Profile:	+]
	Routers				
	Users				
	Sessions			Cr	este profile
	Customers			CI	
	Logs			Na	me TelnetProfile
	Payments				Create
	Profiles				
	Settings			_	
	Reports				
	0 A sessions				
	0 A users				
	Advanced search				
	Maintenance	~			
	Mikro Tik	^	Profiles Limita	atio	ins
	Mikrotik User Manager		Profil	e: [TelnetProfile
[Routers		Nam	e:	TelnetProfile
Ì	Users		Name for user	s:	
Ì	Sessions		Owne	r: j	admin
ľ	Customers		Validit	y:	
ľ	Loge		Start	s:	At first logon
J	Logs		Pric	e:	0.00



 Profile cho phép định nghĩa khoảng thời gian được phép Telnet tới các thiết bị mạng (tính năng này hiện chưa hoạt động được).

	Â	Profil	Profile part
Pouters			✓ Period Days: ☑ Sunday
Users		Nam	✓ Monday ✓ Tuesday
Sessions			✓ Wednesday ✓ Thursday
Logs			✓ Friday
Payments		Sł	Time: 0:00:00 -23:59:59
Profiles		Save	▼ Limits
Settings Reports		Unlimit	New Innit Cancer Add
0 A sessions			
0 A users			
Advanced search			
Maintenance	~		

Bước 4.3. Khởi tạo các tài khoản quản trị thiết bị mạng trên RADIUS Server.



Bước 4.4. Khai báo thông tin của RADIUS Client trên RADIUS Server.



Bước 5. Khảo sát quá trình Telnet tới thiết bị mạng xác thực bằng giao thức RADIUS. Từ máy tính của người quản trị admin, ta telnet tới Cisco Router.

Quick Connect		×
Protocol:	Telnet 🗸	
Hostname:	172.16.0.1	
Port:	23 Firewall: None ~	•
	_	
Show quick c	ionnect on startup	
	Connect Cancel	

CiscoRT# debug radius authentication Radius protocol debugging is on Radius protocol brief debugging is off Radius protocol verbose debugging is off Radius packet hex dump debugging is off Radius packet protocol (authentication) debugging is on Radius packet protocol (accounting) debugging is off Radius elog debugging debugging is off Radius packet retransmission debugging is off Radius server fail-over debugging is off Radius elog debugging debugging is off Radius elog debugging debugging is off

```
CiscoRT#
*Mar 26 10:50:28.503: RADIUS/ENCODE(0000000F): ask "Username: "
*Mar 26 10:50:28.503: RADIUS/ENCODE(0000000F): send packet; GET_USER
CiscoRT#
```

Telnet 172.16.0.1	-	
User Access Verification		
Username: subadmin01 Password:		

Х

CiscoRT# *Mar 26 10:51:38.995: RADIUS/ENCODE(00000010): ask "Password: " *Mar 26 10:51:38.995: RADIUS/ENCODE(00000010): send packet; GET_PASSWORD CiscoRT#

Telnet 172.16.0.1	-	×
User Access Verification		^
Username: subadmin01 Password:		
CiscoRT>		Ŷ

```
CiscoRT#
*Mar 26 10:52:48.531: RADIUS/ENCODE (00000011):Orig. component type = Exec
*Mar 26 10:52:48.531: RADIUS: AAA Unsupported Attr: interface
                                                                       [209] 6
*Mar 26 10:52:48.531: RADIUS:
                              74 74 79 35
                                                      [ tty5]
*Mar 26 10:52:48.531: RADIUS/ENCODE(00000011): dropping service type, "radius-server
attribute 6 on-for-login-auth" is off
*Mar 26 10:52:48.535: RADIUS(00000011): Config NAS IP: 0.0.0.0
*Mar 26 10:52:48.535: RADIUS/ENCODE (00000011): acct session id: 5
*Mar 26 10:52:48.535: RADIUS(00000011): sending
*Mar 26 10:52:48.535: RADIUS/ENCODE: Best Local IP-Address 192.168.1.2 for Radius-
Server 192.168.1.1
*Mar 26 10:52:48.535: RADIUS(00000011): Send Access-Request to 192.168.1.1:1812 id
1645/3, len 76
*Mar 26 10:52:48.535: RADIUS: authenticator 4C CB 25 93 A3 CF 43 86 - 42 8E DF 87 AB
57 AB 8B
*Mar 26 10:52:48.535: RADIUS: User-Name
                                                   [1]
                                                         12
                                                            "subadmin01"
*Mar 26 10:52:48.535: RADIUS: User-Password
                                                   [2]
                                                        18
                                                             *
*Mar 26 10:52:48.535: RADIUS: NAS-Port
                                                  [5]
                                                         6
                                                             514
*Mar 26 10:52:48.535: RADIUS: NAS-Port-Id
                                                  [87] 8
                                                             "tty514"
*Mar 26 10:52:48.535: RADIUS: NAS-Port-Type
                                                   [61] 6
                                                            Virtual
[5]
*Mar 26 10:52:48.535: RADIUS: NAS-IP-Address
                                                   [4]
                                                         6
                                                             192.168.1.2
*Mar 26 10:52:48.535: RADIUS(00000011): Started 5 sec timeout
*Mar 26 10:52:48.539: RADIUS: Received from id 1645/3 192.168.1.1:1812, Access-Accept,
len 26
*Mar 26 10:52:48.539: RADIUS: authenticator 02 FE EA 5D 0F 31 7C 58 - 50 33 0D 53 A0
4F D9 6E
*Mar 26 10:52:48.539: RADIUS: Acct-Interim-Interva[85] 6
                                                             60
*Mar 26 10:52:48.539: RADIUS(00000011): Received from id 1645/3
CiscoRT#
```

age Telnet 172.16.0.1	_	×
		~
Username: subadmin01		
Password:		
CiscoRT>enable		
Password:		
CiscoRT#		

Quan sát thông tin thống kê số lần Telnet tới thiết bị mạng trên RADIUS Server.

Mikro Tik	Add	Edit			
Mikrotik User Manager					9
Routers		∇Name	⊽ IP address	∇ Shared sec	ret
Users		CiscoRT	192.168.1.2	mobile24h	
Sessions	•	Router details		×	Per page [20] ~
Customers		▲ Main		<u>^</u>	
Logs		Name	CiscoRT		
Payments		Owner	admin		
Profiles		IP address	192.168.1.2		
Settings		Shared secret	ti mobile24h		
Reports		Time zone	Parent time zone	~	
		Disabled	l:		
0 A sessions			Authorization success		
0 A users		Log events	Authorization failure		
Advanced search			Accounting failure		
Maintenance		▲ Radius incomming—			
Logout		CoA support	:		
		CoA port	1700		
		▲ Request statistics			
		Authorization	: 8 · 1		
		Accounting	: 0		
		Acct failures	: 0		
		Disconnect ACK	: 0		
		CoA ACK	: 0 : 0	~	
		Acct failures Disconnect ACK Disconnect NAK CoA ACK	2 0 2 0 2 0	v	

Phần 19.3. Khởi tạo cùng lúc nhiều tài khoản End User và mã Vouchers cho dịch vụ Hotspot trên RADIUS Server cài đặt trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Thiết lập cùng lúc nhiều tài khoản End User trên RADIUS Server.
- Bước 2. Xuất danh sách các tài khoản End User dưới dạng File Excel CSV.
- Bước 3. Xuất danh sách các tài khoản End User dưới dạng mã Vouchers.

Các bước thực hiện chi tiết:

Bước 1. Thiết lập cùng lúc nhiều tài khoản End User trên RADIUS Server. Thiết lập Hotspot Profile trước khi khởi tạo các tài khoản End User.



Mikro Tik	Profiles Limitation	ons
Mikrotik User Manager	Profile:	HotspotProfile
Routers	Name:	HotspotProfile
Users	Name for users:	
Sessions	Owner:	admin
Customers	Validity:	
Logs	Starts:	At first logon
Payments	Price:	0.00
Profiles	Shared users:	
Settings	Unlimited profile	emove prome
Penorts	Add new limitat	ion
0 A sessions		
0 A users		
Advanced search		
Maintenance		
Logout		

Khởi tạo các tài khoản End User.

