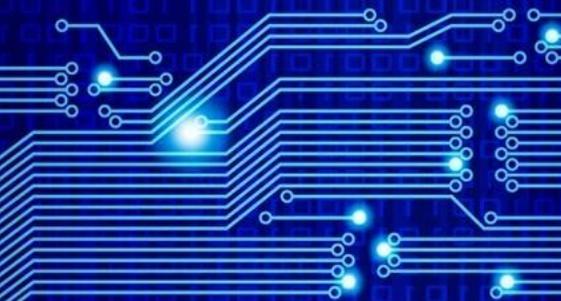


*Configuración inicial router
MikroTik para hogar y pequeña
empresa*



MikroTik

JANUARY 20

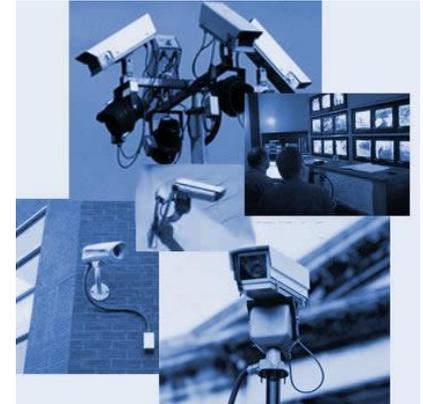
MUMHONDURAS

MIKROTIK USER MEETING • SAN PEDRO SULA 2020

MikroTik

Sobre el expositor

- Juan Manuel Diaz Gómez
- Ingeniero de Telecomunicaciones
Universidad Santo Tomás sede Medellín-
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- Certificaciones obtenidas: MTCNA-MTCTCE
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Introducción

Hoy en día, muchas personas buscan para los hogares, colegios, empresas, etc., tener una red Wi-Fi, controlar la velocidad, tener una red segura, poder establecer una VPN para acceder a los servicios remotamente, poder tener empleados realizando teletrabajo. Una opción por las que muchos están optando es adquirir un router:



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Objetivos

Los objetivos a alcanzar para implementar soluciones en hogar y empresa son:

- Configuración por defecto
- Configuración desde cero de nuestro dispositivo
- Configuración red WAN y LAN (cableada y Wi-Fi)
- Firewall básico
- Calidad de servicio
- DNS
- Backups
- VPN

Configuración por defecto

MikroTik

Configuración por defecto

RouterOS Default Configuration

The following default configuration has been installed on your router:

RouterMode:

- * WAN port is protected by firewall and enabled DHCP client
- * Wireless and Ethernet interfaces (except WAN port ether1) are part of LAN bridge

wlan1 Configuration:

mode: ap-bridge;
band: 2ghz-b/g/n;
ht-chains: 0,1;
ht-extension: 20/40mhz-Ce;

LAN Configuration:

IP address 192.168.88.1/24 is set on bridge (LAN port)
DHCP Server: enabled;

WAN (gateway) Configuration:

gateway: ether1 ;
ip4 firewall: enabled;
NAT: enabled;
DHCP Client: enabled;
DNS: enabled;

Remove Configuration

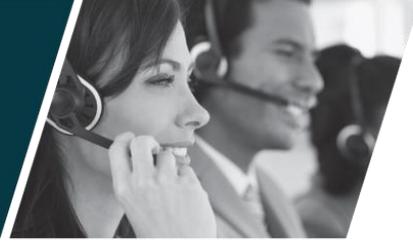
Show Script...

OK

Configuración desde cero de nuestro dispositivo

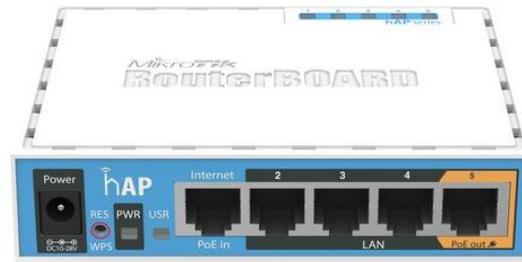
MikroTik

1) Escoger el dispositivo

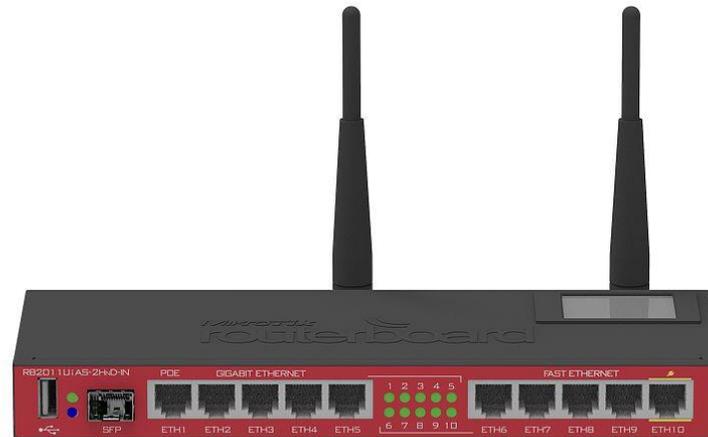


RB931

RB941



RB952



RB2011



1) Escoger el dispositivo

Product code	RB931-2nD
CPU	QCA9533
CPU nominal frequency	650 MHz
CPU core count	1
Size of RAM	32 MB
10/100 Ethernet ports	3
Wireless	Built-in 2.4 GHz 802.11b/g/n, dual-chain



1) Escoger el dispositivo

Antenna gain	1.5 dBi
Antenna beam width	360°
Wireless chip model	QCA9533
Supported input voltage	5 V (Jack)
Dimensions	48 x 78 x 81mm
License level	4
Operating System	RouterOS

2) Eliminar la configuración por defecto

RouterOS Default Configuration

The following default configuration has been installed on your router:

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wlan1 Configuration:

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DHCP Server: enabled;

WAN (gateway) Configuration:

gateway: ether1 ;
ip4 firewall: enabled;
NAT: enabled;
DHCP Client: enabled;
DNS: enabled;

Remove Configuration

Show Script...