Mikro Tik	Add Edit Generate
Mikrotik User Manager	One
Routers	Batch ername \bigtriangledown Till time \bigtriangledown Total time left \bigtriangledown Actual profile
Users	. Per page [20] ~
Sessions	
Customers	
Logs	
Payments	
Profiles	
Settings	
Reports	
0 A sessions	
0 A users	
Advanced search	
Maintenance	
Logout	

Routers Users Sessions Customers Logs	User d	etails				9
Users Sessions Customers	🔺 Main				×	Actual profile
Sessions Customers					_	Per page [20] ~
Customers		Owner: a	dmin			
Logs	1	Number of users: 4				
	l	Username prefix: u	iser			
Payments	U	Isername length:	3	~		
Profiles	FW	Password length:	5	~		
Settings	▼ Cons	traints	-		_	
Reports	 Wirel Privation 	ess te information				
0 A sessions		Assign profile:	HotspotProfile	~		
				Add		
Advanced search						
Maintenance						
Logout						
Logour						
Mikrotik User Manager	Ad	d Edit Ge	nerate			Q
		∇ Username	⊽ Till time	∇ Total time left	:	Actual profile
Routers			Not set			
Routers Users		user57z				
Routers Users Sessions		user57z user7bb	Not set			
Routers Users Sessions Customers		user57z user7bb userimn	Not set Not set			
Routers Users Sessions Customers Logs	\mathbf{X}	user57z user7bb userimn userfik	Not set Not set Not set			
Routers Users Sessions Customers Logs Payments	VVV VV	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions Customers Logs Payments Profiles		user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions Customers Logs Payments Profiles Settions	YYYY .	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] V
Routers Users Sessions Customers Logs Payments Profiles Settings Beports	Y Y Y Y Y Y	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions Customers Logs Payments Profiles Settings Reports		user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions	N N N N .	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] V
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users	N N N N .	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search	N N N N .	user57z user7bb userimn userfik	Not set Not set Not set			Per page [20] ~
Routers Users Sessions		user57z user7bb	Not set			

Tham khảo thêm các thiết lập mở rộng trên RADIUS Server khi khởi tạo nhanh các tài khoản End User.

Mikro Tik Mikrotik User Manager	Add	Edit Generate			
Deuters		User details		×	
Routers					HotspotProfile
Osers		 Main Owner: 	admin		HotspotProfile
Sessions		Number of users:	2		HotspotProfile
Customers		Username prefix:	user		HotspotProfile
Logs		Username length:	3	~	Per page [20] ~
Payments		Pwd same as login:			
Profiles		Password length:	6		
Settings		IP address:	0.0.0.0		
Reports		Caller ID:	Bind on first use		
0 A sessions		Caller ID.			
0 A users		Shared users:	1	~	
Advanced search		Preshared key:			
Maintenance		Enc key:			
Logout		Enc algo:	None	~	
		Assign profile:	HotspotProfile	~	
				Add	
A dilano	Add	L Edit Caparata			
Mikrotik User Manager	Add	i Eult Generate			
		Vilcornamo	⊽ Till time	⊽ Total time left	
Routers		user57z	Unlimited	Unlimited	HotspotProfile
Users	IH H	user7bb	Unlimited	Unlimited	HotspotProfile
Sessions	마음	userimn	Unlimited	Unlimited	HotspotProfile
Customers		userfik	Unlimited	Unlimited	HotspotProfile
Logs		usersce	Not set		
Payments		usernpd	Not set		
Profiles					Per page [20] ~
Settings					
Reports					
0 A sessions					
0 A users					
Advanced search					
Maintenance					
Logout					
_					

Mikro Tik	Add Edit Generate
Routers	Image: Second state of the second state of
Users	User details
Sessions	▲ Main
Customers	Username: user57z
Logs	Password: 83guxv
Payments	Disabled:
Profiles	Actual profile
Settings	Constraints
Reports	 ▼ Private information
0 A sessions	▼ Statistics
0 A users	▼ All profiles
Advanced search	+ HotspotProfile ~
Maintenance	Save
Logout	

Bước 2. Xuất danh sách các tài khoản End User dưới dạng File Excel CSV.

Mikro Tik		Ado	d Edit	Ge	nerate				
Mikrotik User Manager				CS	V File			[9
Routers		\checkmark	⊽Userna	Vo	uchers	me	∇ Total time left		Actual profile
Users		\checkmark	user57z		Not set				
Sessions		\checkmark	user7bb		Not set				
Customers			userimn		Not set				
Logs		\checkmark	userfik		Not set				Des 2020 [20]
Payments	1.								Per page [20] *
Profiles									
Settings									
Reports									
0 A sessions									
0 A users									
Advanced search									
Maintenance									
Logout									

Mikro Tik	A	١d٥	d Edit Ger	nerate			
Mikrotik User Manager							9
Routers			∇ Username	⊽ Till time	▽ Total time I	eft	Actual profile
Users			user57z	Not set			
Sessions			user7bb	Not set			
Customers			userimn	Not set			
Logs			userfik	Not set			
Payments	·						Per page [20] ~
Profiles							
Settings							
Reports							
0 A sessions		I	CSV File		×		
0 A users		ſ	Break after: 1	~			
Advanced search			Download as	file			
Maintenance							
Logout				Generate			
			_		- 1		

Đổi đuôi file từ .html thành .csv

🗹 🔾 CSV File.html	4/6/2020 4:55 PM	Opera Web Docu	1 KB
CSV File.csv	4/6/2020 4:55 PM	Microsoft Excel C	1 KB

Nội dung file CSV File.csv

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F	ile Ho	ome Inse	ert Page Layo	out Formulas	; Data Revi	ew View I
Pa	Ste	t py • rmat Painter	Calibri B I <u>U</u>	 ✓ 11 ✓ ▼ ⊞ ▼ 	≡ ≡	= ≫ · d = • • •
	Clipboa	rd	L7	Font	L2	Alignmen
F1	.7	• : :	$\times \checkmark f_x$			
	Α	В	С	D	E	F
1	Login	Password	Uptime Limit	Used Uptime	Used Download	Used Upload
2	user57z	83guxv	Unlimited			
3	user7bb	czbwt5	Unlimited			
4	userimn	37k32r	Unlimited			
5	userfik	fdest8	Unlimited			
2	userrik	Tuesto	ommited			

	⊟ 5 • (c> - 🔹 -	₹			
F	ile Ho	me Inse	ert Page Layo	out Formulas	; Data Re	view View H
Pa	Cur En Co aste V For	t py • mat Painter	Calibri B I <u>U</u>	 11 ∨ + ⊞ + <u>⊅</u> 		= ≫ - ct = = € = = E
	Clipboa	rd	۲ <u>۵</u>	Font	L2	Alignmen
G	15	• : :	$\times \checkmark f_x$			
	А	В	с	D	E	F
1	Login	Password	Uptime Limit	Used Uptime	Used Downloa	d Used Upload
2	user57z	83guxv	Unlimited			
3	user7bb	czbwt5	Unlimited			
4	userimn	37k32r	Unlimited			
5	userfik	fdest8	Unlimited			

Bước 3. Xuất danh sách các tài khoản End User dưới dạng mã Vouchers.

Mikro Tik	Ad	ld Ed	lit Ge	nerate			
Mikrotik User Manager			CS	V File			Q
Routers		∇Use	erna Vo	uchers	me	▽ Total time left	∇ Actual profile
Haara		user57	z	Not set			
Users		user7h	h	Not set			
Sessions		userim	-	Not get			
Customers		userim	n	Not set			
Logs		userfik		Not set			Por page [20] v
Payments	1.						Fei page [20] *
Profiles							
Settings							
Reports							
0 A sessions							
0 A users							
Advanced search							
Maintenance							
Logout							

Mikro Tik	Ad	d Edit Ger	nerate		
Mikrotik User Manager					Q
Routers Users Sessions Customers Logs Payments Profiles Settings Reports 0 A sessions 0 A users Advanced search Maintenance Logout		♥ Username user57z user7bb userimn userfik Vouchers Break after: 1 ♥ Download as	♥ Till time Not set Not set Not set Not set	✓ Total time left	▼ Actual profile Per page [20] ▼
	l				
Vouchers.htm	nl	4/6/2020 5:	09 PM	Opera Web Doo	:u 51



Phần 20. Giám sát hoạt động của Router MikroTik. **Phần 20.1**. Kích hoạt SNMP trên Router MikroTik.

Kiểm tra SNMP đã được kích hoạt trên Router MikroTik hay chưa.

```
[admin@MikroTik] > /snmp print
enabled: no
contact:
location:
engine-id:
trap-target:
trap-community: public
trap-version: 1
trap-generators: temp-exception
[admin@MikroTik] >
```

[admin@MikroTik] > /snmp set enabled=yes
[admin@MikroTik] >	/snmp print
enabled:	yes
contact:	
location:	
engine-id:	
trap-target:	
trap-community:	public
trap-version:	1
trap-generators:	temp-exception
[admin@MikroTik] >	

Kiểm tra giá trị SNMP Community.

[admin@MikroTik] > /snmp community print

[admin@MikroTik] > /snmp community print Flags: * - default # NAME 0 * public [admin@MikroTik] >

ADDRESSES ::/0

[admin@MikroTik] > /ip service print

[admin@MikroTik] > /ip service print Elaos: X - disabled, T - invalid	
# NAME	PORT ADDRESS
0 telnet	23
1 ftp	21
2 www	80
3 ssh	22
4 XI WWW-SS]	443
5 api	8728
6 winbox	8291
7 api-ssl	8729
[admin@MikroTik] >	

[admin@MikroTik] > /snmp community add name=rosneft@123 addresses=0.0.0.0/0

[admin@MikroTik] > /snmp community remove 1

[admin@MikroTik] > /snmp community print Flags: * - default **# NAME** 0 * public 1 rosneft@123 [admin@MikroTik] > /snmp community remove [admin@MikroTik] >

ADDRESSES ::/0 0.0.0.0/32

Safe Mode	Session: B8:69:F4:8F:D0:5	E 🗖
🖌 🔏 Quick Set		
CAPsMAN		
Interfaces		
🔔 Wireless	ARP	
📲 🖁 Bridge	Accounting	
📑 PPP	Addresses	
🛫 Switch	Cloud	
°t¦8 Mesh	DHCP Client	
₽55 IP ►	DHCP Relay	
🖉 MPLS 🗈 🗅	DHCP Server	
🔀 Routing 🗈	DNS	
💮 System 🗅	Firewall	
Rueues	Hotspot	
Files	IPsec	
Log	Kid Control	
🧟 RADIUS	Neighbors	
🗙 🄀 Tools 📃 🗈	Packing	
📓 🔚 New Terminal	Pool	
	Routes	
MetaROUTER	SMB	
👸 b Partition	SNMP	
👩 🗋 Make Supout.rif	Services	
🗃 🚱 Manual	Settings	
🗠 🔘 New WinBox	Socks	
	TFTP	

5	0	Safe Mod	е	Session: 172.16.73.253		Memory: 970.9 MiB	CPU: 0%	
	2	Quick Set CAPsMAN Interfaces						
	1 500	Wireless		SNMP Settings]	
	85 C	PPP		✓ Enabled		ОК		
	°T8	Mesh	•	Location:		Cancel		
		MPLS	Þ	Engine ID:		Apply		
	200 200	Routing	4			Communities		
	-	Queues		Trap Community: rosneft@123	₹			
		Files		Trap Version: 2	Ŧ			
X	<u></u>	Radius		Trap Generators:	\$			
BG	×	Tools	Þ	Trap Interfaces:	÷			
Wir		New Terminal		Src. Address: :::				
OS		Partition Make Supout.r	ff					
ter	•	Manual						
no.	0	New WinBox						

rosneft@123

SNMP Communities				
4 - 7				Find
Name 🛛	Addresses	Security	Read Ac	Write Acc 💌
* 🕜 public	::/0	none	yes	no
Prosneft@123	0.0.0/0	none	yes	no
2 items (1 coloritori)				
2 items (1 selected)				

Be sure that the name and Authentication fields match!

SNMP Communities							
÷	SNMP Community <rosneft< th=""><th>@123></th><th>□ ×</th><th></th></rosneft<>	@123>	□ ×				
Na	Name:	rosneft@123	ОК	. 🔻			
6	Addresses:	0.0.0/0	Cancel				
	Security:	none	Apply				
		Read Access Write Access	Сору				
	Authentication Protocol:	MD5	Remove				
	Encryption Protocol:	DES					
	Authentication Password:	••••••					
	Encryption Password:						
2 iter							

Sử dụng PRTG để connect tới Router MikroTik.

Network Performance Monitor on DESKTOP-HACFP9Q								
<u>F</u> ile <u>E</u> dit <u>N</u> odes	<u>Interfaces</u>	<u>E</u> vents	<u>A</u> lerts	<u>C</u> harts	<u>V</u> iew	<u>W</u> indows	<u>H</u> elp	
🔶 📑	- 6	5		Δ	Δ		X	41
New Open	Save Pr	int	View	Events	Alerts	Refresh	Clear	Detail
	arts 🛛 🔛	Add No	de or Int	terface to	Monito	r		×
	н	ostname o 72.16.73.2	r IP Addr 253	ess of Ser	ver, Rout	er, etc.	OK	
		Dynamic	o IP Addre	ess (DHC	P or BOO	ITP)	Cance	
	si n	NMP Com osneft@12	munity Sti 23	ring		•	Help	
		Node do Respon	pes not su se Time a	upport SNI and Packe	MP, Moni It Loss or	itor ıly.		



Phần 20.2. Giám sát lưu lượng trên các cổng giao tiếp của Router MikroTik.

Giám sát lưu lượng trên các cổng giao tiếp của Router MikroTik.

Autok Set CAPsMAN Im Interfaces Wreless Wreless Bridge PPP Switch Newh IP MPLS Bandwidth Test MPLS Bandwidth Test System Email Ouceues Flees Graphing Icog IP Scan ARDIUS MAC Server Netwatch Packet Sniffer Ping Ictop Ping Ictop Ping Podile Patition Profile Make Supout.rf RoMON Manual SMS	Safe Mode	Session: B8:69:F4:8F:D0:5	E
CAPsMAN Im Interfaces Wireless Bridge PPP Switch Switch Switch MPLS Bandwidth Test System Email Queues Routing Fles Graphing Icog IP Scan RADIUS MAC Server Netwatch Nake Supput: RoMON Make Supput: RoMON Manual SMS	🔏 Quick Set		
Immediate Wreless Bridge PPP Switch Switch Immediate MPLS Bandwidth Test System Email Oucues Rodding Bandwidth Test System Email Oucues Rodd Ping Files Graphing Iog IP Scan MAC Server Netwatch New Terminal Packet Sniffer Index MetaROUTER Ping Speed Patition Profile Manual SMS	CAPsMAN		
Wireless Bridge PPP Switch Switch Switch Switch Switch Bandwidth Test Bandwidth Test System Email Queues Flood Ping Files Graphing Iog IP Scan MAC Server Netwatch New Terminal Packet Sniffer Ping MetaROUTER Ping Speed Porfile Make Supout.nf RoMON Manual SMS	Interfaces		
Bridge PPP Switch Nesh IP MPLS Bandwidth Test Bandwidth Test Bandwidth Test System Email Cueues Fles Graphing Icog IP Scan MAC Server NAC Server Not Tools Netwatch New Terminal Packet Sniffer In LCD Ping Netwatch Poile Make Supput Iff RoMON Manual SMS	🗊 Wireless		
PPP Swtch Swtch Swtch Swtch IP Pattion Profile Make Support riff Roll Swtch Pattion Profile Make Support riff Swt Swt <td>퉕虞 Bridge</td> <td></td> <td></td>	퉕虞 Bridge		
Switch Mesh IP N MPLS BTest Server Routing Bandwidth Test Bandwidth Test System Email Queues Rood Ping Files Graphing Icog IP Scan MAC Server MAC Server Netwatch Netwatch Netwatch In New Terminal Packet Sniffer Ping IcD Ping MataROUTER Ping Speed Profile Make Supput.rif RoMON Manual SMS	📑 PPP		
Wesh IP N MPLS BTest Server Routing Bandwidth Test Bandwidth Test System Email Queues Flood Ping Files Graphing Icog IP Scan RADIUS MAC Server Netwatch Packet Sniffer Icob Ping Netwatch Packet Sniffer Icob Ping Mate Support.rff RoMON Manual SMS Manual SMS	🕎 Switch		
IP N MPLS Bardwidth Test Bandwidth Test System Email Oueues Flood Ping Files Graphing Files Graphing Icog IP Scan AC Server RADIUS MAC Server Netwatch Netwatch Netwatch Netwatch Icog Ping Packet Sniffer Icop Ping Packet Sniffer Make Supout.iff Pofile Make Supout.iff RoMON Manual SMS Num WinDum	°t¦e Mesh		
MPLS Barest Server Routing Bandwidth Test System Email Queues Flood Ping Routing IP Scan RADIUS MAC Server RADIUS MAC Server Netwatch Packet Sniffer Incl Ping MetaROUTER Ping Speed Partion Profile Make Supput Iff RoMON Manual SMS New Manual SMS	255 IP 🗅		
Routing Network Bandwidth Test System Email Queues Flood Ping Files Graphing I Log IP Scan RADIUS MAC Server RADIUS Netwatch Network Packet Sniffer I LCD Ping MetaROUTER Ping Speed Patition Profile Make Supout.rff RoMON Manual SMS	🖉 MPLS 🛛 🗅	BTest Server	
Image: System Image: Email Image: Queues Flood Ping Image: Files Graphing Image: Log IP Scan Image: RADIUS MAC Server Image: RADIUS MAC Server Image: RADIUS Netwatch Image: RADIUS Netwatch Image: RADIUS Netwatch Image: RADIUS Packet Sniffer Image: RADIUER Ping Image: RADIUER Ping Speed Image: RADIUS Profile Image: RADIUS SMS Image: RADIUS Telepet	🔀 Routing 🛛 🗅	Bandwidth Test	
Queues Flood Ping Image: Files Graphing Log IP Scan RADIUS MAC Server RADIUS MAC Server Tools Netwatch Image: New Terminal Packet Sniffer Image: LCD Ping Image: MetaROUTER Ping Speed Image: MetaRout.rff RoMON Image: Manual SMS Image: New Were Data Talaet	🛞 System 🗈	Email	
Files Graphing ID Log IP Scan RADIUS MAC Server Netwatch Netwatch New Terminal Packet Sniffer ID Ping ID Porfile ID Profile ID Make Supout.rif RoMON SMS ID Nawi WireBare Telpet Telpet	🙊 Queues	Flood Ping	
Log IP Scan MAC Server Tools Netwatch New Terminal Packet Sniffer Packet Sniffer Ping MetaROUTER Ping Speed Partition Profile Make Supout.rif RoMON Manual SMS	Files	Graphing	
MAC Server Tools Netwatch New Terminal Packet Sniffer LCD Ping MetaROUTER Ping Speed Partition Profile Make Support.rif RoMON Manual SMS Name Min Ban Telpet	E Log	IP Scan	
Y Tools Netwatch Image: New Terminal Packet Sniffer Image: LCD Ping Image: NetaROUTER Ping Speed Image: MetaROUTER Ping Speed Image: Partition Profile Image: Make Support inf RoMON Image: Manual SMS Image: Manual SMS	🧟 RADIUS	MAC Server	
Image: New Terminal Packet Sniffer Image: LCD Ping Image: MetaROUTER Ping Speed Image: Partition Profile Image: Make Support of Manual SMS Image: Manual SMS Image: Manual Telepet	🄀 Tools 🛛 🗅	Netwatch	
Image: ICD Ping Image: MetaROUTER Ping Speed Image: Partition Profile Image: Make Support riff RoMON Image: Manual SMS Image: Manual Telepet	< 📰 New Terminal	Packet Sniffer	
MetaROUTER Ping Speed Partition Profile Make Suport.rif RoMON Q Manual SMS O Nam Wer Park Telepet	🖥 🚍 LCD	Ping	
Partition Profile Make Supout.nf RoMON Manual SMS Manual Telpet	🛃 MetaROUTER	Ping Speed	
Make Supout rif RoMON Wanual SMS	Nartition	Profile	
Wanual SMS	👌] Make Supout.rif	RoMON	
	🛛 📢 Manual	SMS	
	📎 New WinBox	Telnet	
Torch		Torch	