OK

B) Actualizar versión RouterOS y el firmware

Check For Updates

Channel:

Installed Version:

Latest Version:

What's new in 6.46.2 (2020-Jan-14 07:17):

- *) chr - improved stability when changing ARP modes on e1000 type adapters;
- *) console - prevent "flash" directory from being removed (introduced in v6.46);
- *) console - updated copyright notice;
- *) crs305 - disable optical SFP/SFP+ module Tx power after disabling SFP+ interface;
- *) defconf - fixed "caps-mode" not initialized properly after resetting;
- *) defconf - fixed default configuration loading on RBwAPG-60adkit (introduced in v6.46);
- *) lora - fixed packet sending when using "antenna-gain" higher than 5dB;
- *) lte - fixed "cell-monitor" on R11e-LTE in 3G mode;
- *) lte - fixed "earfcn" reporting on R11e-LTE6 in UMTS and GSM modes;
- *) lte - report only valid info parameters on R11e-LTE6;
- *) ppp - fixed minor typo in "ppp-client" monitor;
- *) qsfm - do not report bogus monitoring readouts on modules without DDMI support;
- *) qsfm - improved module monitoring readouts for DAC and break-out cables;
- *) routerboard - added "mode-button" support for RBcAP2nD;
- *) security - fixed vulnerability for routers with default password (limited to Wireless Wire), admin could login on startup with empty password before default configuration script was fully loaded;
- *) system - fixed ".auto.rsc" file execution (introduced in v6.46);
- *) system - fixed "check-installation" on PowerPC devices (introduced in v6.46);
- *) traffic-generator - improved memory handling on CHR;
- *) webfig - allow skin designing without "ftp" and "sensitive" policies;
- *) webfig - fixed "skins" saving to "flash" directory if it exists (introduced in v6.46);
- *) winbox - automatically refresh "Packets" table when new packets are captured by

New version is available

Routerboard

Routerboard

Model:

Revision:

Serial Number:

Firmware Type:

Factory Firmware:

Current Firmware:

Upgrade Firmware:



3) Actualizar versión RouterOS y el firmware

Package List

Check For Updates Enable Disable Uninstall Unschedule Downgrade Check Installation Find

Name	Version	Build Time	Scheduled
routeros-smips	6.46.1	Dec/13/2019 12:44:23	
advanced-t...	6.46.1	Dec/13/2019 12:44:23	
dhcp	6.46.1	Dec/13/2019 12:44:23	
hotspot	6.46.1	Dec/13/2019 12:44:23	
ipv6	6.46.1	Dec/13/2019 12:44:23	
mpls	6.46.1	Dec/13/2019 12:44:23	
ppp	6.46.1	Dec/13/2019 12:44:23	
routing	6.46.1	Dec/13/2019 12:44:23	
security	6.46.1	Dec/13/2019 12:44:23	
system	6.46.1	Dec/13/2019 12:44:23	
wireless	6.46.1	Dec/13/2019 12:44:23	

Free HDD Space: 7.6 MiB
Total HDD Size: 16.0 MiB

4) Asignar un usuario y contraseña

The screenshot shows a 'User List' window with a 'New User' dialog box open. The 'User List' window has tabs for 'Users', 'Groups', 'SSH Keys', 'SSH Private Keys', and 'Active Users'. The 'Users' tab is selected, and a table lists users. The 'New User' dialog box has fields for Name, Group, Allowed Address, Last Logged In, Password, and Confirm Password. The 'Name' field is filled with 'user1', and the 'Group' field is set to 'read'. The 'enabled' checkbox is checked.

Name	Group	Allowed Address	Last Logged In
vijt	full		

New User

Name:

Group:

Allowed Address:

Last Logged In:

Password:

Confirm Password:

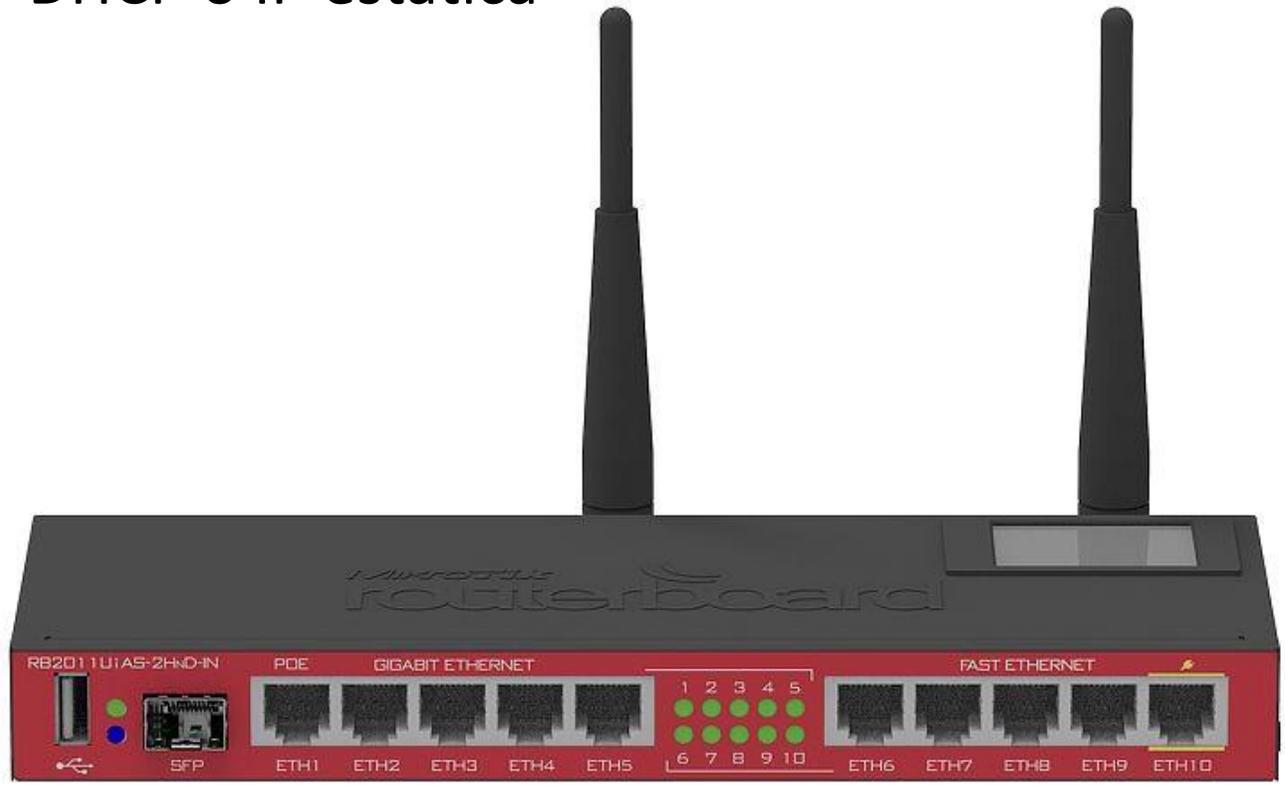
enabled

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

Configuración WAN y LAN (cableada y Wi-Fi)

1) Definir los puertos a utilizar

- Recomendación para el puerto WAN usar cualquiera diferente al ETH1, por DHCP o IP estática



2) Especificar los servicios requeridos en la LAN

- Cámaras de seguridad
- Automatización del hogar u oficina
- Servidores (telefonía, crm, etc.)
- Número de sedes (VPN)
- Visitantes (opción hotspot con trial)
- Dispositivos a conectar
- Ancho de banda total
- Servidor NTP





3) Ejemplo

- Oficina con 5 empleados, servidor VOIP, cámaras, alarma, automatización de luces, 2 sedes remotas, 2 empleados por teletrabajo, computador de escritorio por empleado, dispositivo Wi-Fi por empleado, visitantes diariamente llegan a la oficina, ancho de banda de 40 Mbps dedicados
- Por cable red empleados: 192.168.20.0/24 (5 puertos ethernet)
- Por cable servidor, cámaras, alarma red 192.168.50.0/28 (3 puertos ethernet)
- Por wifi 3 redes: empleados 192.168.10.0/24 – visitantes 192.168.15.0/24 – automatización de luces 192.168.30.0/28



4) Configuración red Wi-Fi usando virtual AP

The image displays two screenshots of a network configuration interface, likely from a MikroTik device, showing the configuration for two wireless interfaces: wlan1 and wlan2.

Interface <wlan1>

- General
- Wireless
- Data Rates
- Advanced
- HT
- HT MCS
- WDS
- ...

Mode: ap bridge

Band: 2GHz-B/G/N

Channel Width: 20/40MHz eC

Frequency: auto MHz

SSID: empleados

Radio Name: 744D28D505A8

Scan List: default

Wireless Protocol: any

Security Profile: empleados

WPS Mode: disabled

Interface <wlan2>

- General
- Wireless
- WDS
- Status
- Traffic

Mode: ap bridge

Secondary Channel:

SSID: visitantes

Master Interface: wlan1

Security Profile: visitantes

WPS Mode: disabled

VLAN Mode: no tag

VLAN ID: 1

Default AP Tx Rate: hns



4) Configuración red Wi-Fi usando virtual AP

Interface <wlan3>

General | **Wireless** | WDS | Status | Traffic

Mode: **ap bridge**

Secondary Channel:

SSID:

Master Interface:

Security Profile:

WPS Mode:

VLAN Mode:

VLAN ID:

Default AP Tx Rate: bos

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Advanced Mode
Torch



4) Configuración red Wi-Fi usando virtual AP

Wireless Tables

WiFi Interfaces W60G Station Nstreme Dual A

+ - ✓ ✗ 📁 📶 CAP

Name	Type
📶 wlan1	Wireless (Atheros AR9...
📶-📶 wlan2	Virtual
📶-📶 wlan3	Virtual



4) Configuración red Wi-Fi usando virtual AP

Wireless Tables

WiFi Interfaces | W60G Station | Nstreme Dual | Access List | Registration | Connect List | Security Profiles | Channels

+ - [Folder Icon] [Filter Icon]

Name	Mode	Authenticatio...	Unicast Ciphers	Group Ciphers	WPA Pre-Shared ...	WPA2 Pre-Shared...
visitantes	dynamic keys	WPA2 PSK	aes ccm tkip	aes ccm tkip		qwerty123
empleados	dynamic keys	WPA2 PSK	aes ccm tkip	aes ccm tkip		abcd1234
* default	none					
automatizacion	dynamic keys	WPA2 PSK	aes ccm tkip	aes ccm tkip		qazxswedc

4) Configuración red Wi-Fi usando Access-List

WiFi Interfaces W60G Station Nstreme Dual Access List Registration Connect List Security Profiles Chan

+ - ✓ ✗ 📄 📏

#	MAC Address	Interface	Signal Str...	Authentication	Forwarding
0	00:27:15:DD:EA:...	wlan1	-120..120	yes	yes

AP Access Rule <00:27:15:DD:EA:AE>

MAC Address: 00:27:15:DD:EA:AE

Interface: wlan1

Signal Strength Range: -120..120

Allow Signal Out Of Range: 00:00:10

AP Tx Limit: []

Client Tx Limit: []

Authentication

Forwarding

VLAN Mode: no tag

VLAN ID: 1

Private Key: none 0x []

Private Pre Shared Key: []

Management Protection Key: []

Time: 00:00:00 - 1d 00:00:00

Days: sun mon tue wed thu fri sat

OK Cancel Apply Disable Comment Copy Remove

Firewall Básico

MikroTik



1) Cambiar puertos por defecto desactivar los no utilizados

IP Service List

Find

	Name	Port	Available From	Certificate	
	api	8728	157.245.190.83		
X	api-ssl	8729		none	
X	ftp	21			
	ssh	49722			
X	telnet	49723			
	winbox	8291			
	www	49780			
X	www-ssl	443		none	

8 items

2) Port knocking

Firewall															
Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols															
+ - ✓ ✗ 📁 🗑️ 00 Reset Counters 00 Reset All Counters															
#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Ad...	Bytes	Packets
0	add...	input			6 (tcp)		20567							640 B	12
1	add...	input			6 (tcp)		31678					reten1		580 B	11
2	add...	input			6 (tcp)		42789					reten2		580 B	11
3	✗ drop	input			6 (tcp)		8291,49780,49722					reten3		197.9 KiB	4 714
4	⊗ tarpit	input			6 (tcp)		22-23	ether3						6.4 MiB	162 254
::: VPN PPTP															
5	✓ acc...	input			6 (tcp)		1723							78.5 KiB	1 131
::: VPN PPTP															
6	✓ acc...	input			47 (g...)									2985.9 KiB	34 074
::: VPN L2TP															
7	✓ acc...	input			17 (u...)		1701							7.8 MiB	87 942
::: CONEXIONES SIMULTANEAS POR CLIENTE															
8 X	✗ drop	forward			6 (tcp)									0 B	0
::: BLOQUEO CONEXIONES INVALIDAS															
9	✗ drop	input												46.6 MiB	746 533
10	✗ drop	output												129.3 KiB	308
11	✗ drop	forward												144.1 MiB	2 680 672

2) Port knocking

New Firewall Rule

General Advanced Extra Action Statistics

Chain:

Src. Address:

Dst. Address:

Protocol: 6 (tcp)

Src. Port:

Dst. Port: 50000

Any. Port:

In. Interface:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

New Firewall Rule

Advanced Extra Action Statistics ...

Action:

Log

Log Prefix:

Address List:

Timeout:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

2) Port knocking

New Firewall Rule

General Advanced Extra Action Statistics

Chain:

Src. Address:

Dst. Address:

Protocol: 6 (tcp)

Src. Port:

Dst. Port:

Any. Port:

In. Interface:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

New Firewall Rule

General Advanced Extra Action Statistics

Src. Address List: puerto_1PK

Dst. Address List:

Layer7 Protocol:

Content:

Connection Bytes:

Connection Rate:

Per Connection Classifier:

Src. MAC Address:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

2) Port knocking

New Firewall Rule

General | Advanced | Extra | Action | Statistics

Chain: input

Src. Address:

Dst. Address:

Protocol: 6 (tcp)

Src. Port:

Dst. Port: 40000

Any. Port:

In. Interface:

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

New Firewall Rule

General | Advanced | Extra | Action | Statistics

Action: add src to address list

Log

Log Prefix:

Address List: puerto_2PK

Timeout: 00:10:00

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Reset Counters
Reset All Counters

2) Port knocking

New Firewall Rule

General | Advanced | Extra | Action | Statistics

Chain: input

Src. Address:

Dst. Address:

Protocol: 6 (tcp)

Src. Port:

Dst. Port: 8291

Any. Port:

In. Interface:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

New Firewall Rule

General | Advanced | Extra | Action | Statistics

Src. Address List: puerto_2PK

Dst. Address List:

Layer7 Protocol:

Content:

Connection Bytes:

Connection Rate:

Per Connection Classifier:

Src. MAC Address:

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Reset Counters

Reset All Counters

New Firewall Rule

General | Advanced | Extra | Action | Statistics

Action: drop

Log

Log Prefix:

OK

Cancel

Apply

Disable

Comment

3) Bloquear peticiones de DNS externo

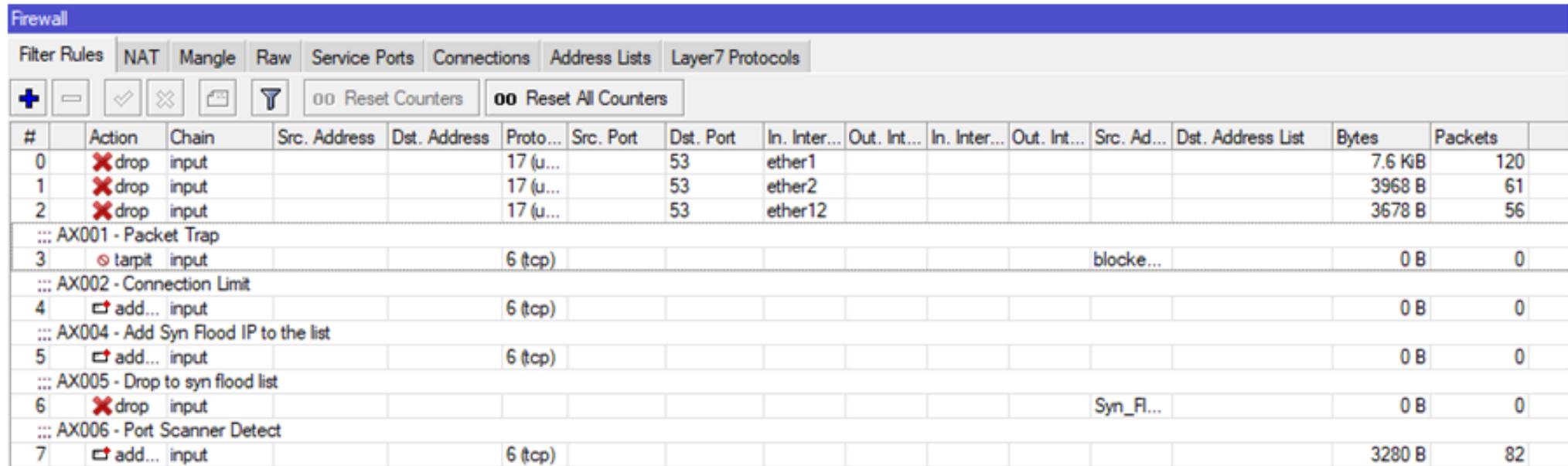
Firewall

Filter Rules NAT Mangle Raw Service Ports Connections Address Lists Layer7 Protocols

+ - ✓ ✗ 📄 🏠 00 Reset Counters 00 Reset All Counters

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out
0	✗ drop	prerouting			17 (u...		53	ether3	
1	✗ drop	prerouting			6 (tcp)		53	ether3	

4) Servicios pagos para listas



The screenshot shows the Mikrotik WinBox Firewall Filter Rules configuration page. The 'Filter Rules' tab is active, and the 'Address Lists' sub-tab is selected. The interface includes a toolbar with icons for adding, deleting, and enabling rules, along with buttons for 'Reset Counters' and 'Reset All Counters'. Below the toolbar is a table listing the configured filter rules.