Graphing			
Interface Rules	Queue Rules Resour	rce Rules	
4 - 7	Graphing Settings		Find
Interface	△ Allow Address	Store on D	
Gi S 0 items	raphing Settings itore Every: 5 <u>min</u> 3	Cancel Apply	

Graphing					
Interface Rules	Queue Rules	Resource	e Rules		
+ - 7	Graphing Se	ttings			Find
Interface	Allow Addr	ess	Store or	n D	•
New Interface G	raphing Rule				
Interface:	all			₹	ОК
Allow Address:	0.0.0/0				Cancel
	Store on Dis	sk			Apply
					Сору
					Remove
0 items					



Traffic and system resource graphing

You have access to 12 interfaces: <u>sfp1</u> <u>ether1</u> <u>ether2-master</u> <u>ether3</u> <u>ether5</u> <u>ether6-master</u> <u>ether7</u> <u>ether8</u> <u>ether9</u> <u>ether10</u> <u>bridge</u>



Phần 20.3. Reset mật khẩu Password trên Router MikroTik.

https://wiki.mikrotik.com/wiki/Manual:Reset

Bước 1. Tháo nguồn thiết bi.

Bước 2. Nhấn và giữ button reset trong vòng 5 giây ngay sau khi gắn nguồn thiết bị. USER LED màu xanh lá sẽ bắt đầu chớp liên tục. Lưu ý, nếu để đèn LED ngừng nhấp nháy rồi sau đó mới nhả button reset thì thiết bị sẽ khởi động sang chế độ Netinstall mode để cài đặt lại RouterOS. Bước 3. Nhả button reset để xóa cấu hình.

Phần 20.4. Thiết lập thời gian khởi động Router MikroTik.



Thiết lập thời gian tự động khởi động Router MikroTik.

```
[admin@MikroTik] >
/system scheduler add name="schedule1" start-date=apr/11/2020 start-time=23:59:59
interval=1d
```

```
[admin@MikroTik] > /system scheduler print
Flags: X - disabled
    NAME
            START-DATE START-TIME
                                       INTERVAL
                                                             ON-EVENT
                                                                          RUN-COUNT
 #
    sche... apr/11/2020 23:59:59
0
                                       1d
                                                                                  0
[admin@MikroTik] >
```

N)	Safe Mode	Session: 4C:5E:0C:17:F0:38	
	🔏 Quick Set		
	CAPsMAN		
	Interfaces		
	🚊 Wireless		
	👷 🖁 Bridge		
	🚅 PPP		
	°t¦8 Mesh		
	255 IP 🗅		
	🖉 MPLS 🛛 🗅		
	ve_lPv6 ►		
	😹 Routing 🛛 🗅		
	🎲 System 🗅	Auto Upgrade	
	👰 Queues	Certificates	
	Files	Clock	
	📄 Log	Console	
	🧟 RADIUS	Disks	
	🗙 Tools 🛛 🗅	Health	
X	🔚 New Terminal	History	
le	«¦> Dot1X	Identity	
Nir	LCD	LEDs	
l s	Partition	License	
6	💄 Make Supout.rif	Logging	
fe	😲 Manual	NTP Client	
6	Sin WinBox	NTP Server	
		Note	
		Packages	
		Password	
		Ports	
		Reboot	
		Reset Configuration	
		Resources	
		Routerboard	
		Scheduler	
		Scripts	



Phần 20.5. Giám sát kết nối Internet và các thiết bị trên hạ tầng mạng bằng tính năng Netwatch trên Router MikroTik và tự động gửi Email khi có sự cố phát sinh.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.
- Bước 3. Kiểm tra Log sự kiện trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DRCPServ interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.

[admin@MikroTik] >
/tool netwatch add host=8.8.4.4 timeout=1s interval=4s

[[admin@MikroTik] > /tool netwatch print						
F	Flags: X - disabled						
	#	HOST	TIMEOUT	INTERVAL	STATUS		
	0	8.8.4.4	1s	4s	up		
[[admin@MikroTik] >						

```
[admin@MikroTik] > /tool netwatch print detail
Flags: X - disabled
0 host=8.8.4.4 timeout=1s interval=4s since=apr/11/2020 19:36:44 status=up
up-script=:log error "Wan link is up";
    down-script=:log error "Wan link is down";
[admin@MikroTik] >
```

K	Safe Mode	Session: 4C:5E:0C:17:F0:3E	= 🛱
	🗯 Quick Set		
	CAPsMAN		
	Interfaces		
	 Wireless 		
	Bridge		
	PPP		
	°t¦8 Mesh		
	MPLS N		
	🔀 Routing		
	System		
	Queues		
	Files		
	E Log		
	A RADIUS		
	🄀 Tools 🗈 🗈	BTest Server	
×	🔚 New Terminal	Bandwidth Test	
B	4¦≽ Dot1X	Email	
Vin	🖳 LCD	Flood Ping	
	🅭 Partition	Graphing	
Ç	📑 Make Supout.rif	IP Scan	
4	😧 Manual	MAC Server	
ā	Sin New WinBox	Netwatch	
_		Packet Sniffer	
ĸ	Ca Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
	🎢 Quick Set		
	🚊 CAPsMAN		
	Interfaces		
	🔔 Wireless		
	Bridge		
	📑 PPP	Netwatch	
	°t¦8 Mesh	New Netwatch Host	Find
		Host Up Down	
	MPLS P		
	Routing	Apply Apply	
	System 1	Timeout: 1000 ms Disable	
		Status: Comment	
		Since:	
		Permana Permana	
	Tools		
Ļ	New Terminal	enabled	
i i i	♦ Dot1X	0 items	
i	LCD		
3	Partition		
SOS	[Make Supout.rif		
L.	Manual		
	- Manaai		

Ghi lại Log nếu quá trình ping 8.8.4.4 thành công. :log error "Wan link is up";

Safe Mode	Session: 4C:5E:0C:17:F0:3E	
📕 🔏 Quick Set		
I CAPsMAN		
Interfaces		
🚊 Wireless		
📲 🖁 Bridge		
PPP	Netwatch	
°t¦8 Mesh		
255 IP	Host Host Up Down	
Ø MPLS		
ve IPv6	On Up: Cancel	
2 Routing	Apply	
System	Disable	
Queues	Comment	
Files		
E Log	Сору	
A RADIUS	Remove	
X Tools	enabled	
New Terminal		
Dot1X	0 items	
Partition		
Make Supout.nf		
Manual		
🔁 🕓 New WinBox		

Ghi lại Log nếu quá trình ping 8.8.4.4 không thành công.

:log error "Wan link is down"; Safe Mode Session: 4C:5E:0C:17:F0:3E here a claim text Quick Set CAPsMAN Interfaces 🚊 Wireless 📲 Bridge 📑 PPP 1 🖵 + - 🗸 °t¦8 Mesh New Netwatch Host 255 IP ||Host -Host Up Down OK $\left| \right\rangle$ MPLS On Down: v∮ IPv6 $\[\]$ Cancel $\left| \right\rangle$ 😹 Routing Apply $\[\]$ System Disable Queues Comment Files Сору Log A RADIUS Remove Þ 🔀 Tools enabled 🔚 New Terminal **∢** Dot1X 0 items 💻 LCD 4 Partition] Make Supout.rif 😧 Manual 🔘 New WinBox

Bước 2. Thiết lập tiến trình Ping tới địa chỉ IP bất kỳ ở ngoài Internet thông qua tính năng Netwatch.

[admin@MikroTik]> /log print

Safe Mode	Session: 4C:5E:0C:17:F	F0:3E			
Quick Set					
T CAPSMAN					
	Loa				IX
Interfaces					
Wireless	Freeze			al	₹
📲 🖁 Bridge	Apr/11/2020 15:12:50	memory	system, info	nat rule added by admin	•
	Apr/11/2020 15:15:32	memory	system, info, account	user admin logged in via local	
	Apr/11/2020 15:39:33	memory	system, info, account	user admin logged out via local	
°t¦8 Mesh	Apr/11/2020 15:39:51	memory	system, info	address list entry removed by admin	
255 IP	Apr/11/2020 18:56:16	memory	system, info	new script scheduled by admin	
	Apr/11/2020 18:56:55	memory	system, info, account	user admin logged in via local	
🧷 MPLS 🗈	Apr/11/2020 18:57:48	memory	system, info, account	user admin logged out via local	
	Apr/11/2020 18:57:55	memory	system, info, account	user admin logged in via local	
±	Apr/11/2020 19:18:34	memory	system, info, account	user admin logged out via local	
📈 Routing 🗈	Apr/11/2020 19:24:16	memory	system, info	monitoring new host by admin	
🚳 System	Apr/11/2020 19:24:53	memory	interface, info	ether1 link down	
	Apr/11/2020 19:24:53	memory	dhcp, info	dhcp-client on ether1 lost IP address 172.16.1.169 - lease	:
Queues				stopped locally	
Files	Apr/11/2020 19:27:10	memory	interface, info	ether1 link up (speed 1G, full duplex)	
	Apr/11/2020 19:28:07	memory	interface, info	ether1 link down	
E Log	Apr/11/2020 19:28:09	memory	interface, info	ether1 link up (speed 1G, full duplex)	
🧟 RADIUS	Apr/11/2020 19:29:19	memory	system, info	netwatch host modified by admin	
SRIT-I N	Apr/11/2020 19:29:19	memory	script, error	Wan link is down	
X TOOIS	Apr/11/2020 19:31:58	memory	dhcp, info	dhcp-client on ether1 got IP address 172.31.0.2	
🔀 🔚 New Terminal	Apr/11/2020 19:34:28	memory	script, error	Wan link is up	
Ala Dat1V	Apr/11/2020 19:35:57	memory	script, error	Wan link is down	
	Apr/11/2020 19:36:04	memory	script, error	Wan link is up	
🚊 🖳 LCD	Apr/11/2020 19:36:17	memory	script, error	Wan link is down	
Partition	Apr/11/2020 19:36:25	memory	script, error	Wan link is up	
()	Apr/11/2020 19:36:37	memory	script, error	Wan link is down	
O Make Supout.rif	Apr/11/2020 19:36:44	memory	script, error	Wan link is up	٠
🖸 🔮 Manual	-				
🗦 🔘 New WinBox					

Phần 20.6. Tính năng gửi Email trên Router MikroTik khi có sự cố phát sinh.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên Router MikroTik.
- Bước 2. Thiết lập tính năng gửi Email trên Router MikroTik.
- **Bước 3.** Thiết lập tính năng Netwatch giám sát hệ thống Server và tự động gửi email nếu có sự cố phát sinh.
- Bước 4. Thiết lập Logging Rule tự động gửi email khi có sự cố liên quan đến tính năng Netwatch phát sinh.

Chi tiết các bước thực hiện:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=172.31.0.254/24 interface=ether3
/ip address add address=192.168.1.1/24 interface=ether2
```

```
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```

Bước 2. Thiết lập tính năng gửi Email trên Router MikroTik.

```
[admin@MikroTik]>
/tool e-mail set address=74.125.141.108 port=587 start-tls=yes from=bquocky@gmail.com
user=bquocky@gmail.com password=123456
```

```
[admin@MikroTik] > /tool e-mail print
address: 74.125.141.108
    port: 587
start-tls: yes
    from: bquocky@gmail.com
    user: bquocky@gmail.com
    password: 123456
last-status: succeeded
[admin@MikroTik] >
```

Safe Mode	Session: 4C:5E:0C:17:F0:3	E 🗖 🗖
🄏 Quick Set		
CAPsMAN		
Interfaces		
Wireless		
🕌 🎇 Bridge		
📑 PPP		
° <mark>t</mark> ₿ Mesh		
255 IP		
🖉 MPLS 🛛 🗅		
👳 IPv6 🗈 🗈		
🔀 Routing 🗈 🗈		
∰ System ト		
🙊 Queues	BTest Server	
Files	Bandwidth Test	
Log	Email	
🥵 RADIUS	Flood Ping	
🗙 🎇 Tools 🛛 🗅	Graphing	
🔒 🔳 New Terminal	IP Scan	
E 🗧 Dot1X	MAC Server	
S ICD	Netwatch	
💍 🦺 Partition	Packet Sniffer	
🛅] Make Supout.rif	Ping	
🔁 😢 Manual	Ping Speed	
🞽 🔘 New WinBox	Profile	
	RoMON	

Gmail Server: 74.125.141.108 Port: 587

6	Safe Mode	Session	: 4C:5E:0C:17:F0:3E						a
1	Quick Set								
Î O	CAPsMAN								
Jan I	nterfaces								
٦V	Wireless	_							
26 E	Bridge	_							
F F	PPP	_							
°të N	Mesh	_							
255	Р			Email Settin	ns			1	
<i>2</i>	MPLS			Contract	74 125 141 100				
뿇	P∨6			Server:	74.125.141.108		UK		
200 F	Routing			Port:	587		Cancel		
	System	-		Start TLS:	yes	₹	Apply		
	Queues	-		From:	bauocky@amail.com		Send Email		
E F	les	-		Lleer	bauocku@amail.com				
	Log	-		Usei.	bquocky@gmail.com	 			
	RADIUS	N		Password:		-			
lõ 🚔	louis								
	New Terminal	-							
		-							
S -	Partition	-							
	Make Supout ri								
Ť 💿	Manual								
200	New WinBox								

Thiết lập trên Gmail cho phép Router MikroTik gửi Email tới.

https://myaccount.google.com/lesssecureapps

0	G Less secure app access X +	~	-		×
	< > C = myaccount.google.com/lesssecureapps	ABP	0	⊥	≢
	Google Account		•	В)
	← Less secure app access				
© 	Some apps and devices use less secure sign-in technology, which makes your account vulnerable. Yo can turn off access for these apps, which we recommend, or turn it on if you want to use them despit the risks. Google will automatically turn this setting OFF if it's not being used. Learn more)U :e			
	Allow less secure apps: ON				
	Privacy Policy · Terms of Service · Help				~

Tiến hành gửi Email từ Router MikroTik.

	2	œ	Safe Mode	•	Session: 4C:5E:0C:17:F0:3E						
		<u>م</u>	uick Set								
		<u>î</u> C	APsMAN								
	1	i In	terfaces								
		Î V	/ireless								
	1	Bi Bi	ridge								
	Ę	📫 Pi	PP								
	6	te M	lesh								
	j.	255 IP)	Þ		Email Sottin]	
	<	🖉 М	PLS	Þ		Linal Setur	ys	_			
	ļ	vé IP	∿6	Þ		Server:	74.125.141.108		OK		
	2	🙈 R	outing	Þ		Port:	587	•	Cancel		
	ģ	() S	ystem	Þ		Start TLS:	yes	₹	Apply		
	4	🗩 Q	ueues			From	hauseku@amail.com		Send Email		
		Fi	les				bquocky@gmail.com	1.	Sond Ender		
		L	bg			User:	bquocky@gmail.com	•			
	4	🥵 R	ADIUS			Password:		•			
2		XT	ools							1	
ľå	ă I	2 N	ew Terminal								
Mir		() D	ot1X								
U	2		CD								
ç	2	b Pa	artition								
4	Ŋ	<u></u> М	ake Supout.ri	f							
Ī	5	😋 M	anual								
	۲ (🄘 N	ew WinBox								

6	0	Safe Mode	Session: 4C:5E:0C:1	17:F0:3E			a
	溢	Quick Set					
	Ĵ	CAPsMAN					
) 	Interfaces		Send Email		×	
	Ĵ	Wireless	-	Address:	0.0.0.0	Send Email	
	25	Bridge	-	Port:	•	Cancel	
	Ę.	PPP	-	Lieer:	_	Galicon	
	°t8	Mesh	_	Darmard			
	255	IP		Password:			
	<i>\</i>	MPLS					
	뽀	IPV6		To:	bquocky@gmail.com		
	200	Routing		CC:			
		Queues		From:	bquocky@gmail.com		
	Ŧ	Files	-	Subject:	MikroTik: Send from Router MikroTik		
		Log			An Email send from Router		
		RADIUS	-		MikroTik!		
\times	×	Tools					
B	2	New Terminal					
Vin	<¦>	Dot1X					
	ę	LCD		Body:	~		
ļõ	G	Partition	-	Files:	, 		
Ę		Make Supout.ri			•		
no	9	Manual					
R	0	New WinBox					



Bước 3. Thiết lập tính năng Netwatch giám sát hệ thống Server và tự động gửi email nếu có sự cố phát sinh.