#	Action	Chain	Src. Address	Dst. Address	Proto...	Src. Port	Dst. Port	In. Inter...	Out. Int...	In. Inter...	Out. Int...	Src. Ad...	Dst. Address List	Bytes	Packets
0	✗ drop	input			17 (u...		53	ether1						7.6 KiB	120
1	✗ drop	input			17 (u...		53	ether2						3968 B	61
2	✗ drop	input			17 (u...		53	ether12						3678 B	56
... AX001 - Packet Trap															
3	⊙ tarpit	input			6 (tcp)							blocke...		0 B	0
... AX002 - Connection Limit															
4	➡ add...	input			6 (tcp)									0 B	0
... AX004 - Add Syn Flood IP to the list															
5	➡ add...	input			6 (tcp)									0 B	0
... AX005 - Drop to syn flood list															
6	✗ drop	input										Syn_Fl...		0 B	0
... AX006 - Port Scanner Detect															
7	➡ add...	input			6 (tcp)									3280 B	82

Información tomada de <https://axiomcyber.com/shield/>



4) Servicios pagos para listas



Ransomware (Nodes, Sites, IP addresses)



Malware (Nodes, Sites, IP addresses)



Command & Control servers



Known spammers and spam servers



TOR Exit Nodes (DarkWeb)



Layer 7 Regular Expression blocking

Calidad de Servicio

MikroTik

1) Velocidad por red



#	Name	Target	Dst.	Upload Max Limit	Download Max Limit	Upload Queue Type	Download Queue Type
0	Red_empleados	192.168.20.0/24	ether10	20M	20M	pcq-upload-default	pcq-download-default
1	servidor_camaras_alama	192.168.50.0/24	ether10	10M	10M	pcq-upload-default	pcq-download-default
2	wifi_empleados	192.168.10.0/24	ether10	5M	5M	pcq-upload-default	pcq-download-default
3	wifi_visitantes	192.168.15.0/24	ether10	2M	2M	pcq-upload-default	pcq-download-default
4	wifi_automatizacion	192.168.30.0/24	ether10	4M	4M	pcq-upload-default	pcq-download-default

Simple Queue <servidor_camaras_alama>

General | Advanced | Statistics | Traffic | Total | Total Statistics

Name: servidor_camaras_alama

Target: 192.168.50.0/24

Dst.: ether10

Target Upload: 10M | Target Download: 10M bits/s

Burst Limit: unlimited | unlimited bits/s

Burst Threshold: unlimited | unlimited bits/s

Burst Time: 0 | 0 s

enabled

Simple Queue <Red_empleados>

General | Advanced | Statistics | Traffic | Total | Total Statistics

Packet Marks:

Target Upload: unlimited | unlimited bits/s

Target Download: unlimited | unlimited bits/s

Priority: 8 | 8

Bucket Size: 0.100 | 0.100 ratio

Queue Type: pcq-upload-default | pcq-download-default

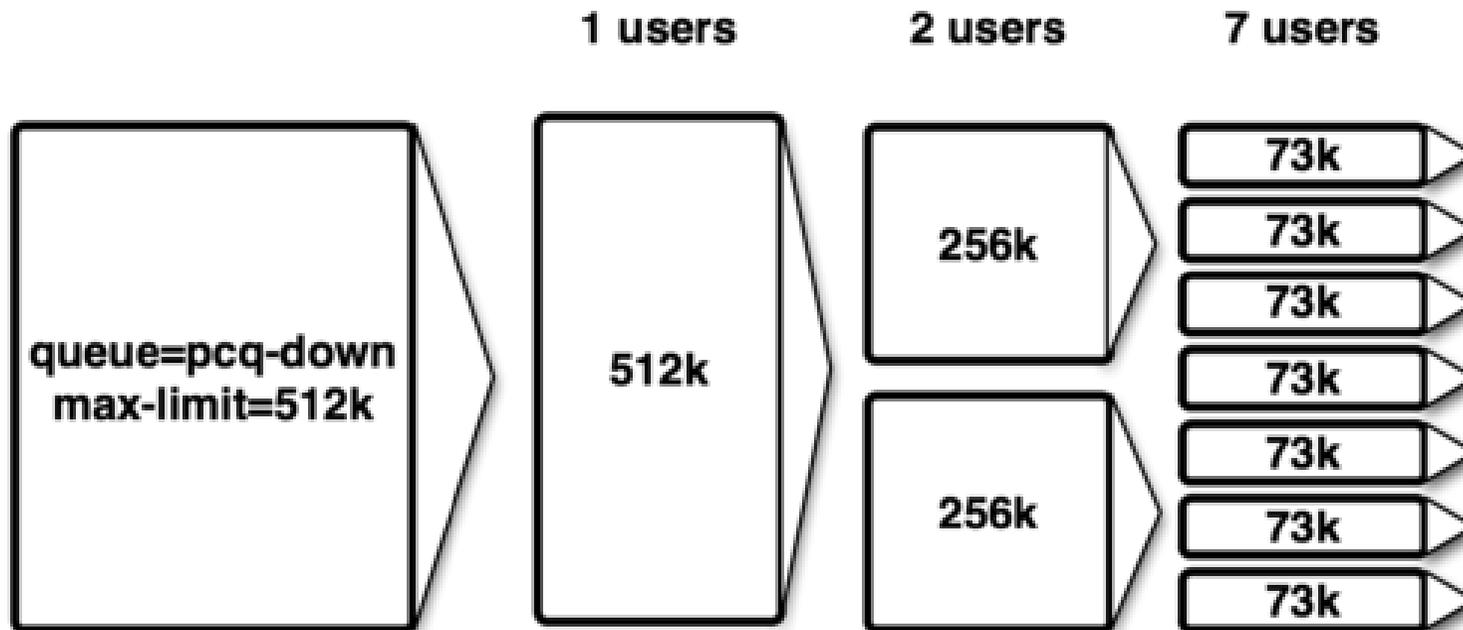
Parent: none

enabled



2) QoS usando PCQ

pcq-rate=0





4) Queue Tree (asignar prioridades a los servicios marcados)

Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - [check] [x] [list] [filter] [00] Reset Counters [00] Reset All Counters

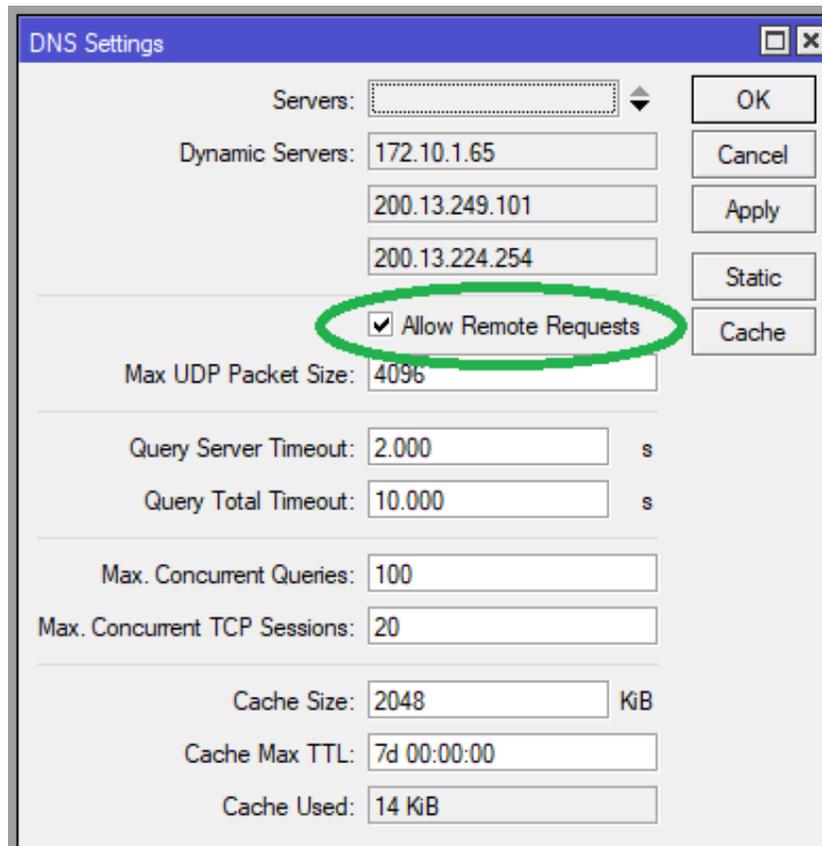
Name	Parent	Packet Marks	Priority	Limit At (b...	Max Limit ...
Download-1	ether2		8		400M
DNS	Download-1	DNS	3	10M	20M
HTTP	Download-1	HTTP	5	150M	300M
PING	Download-1	ICMP	3	10M	20M
TRAFREST	Download-1	SINMARCA	8	100M	150M
VOIP	Download-1	VOIP	2	30M	50M
YOUTUBE	Download-1	YOUTUBE	3	100M	150M
Download-2	ether7		8		400M
DNS-2	Download-2	DNS	3	10M	20M
HTTP2	Download-2	HTTP	5	150M	300M
PING2	Download-2	ICMP	3	10M	20M
TRAFREST2	Download-2	SINMARCA	8	100M	150M
VOIP2	Download-2	VOIP	2	30M	50M
YOUTUBE2	Download-2	YOUTUBE	3	100M	150M
Upload	sfp1		8		800M
DNS-UP	Upload	DNS	3	20M	40M
HTTPUP	Upload	HTTP	5	300M	600M
PINGUP	Upload	ICMP	3	20M	40M
TRAFRESTUP	Upload	SINMARCA	8	200M	300M
VOIPUP	Upload	VOIP	2	60M	100M
YOUTUBEUP	Upload	YOUTUBE	3	200M	300M