Thiết lập tính năng Netwatch trên Router MikroTik giám sát các Server.

```
[admin@MikroTik] >
/tool netwatch add host=172.31.0.1 interval=4s timeout=1s
/tool netwatch add host=172.31.0.2 interval=4s timeout=1s
```

[admin@MikroTik] > /tool netwatch print							
Flags: X - disabled							
#	HOST	TIMEOUT	INTERVAL	STATU			
0	172.31.0.1	1s	4s	down			
1	172.31.0.2	1s	4s	down			
[admin@MikroTik] >							

```
[admin@MikroTik] > /tool netwatch print detail
Flags: X - disabled
0 host=172.31.0.1 timeout=1s interval=4s since=apr/13/2020 17:19:17 status=down
up-script=:log error "Server1 is up";
    down-script=:log error "Server1 is down";
1 host=172.31.0.2 timeout=1s interval=4s since=apr/13/2020 17:19:48 status=down
up-script=:log error "Server2 is up";
    down-script=:log error "Server2 is down";
[admin@MikroTik] >
```

N	0	Safe Mode	e Session	: 4C:5E:0C:17:F0:3E						
	溢	Quick Set								
	Î	CAPsMAN								
]	Interfaces								
	î	Wireless								
	22	Bridge								
		PPP		Netwatch						×
	°t8	Mesh		+ - 🖌 🗙	- 7				Find	
	255	IP	N	Host	∇ Interval	Timeout (Status	Since		-
	0	MPLS	1	4 172.31.0.2	00:00:04	1000	down	Apr/13/2020	17:19:48	
	v6	IPv6	N	•• 1/2.31.0.1	00:00:04	1000	down	Apr/13/2020	17:19:17	
	*	Routing	<u>N</u>							
	63	System	<u> </u>							
		Queues								
		Files								
		Log	_							
		RADIUS								
	×	Tools	<u> </u>							
$ $ \times		New Terminal								
B	« >	Dot1X		2 items (1 selected)						
/in		LCD								_
		Partition								
0 S		Make Supout.ri	f							
e L	0	Manual								
out	۲	New WinBox								

- Nội dung Tab Up.

```
:log error "Server1 is up";
/tool e-mail send to="<u>bquocky@gmail.com</u>" subject="$[/system identity get name] Server1 is up
$[/system clock get time]"
```

:log error "Server2 is up"; /tool e-mail send to="bquocky@gmail.com" subject="\$[/system identity get name] Server2 is up \$[/system clock get time]"

- Nội dung Tab Down.

:log error "Server1 is down";
/tool e-mail send to="bquocky@gmail.com" subject="\$[/system identity get name] Server1 is down
\$[/system clock get time]"

:log error "Server2 is down";

/tool e-mail send to="bquocky@gmail.com" subject="\$[/system identity get name] Server2 is down
\$[/system clock get time]"







Ю	¢•	Safe Mode	Session	: 4C:5E:0C:17:F0:3E							
	🎢 Qu	uick Set									
	🗐 CA	APsMAN									
) Int	terfaces									
	â W	ireless									
	📲 🖁 Bri	idge									
	🚅 PF	Р		Netwatch		_					×
	°t <mark>8</mark> Me	esh		+ - × ×		·				Find	
	255 IP		P	Host	∇	nterval	Timeout (Status	Since		-
	🖉 MF	PLS	▶	♠ 172.31.0.2		00:00:04	1000	down	Apr/13/20	20 17:32:15	
	yế IP	v6	<u>N</u>	Vi 172.31.0.1		00.00.04	1000	down	Api/ 15/20	20 17.40.11	
	😹 Ro	outing	<u>N</u>								
	🎲 Sy	stem	<u>N</u>								
	👰 Qu	leues									
	📄 Fik	es									
	📄 Lo	g									
	🔏 R/	ADIUS									
	火 То	ols	<u>N</u>								
×	🛅 Ne	ew Terminal									
R	∢¦≯ D o	ot1X		2 items (1 selected)							
/in	🖳 LC	D		Ľ			_				
\leq	🕭 Pa	artition									
Ö	📑 Ma	ake Supout.ri	F								
j	😧 Ma	anual									
DU	🔘 Ne	ew WinBox									





Bước 4. Thiết lập Logging Rule tự động gửi email khi có sự cố liên quan đến tính năng Netwatch phát sinh.



```
[admin@MikroTik] > /system logging action print
Flags: * - default
0 * name="memory" target=memory memory-lines=1000 memory-stop-on-full=no
1 * name="disk" target=disk disk-file-name="log" disk-lines-per-file=1000
disk-file-count=2 disk-stop-on-full=no
2 * name="echo" target=echo remember=yes
3 * name="remote" target=remote remote=0.0.0.0 remote-port=514
src-address=0.0.0.0 bsd-syslog=no syslog-time-format=bsd-syslog
```

```
syslog-facility=daemon syslog-severity=auto
```

4 name="Email" target=email email-to="bquocky@gmail.com" email-start-tls=no [admin@MikroTik] >

PREFIX

[admin@MikroTik]>

```
/system logging add topics=script action=Email
```

```
[admin@MikroTik] > /system logging print
Flags: X - disabled, I - invalid, * - default
# TOPICS ACTION
0 * info memory
1 * error memory
2 * warning memory
3 * critical echo
4 script Email
[admin@MikroTik] >
```

[admin@MikroTik] > /system logging print detail Flags: X - disabled, I - invalid, * - default 0 * topics=info prefix="" action=memory 1 * topics=error prefix="" action=memory 2 * topics=warning prefix="" action=memory 3 * topics=critical prefix="" action=echo 4 topics=script prefix="" action=Email [admin@MikroTik] >

K	Safe Mode	Session: 4C:5E:0C:17:F0:3E
	✓ Quick Set ✓ CAPsMAN ✓ CAPsMAN ✓ Interfaces ✓ Wireless ✓ Bidge ✓ PPP ✓ Mesh ✓ IP ✓ MPLS ✓ IPv6 ✓ Queues Files ✓ IPs	Logging Image: Second seco
MinBox	New Terminal Dot1X LCD Partition	4 items
outerO	Make Supout.rif Manual New WinBox	



	Safe Mod	le	Session: 4C:5E:0C:17:F0:3	BE					🔳 🛅
	🄏 Quick Set								
	🚊 CAPsMAN								
	Interfaces								
	🚊 Wireless								
	퉕 然 Bridge			Loga	ing			×	
	📑 PPP			Ruk	es Actions				
	°t¦8 Mesh						Circl	_	
	ESS IP	\triangleright		T	Tanian (Def	Fina		
	MPLS	\square		•	critical	Frenx	echo		
	ve IPv6	Þ		•	error		memory		
	減 Routing	$\[\]$		•	into script		Email		
	System	$ \rangle$		•	warning		memory		
	Queues								
	Files								
	📄 Log								
	🧟 RADIUS								
	🄀 Tools	$\[\]$							
×	📰 New Terminal								
B	∢ Dot1X								
/in	🖳 LCD			5 ite	ms (1 selected)				
	🅭 Partition								
Ŏ	📑 Make Supout.	rif							
E I	😧 Manual								
BO	🔘 New WinBox								

Thiết lập lại tính năng Netwatch không cần phải gửi Email nữa.



Safe Mode	Session: 4C:5E:0C:17:F0:3E	
Image: CAPsMAN Image	Netwatch Netwatch Netwatch Host <172.31.0.1> Find Find 20 17:32:15 I on Down: Cancel Comment Copy Remove	
New Terminal	enabled	
Dot1X	2 items (1 selected)	
Make Supout.rif		
🙍 💜 Manual		
🗟 🔘 New WinBox		

Khi Server gặp sự cố phát sinh Up/Down.

Ŋ	¢.	Safe Mode	Session	: 4C:5E:0C:17	':F0:3E							a (1)
	<u>/</u>	Quick Set										
	Ĵ	CAPsMAN										
) and in	nterfaces										
	٦V	Vireless										
	2 C B	Bridge										
	🚅 P	PPP		Netwatch			_					×
	°t¦s N	Mesh		+ -	✓ 🗙	[2]	ſ				Find	
	255	Р	1	Host		∇	Interval	Timeout (Status	Since		▼ .
	Ø N	MPLS	N	* 172.3	1.0.2		00:00:04	1000	down	Apr/13/202	20 17:32:15	
	<u>v</u> 6	Pv6	2	•• 1/2.3	1.0.1		00:00:04	1000	down	Apr/13/202	10 18:03:15	
	200 F	Routing	Þ									
	@ S	System	Þ.									
	🙊 (Queues										
	📄 F	Files										
	📄 L	Log										
	<u></u> F	RADIUS										
	Ж т	Tools	1									
×		New Terminal										
B	4)> D	Dot1X		2 items (1 s	elected)							
lin	🖳 L	LCD		-								
	🥭 P	Partition										
ļõ	🛄 N	Make Supout.ri										
te	😲 N	Manual										
0	N	New WinBox										



0	G Less secure app access X M Inbox	5) - bquocky@gmail × +	÷ _	
	く 〉 C 器 🔒 mail.google	.com/mail/u/0/#inbox	0 🥑 > ♡ 🐵 🍵	± ≢
	= M Gmail	Q Search mail	• ⑦	III B
	Compose	□ - C :		\$
٩		∧ Important	1-50 of	369
-	★ Starred	🗌 📩 🐌 me	script,error Server1 is up	6:04 PM
Q	Snoozed	🗌 🕁 🍗 me	script,error Server1 is down	6:03 PM
\triangleright	Important	🗌 🕁 🍗 me	script,error Server1 is up	6:02 PM
88	Sent	🗌 🕁 🍗 me	script,error Server1 is down	6:02 PM
	Dratts Categories	🗌 🛧 🐌 me	MikroTik Server1 is down 17:46:11	5:46 PM
	Social	🗌 🚖 🐌 me	MikroTik Server1 is up 17:44:33	5:44 PM

Phần 20.7. Tính năng giám sát và phân tích lưu lượng Torch trên Router MikroTik.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Kích hoạt tính năng Torch trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no
```



ø	C4 Safe Mode	Session: 4C:5E:0C:17:F0:3	E
	🔏 Quick Set		
	CAPsMAN		
1	🛲 Interfaces		
	Wireless		
	📲 Bridge		
0	📫 PPP		
0	°t <mark>8</mark> Mesh		
	255 IP 🗈 🗎		
<	🖉 MPLS 🛛 🗅		
9	ve IPv6 ►		
2	😹 Routing 💦 🗅		
9	🚱 System 🗈		
6	🙊 Queues		
	📄 Files		
	Log		
4	🧟 RADIUS		
d	🍾 Tools 🛛 🕅	BTest Server	
X	🔚 New Terminal	Bandwidth Test	
١ <u>ه</u>	∢i> Dot1X	Email	
-i	🖷 LCD	Flood Ping	
\int_{Ω}	😓 Partition	Graphing	
ŏ] Make Supout.rif	IP Scan	
E	😧 Manual	MAC Server	
10	🍥 New WinBox	Netwatch	
		Packet Sniffer	
		Ping	
		Ping Speed	
		Profile	
		RoMON	
		SMS	
		Telnet	
		Torch	
		Traceroute	

Safe Mode	Session: 4C:5E:0C:17:	F0:3E							
🔏 Quick Set	Torch (Running)								
I CAPsMAN	- Basic		F	ilters				- s	Start
Interfaces	Interface: ether2	ether2 F Src			0.0.0.0/0				iton
🚊 Wireless	Entry Timeout: 00:00:	:03	s D	st. Address:	0.0.0.0/0				
and ge 문제	- Collect		Sro	Address6:	::/0				lose
📑 PPP	Src. Address	Src. Addre	ss6 Ds	t. Address6:	::/0			New	Window
°t¦8 Mesh	Dst. Address	Dst. Addre	ss6	C Protocol:	al				
🔤 IP 🗈	MAC Protocol	Port	1012		dii				
🖉 MPLS 🗈 🗈	Protocol	U VLAN Id		Protocol:		any 🔸			
v IPv6 ►				Port:	any		Ŧ	:	
🌌 Routing 🗈				VLAN Id:	any		Ŧ	:	
💮 System 🗅				DSCP: a		any 🐺			
🙊 Queues	Et / Protocol Sr	Det	Dst. VLAN Id DSC			Tx Bate	Rx Rate	Ty Par 🔻	
Files	800 (ip) 17 (udp) 25	5.255.255.255	0.0.0.0		VERITIG	0001	12.0 kbps	0 bps	4
E Log	800 (ip) 17 (udp) 19 800 (ip) 6 (tcp) 19	2.168.1.100	255.255.2	55.255 4 177			0 bps	2.8 kbps 0 bps	
A RADIUS	800 (ip) 6 (tcp) 19	2.168.1.100	3.232.162	.211			0 bps	480 bps	- i
🔀 Tools 🗈									
New Terminal									
ĕ de Dot1X									
n Partition									
O Make Supout.rif									
🖞 🔇 Manual	•								٠
🗟 🕓 New WinBox	4 items Total 1	Tx: 12.0 kbps To	tal Rx: 3.3 kbps	Total Tx Pa	acket: 4		Total Rx Pac	ket: 5	

Phần 20.8. Thiết lập tính năng Traffic Monitor cảnh báo khi tốc độ Download vượt quá 5M.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Kích hoạt tính năng Traffic Monitor trên Router MikroTik.
- Bước 3. Khảo sát tính năng Traffic Monitor trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
```

/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4 /ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no

Bước 2. Kích hoạt tính năng Traffic Monitor trên Router MikroTik.

[admin@MikroTik]>
/tool traffic-monitor add name="DownloadTrafficeMonitor" interface=ether1 traffic=received
trigger=above threshold=5000000

[admin@MikroTik] > /tool traffic-monitor print										
Flags: X - disabled, I - invalid										
#	NAME	INTERFACE	TRAFFIC	TRIGGER	THRESHOLD	ON-EVENT				
0	DownloadTra	ether1	received	above	5000000	:log error	"Do			
[adm	in@MikroTik] >									

```
[admin@MikroTik] > /tool traffic-monitor print detail
Flags: X - disabled, I - invalid
0 name="DownloadTrafficeMonitor" interface=ether1 traffic=received trigger=above
threshold=5000000 on-event=:log error "Download is reach 5M";
[admin@MikroTik] >
```

```
い 🖓 🛛 Safe Mode
                     Session: 4C:5E:0C:17:F0:3E
                                                                                                                     🔳 🔒
   he wick Set
   I CAPsMAN
   Interfaces
   1 Wireless
   📲 Bridge
   📑 PPP
   °ta Mesh
   255 IP
   MPLS
   v∳ IPv6
   😹 Routing
                  Þ
   System
   Queues
   Files
   Log
   ARADIUS
  🔀 Tools
                 BTest Server
   New Terminal
                      Bandwidth Test
   ♦ Dot1X
                      Email
   💻 LCD
                      Flood Ping
   Partition
                      Graphing
   ] Make Supout.rif
                      IP Scan
   🚱 Manual
                      MAC Server
   🔘 New WinBox
                      Netwatch
                      Packet Sniffer
                      Ping
                      Ping Speed
                      Profile
                      RoMON
                      SMS
                      Telnet
                      Torch
                      Traceroute
                      Traffic Generator
                      Traffic Monitor
```

Safe Mode	Session: 4C:5E:0C:17:F0:3E	a
🖉 🔏 Quick Set		
I CAPsMAN		
Interfaces		
🔔 Wireless		
퉕룷 Bridge		
PPP 📑	Traffic Monitor List	
°t¦8 Mesh		
IP N	Name / Interface Traffic Trigger Threshold On Event 🔻	
Ø MPLS		
ve IPv6 ►		
🔀 Routing 🗈		
∰ System ►		
🙊 Queues		
Files		
Log		
A RADIUS		
X Tools		
New Terminal		
Dot1X	0 items	
Partition		
Make Supout.rif		
Manual		
🔁 🕓 New WinBox		

:log error "Download is reach 5M";

Safe Mode	Session: 4C:5E:0C:17:F0:3E		
Image: Safe Mode Image: CAPsMAN Image	Session: 4C:5E:0C:17:F0:3E	New Traffic Monitor ▼ Name: DownloadTrafficeMonitor OK Interface: ether1 ▼ Traffic: received ▼ Traffic: above ▼ Trigger: above ▼ Threshold: 5M bita/s On Event: Copy	
Files Cog ADD ACT	0 items	enabled	

Ŋ	Q4	Safe Mode	Session: 4C:5E:	0C:17:F0:3E							a
	// (Quick Set									
	Ĵ.	CAPsMAN									
)en l	Interfaces									
	٦I	Wireless									
	50 ar 20 20 50 ar 20	Bridge									
	📫 F	PPP	_	Traffic Monitor Lis	t						
	°t¦s I	Mesh	_		× 🖻 🍸	·			Find		
	255	IP 1		Name /	Interface	Traffic	Trigger	Threshold	On Event		
	Ø 1	MPLS 1		DownloadTra	ether1	received	above	5M	:log error "Do	·	
	<u>v6</u>	IPv6 ↾									
	200 F	Routing									
	@ S	System 1	_								
	۹ 🥏	Queues	_								
	- F	Files	_								
	E	Log	_								
	<u></u> R	RADIUS	_								
	٦	Tools	_								
		New Terminal	_								
le	* } [Dot1X	_	1 item							
Vin		LCD									
	🕭 F	Partition									
ļõ		Make Supout.rif									
te	Q I	Manual									
OU	0	New WinBox									

Bước 3. Khảo sát tính năng Traffic Monitor trên Router MikroTik.

5	¢	Safe Mode	е	Sess	ion: 4C:5E:0C:17:F0	:3E								
		Quick Set												
	Î	CAPsMAN												
]	Interfaces												
	Î	Wireless												
	52	Bridge		Interfa	ace List									
		PPP		Inter	food late food lite	Ed	E ID T III	ID T	CDF T		VDDD	D	1.75	
	<u>е с</u> е	Mesh		inter	Interface List	Etnemet	EOIP Tunnel	IP Tunnel	GRE TUNN	ei VLAN	VRRP	Bonding	LIE	
	255	ID	N	+ -		- 7	Detect Inte	ernet					Find	
	*		т К		Name /	Туре		Actual MTU	L2 MTU	Тх		Rx		
	Ŵ	MPLS	P	R	♦ ether1	Ethernet		150	0 1580		483.3	kbps	35	.1 M
	v6	IPv6		R	ether2	Ethernet		150	0 1580		35.2 M	Ibps	545	5.5 k
	-	Deuties	N		ether3	Ethernet		150	0 1580		C	bps		0
	24	Routing	-		ether4	Ethernet		150	0 1580		0	bps		0
	0	System			ether5	Ethernet		150	0 1580		C	bps		0
		0			ether6	Ethernet		150	0 1580		0	bps		0
	2	Queues			ether7	Ethernet		150	0 1580		0	bps		0
		Files			ether8	Ethernet		150	0 1580		C	bps		0
		Log			ether9	Ethernet		150	0 1580		0	bps		0
	1	LOg			ether10	Ethernet		150	0 1580		C	bps		0
	<u>e</u>	RADIUS			ether11	Ethernet		150	0 1580		0	bps		0
	×	Tools	\triangleright		♦ ether12	Ethernet		150	0 1580		C	bps		0
×	۶.	New Terminal												
B	« }>	Dot1X		•										•
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\leq	٩	Partition												
Ģ		Make Supout.r	if											
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Safe Mode	Session: 4C:5E:0C:17:F0:3E	
Quick Set		
CAPsMAN		
Interfaces		
Wireless		
Star Pridae		
Mesh	Freeze all ∓	
255 IP	Apr/14/2020 13:24:32 memory system, info filter rule changed by admin	
🖉 MPLS 🗈 🗈	Apr/14/2020 13:25:44 memory system, info layer 7 protocol changed by admin	
VE IPV6	Apr/14/2020 13:27:01 memory system, info filter rule changed by admin	
	Apr/14/2020 13:40:52 memory system, info filter rule removed by admin	
🌌 Routing 🗈	Apr/14/2020 13:40:54 memory system, info layer 7 protocol removed by admin	
∰ System ト	Apr/14/2020 13:54:50 memory system, info traffic monitor added by admin	
	Apr/14/2020 13:55:59 memory script, error Download is reach 5M	
Queues		
Files		
E Log		
A RADIUS		
🄀 Tools 🔹 🗅		
🔀 🔚 New Terminal		
🔏 🚸 Dot1X		
는 📄 LCD		
Nortition		
🔘] Make Supout.rif		
👩 🕢 Manual		
New WinBox		

Phần 20.9. Giám sát và thống kê lưu lượng Download trên Router MikroTik bằng công cụ Graphing.



Tổng quan các bước thực hiện:

- Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.
- Bước 2. Định nghĩa danh sách các Interface sẽ giám sát lưu lượng bằng tính năng Graphing trên Router MikroTik.
- **Bước 3.** Tiến hành giám sát lưu lượng trên các cổng giao tiếp bằng tính năng Graphing trên Router MikroTik.
- Bước 4. Thiết lập địa chỉ IP nào được phép xem thống kê lưu lượng trên Router MikroTik.

Các bước thực hiện chi tiết:

Bước 1. Cấu hình cơ bản trên thiết bị Router MikroTik.

```
[admin@MikroTik]>
/ip address add address=192.168.1.1/24 interface=ether2
/ip dhcp-client add interface=ether1 disabled=no add-default-route=yes
/ip firewall nat add chain=srcnat action=masquerade out-interface=ether1
```

/ip pool add name=PoolLAN ranges=192.168.1.10-192.168.1.100
/ip dhcp-server network add address=192.168.1.0/24 gateway=192.168.1.1 dns-server=8.8.4.4
/ip dhcp-server add name=DHCPserv interface=ether2 address-pool=PoolLAN disabled=no

Bước 2. Định nghĩa danh sách các Interface sẽ giám sát lưu lượng bằng tính năng Graphing trên Router MikroTik.

[admin@MikroTik]>

/tool graphing interface add interface=all allow-address=192.168.1.100/32 store-on-disk=yes

[admin@MikroTik] > /tool graphing interface print						
Flags: X - disabled						
#	INTERFACE	ALLOW-ADDRESS	STORE-ON-DISK			
0	all	192.168.1.100/32	yes			
[admin@MikroTik] >						

```
[admin@MikroTik] > /tool graphing interface print detail
Flags: X - disabled
0 interface=all allow-address=192.168.1.100/32 store-on-disk=yes
[admin@MikroTik] >
```

[admin@MikroTik] > /tool graphing print store-every: 5min page-refresh: 300 [admin@MikroTik] >

[admin@MikroTik] >
/tool graphing set store-every=5min page-refresh=300

Ŋ	Call Safe Mode	Session: 4C:5E:0C:17:F0:3E	3
	🄏 Quick Set		
uterOS WinBox	CAPsMAN		
	Interfaces		
	🚊 Wireless		
	📲 Bridge	Graphing	
	📑 PPP	Interface Rules Queue Rules Resource Rules	
	°t¦8 Mesh	Find Graphing Settings	
	255 IP	Interface / Allow Address Store on D	
	Ø MPLS		
	₩ IPv6		
	🔀 Routing		
	∰ System ▷		
	🕎 Queues		
	Files		
	Log		
	M RADIUS		
		0 items	
	Partition		
	Make Supeut of		
	Manual		
Ō	Wew Winbox		


い CM Safe Mode	Session: 4C:5E:0C:17:F0:3E	1
CAPSMAN CAPSMAN CAPSMAN Im Interfaces Vireless Bridge PPP Kesh PPP Kesh PP Kesh PP CAPSMAN PP CAPSMAN PP CAPSMAN PP CAPSMAN PP CAPSMAN PP CAPSMAN P	Graphing Interface Rules Queue Rules Resource Rules Interface / Allow Address Store on D Interface Interface / Allow Address Store on D Interface Store Every: Smin OK Cancel Apply Apply Interface Interface	J
A Dot1X Dot1X LCD Partition Make Supout.rif Manual Solution	1 item	

Bước 3. Tiến hành giám sát lưu lượng trên các cổng giao tiếp bằng tính năng Graphing trên Router MikroTik.



0	RouterOS -> MikroTik -> Ir × +			:	~	_		\times	
	C BB ⊕ Not secure 192.168.1.1/graphs/iface/ether2/ E	ð 🥑	\triangleright	\bigcirc	ABP	¢	⊥	ŧ	
	Interface <ether2> Statistics</ether2>								
-	• Last update: Tue Apr 14 18:12:10 2020								
\bigcirc	"Daily" Graph (5 Minute Average)								
0	12.00Mb								
-	9.00Mb								
Q	6.00Mb								
\triangleright	3.00Мb								
-	0.00Mb 12 14 16 18 20 22 0 2 4 6 8 10 12 14 16 18								
88	Max In: 143.26Kb; Average In: 17.91Kb; Current In: 5.63Kb; Max Out: 11.55Mb; Average Out: 468.13Kb; Current Out: 39.75Kb;								
\bigcirc									
Ē	"Weekly" Graph (30 Minute Average)								
	4.00Mb								
	3.00Mb								
	2.00mb							~	

Bước 4. Thiết lập địa chỉ IP nào được phép xem thống kê lưu lượng trên Router MikroTik.

Safe Mode	Session: 4C:5E:0C:17:F0:3E	
Quick Set CAPsMAN Interfaces Wireless		
응었 Bridge e童 PPP 약장 Mesh	Graphing	
IP ↑ Image: IP ↓ Image: IP ↓ Image: IP ↓ Image: IP ↓	Interface Graphing Rule cal>	
Image: Weight of the second secon	Allow Address: 192.168.1.100 Cancel	
Files	Copy Remove	
X Tools New Terminal		
LCD	1 item (1 selected)	
Manual New WinBox		

Máy tính không có địa chỉ IP là 192.168.1.100 sẽ không thể xem được thống kê lưu lượng trên Router MikroTik.



D D

Liên kết tham khảo:

- Liên kết tham khảo ý nghĩa các Route Flags: https://wiki.mikrotik.com/wiki/Manual:IP/Route
- https://wiki.mikrotik.com/wiki/Manual:Interface/Ethernet
- Chặn Face & Youtube: <u>https://wiki.mikrotik.com/wiki/Tips and Tricks for Beginners and Experienced Users</u> <u>of RouterOS</u>
- MikroTik 101: QoS How to prioritise your network traffic!: <u>https://www.miro.co.za/mikrotik-101-qos-prioritise-network-traffic/</u>
- Manual:TOC: <u>https://wiki.mikrotik.com/wiki/Manual:TOC</u>
- IRONWIFI CONSOLE SETUP: <u>https://www.ironwifi.com/mikrotik/</u>
- MikroTik Firewall Basic Concept: <u>https://systemzone.net/mikrotik-firewall-basic-concept/</u>
- Main Page: https://wiki.mikrotik.com/wiki/Main_Page
- MikroTik Hotspot Tutorial Complete Edition: <u>https://www.youtube.com/watch?v=gwQsP0Gqde0</u>
- API MikroTik:
 - o Manual:API: <u>https://wiki.mikrotik.com/wiki/Manual:API</u>
 - o API command notes: <u>https://wiki.mikrotik.com/wiki/API command notes</u>
- [Mikrotik] Giới thiệu và cài đặt hotspot: <u>https://viblo.asia/p/mikrotik-gioi-thieu-va-cai-dat-hotspot-WEMkBpzxGQK</u>
- Hướng dẫn cấu hình hotspot trên thiết bị Mikrotik: <u>http://vntik.com/huong-dan-cau-hinh-hotspot-tren-mikrotik/</u>
- Install MikroTik RouterOS on PC: https://systemzone.net/install-mikrotik-os-on-pc/