DNS

MikroTik

1) Usar Router como servidor DNS

- Podemos configurar el Router como un servidor DNS

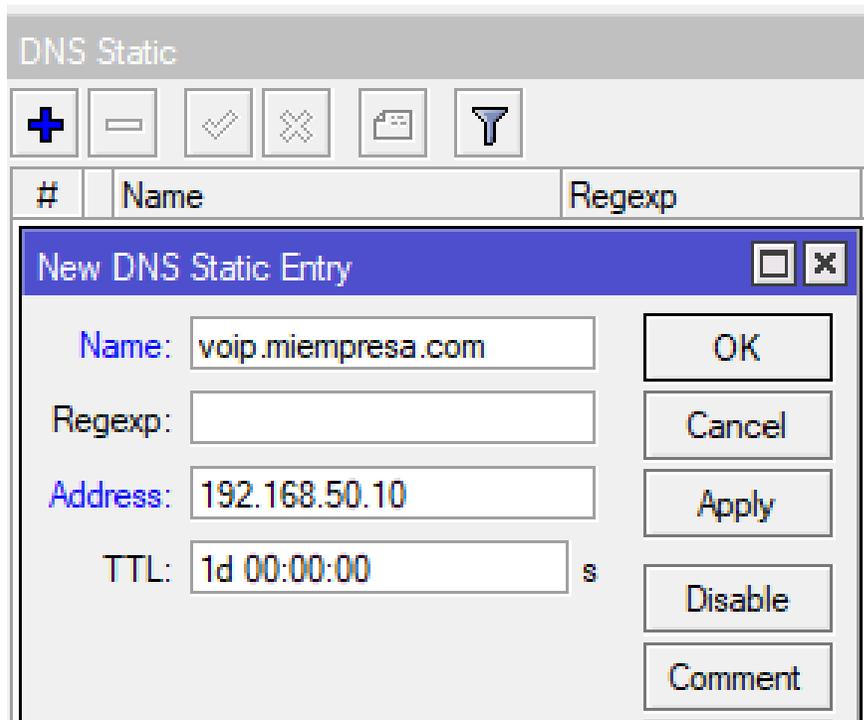


The image shows a screenshot of the 'DNS Settings' window in a router configuration interface. The window has a blue title bar with the text 'DNS Settings' and standard window control buttons (minimize, maximize, close). The main area contains several configuration fields and buttons. The 'Servers' field is empty. The 'Dynamic Servers' section contains three text boxes with the IP addresses '172.10.1.65', '200.13.249.101', and '200.13.224.254'. The 'Allow Remote Requests' checkbox is checked and circled in green. Other fields include 'Max UDP Packet Size' (4096), 'Query Server Timeout' (2.000 s), 'Query Total Timeout' (10.000 s), 'Max. Concurrent Queries' (100), 'Max. Concurrent TCP Sessions' (20), 'Cache Size' (2048 KiB), 'Cache Max TTL' (7d 00:00:00), and 'Cache Used' (14 KiB). Buttons for 'OK', 'Cancel', 'Apply', 'Static', and 'Cache' are located on the right side of the window.

Field	Value
Servers	
Dynamic Servers	172.10.1.65 200.13.249.101 200.13.224.254
Allow Remote Requests	<input checked="" type="checkbox"/>
Max UDP Packet Size	4096
Query Server Timeout	2.000 s
Query Total Timeout	10.000 s
Max. Concurrent Queries	100
Max. Concurrent TCP Sessions	20
Cache Size	2048 KiB
Cache Max TTL	7d 00:00:00
Cache Used	14 KiB

2) Entradas estáticas

- Es posible configurar nombres para acceder servicios de nuestra LAN



DNS Static

+ - ✓ ✗ 📄 🏠

#	Name	Regexp
---	------	--------

New DNS Static Entry

Name: voip.miempresa.com

Regexp:

Address: 192.168.50.10

TTL: 1d 00:00:00 s

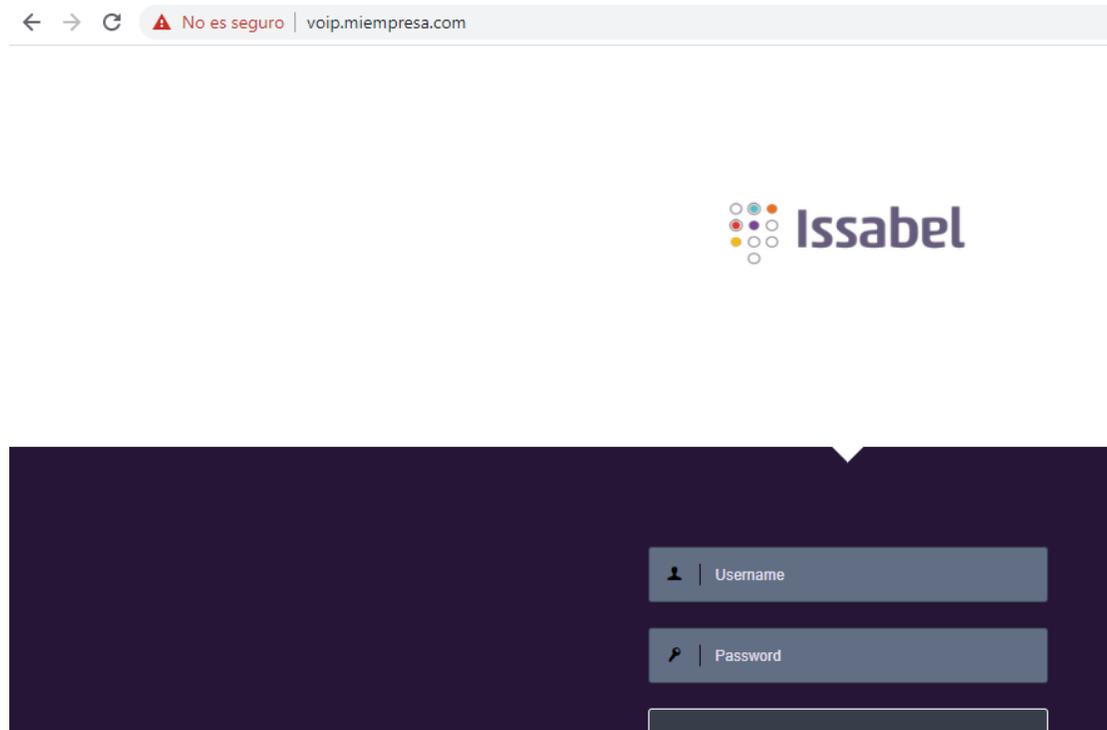
OK

Cancel

Apply

Disable

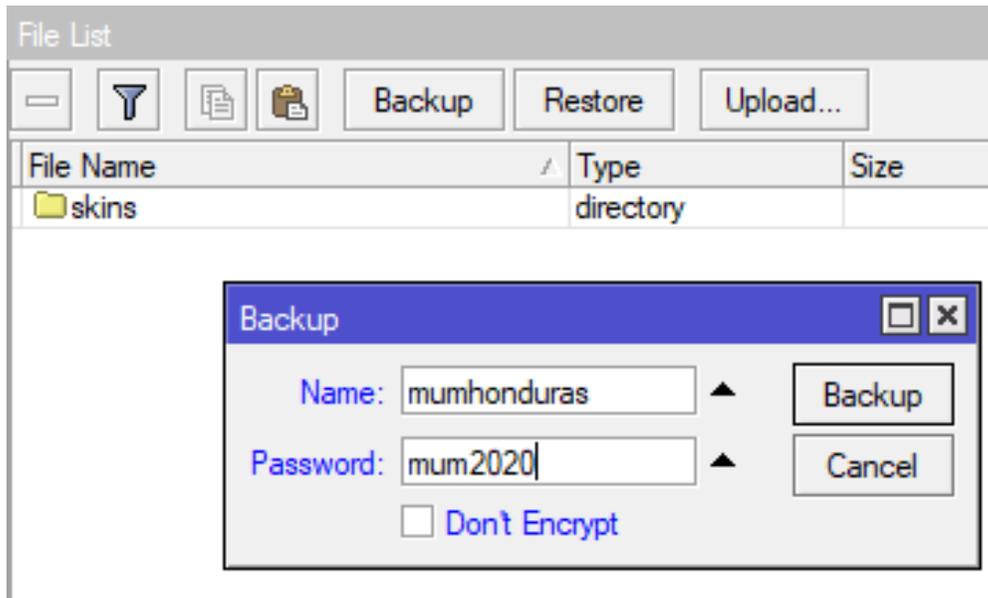
Comment



Backups

1) .backup

- En files → Backup (extensión .backup)

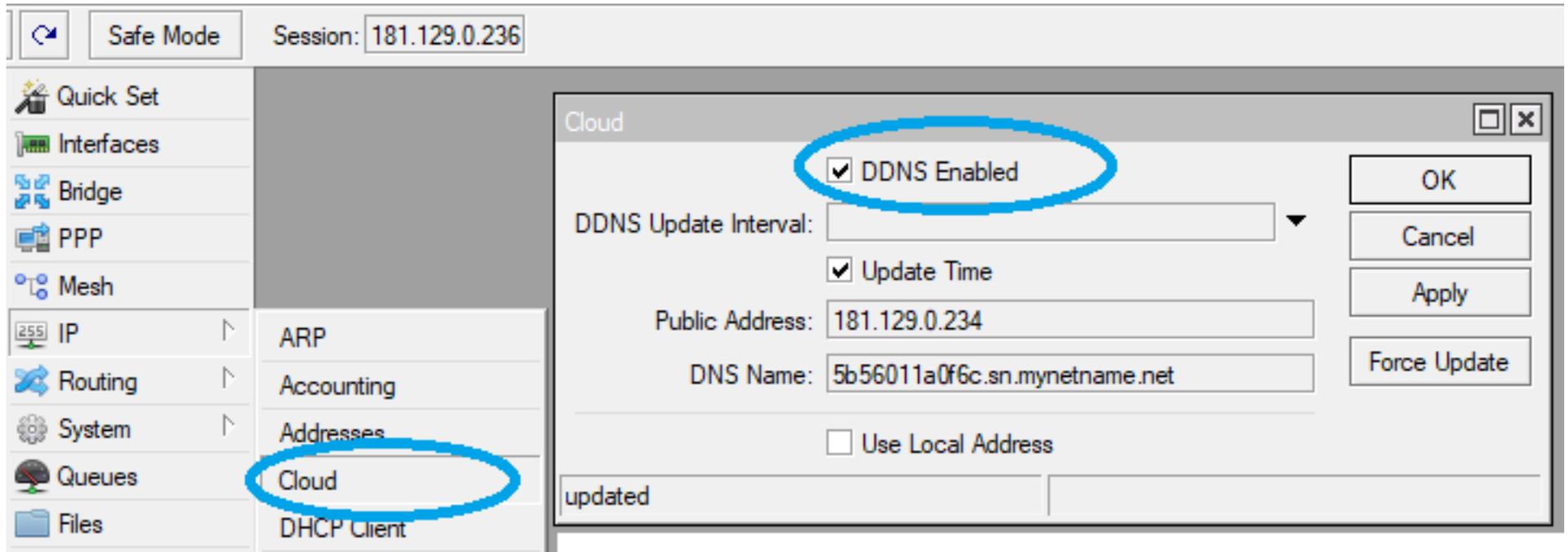


The screenshot shows a 'File List' window with a toolbar containing 'Backup', 'Restore', and 'Upload...' buttons. A table below the toolbar lists files and folders:

File Name	Type	Size	Creation Time
mumhonduras.backup	backup	16.1 KiB	Jan/13/2020 00:27:40
skins	directory		Feb/07/2106 01:28:20

1) .backup

Cloud backup. Desde la versión 6.14 se tiene disponible, versiones anteriores a 6.43 **cloud.mikrotik.com** versiones de 6.43 en adelante se comunican con **cloud2.mikrotik.com**



The screenshot shows the Mikrotik WinBox interface. On the left, the 'System' menu is expanded, and 'Cloud' is highlighted with a blue circle. The main window displays the 'Cloud' configuration dialog. In this dialog, the 'DDNS Enabled' checkbox is checked and circled in blue. Other settings include 'Update Time' checked, 'Public Address' set to '181.129.0.234', and 'DNS Name' set to '5b56011a0f6c.sn.mynetname.net'. The 'Use Local Address' checkbox is unchecked. At the bottom of the dialog, the status 'updated' is visible. On the right side of the dialog, there are buttons for 'OK', 'Cancel', 'Apply', and 'Force Update'. The top of the WinBox interface shows 'Safe Mode' and 'Session: 181.129.0.236'.

1) .backup

Cloud backup. Desde la versión 6.14 se tiene disponible, versiones anteriores a 6.43 **cloud.mikrotik.com** versiones de 6.43 en adelante se

```
Terminal
MMM      MMM      KKK
MMMM     MMMM     KKK
MMM MMMM MMM III  KKK KKK RRRRRR   OOOOOO   TTT      III  KKK  KKK
MMM MM  MMM III  KKKKK  RRR  RRR  OOO  OOO   TTT      III  KKKKK
MMM     MMM III  KKK KKK RRRRRR   OOO  OOO   TTT      III  KKK KKK
MMM     MMM III  KKK KKK RRR  RRR   OOOOOO   TTT      III  KKK  KKK

MikroTik RouterOS 6.46.1 (c) 1999-2019      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

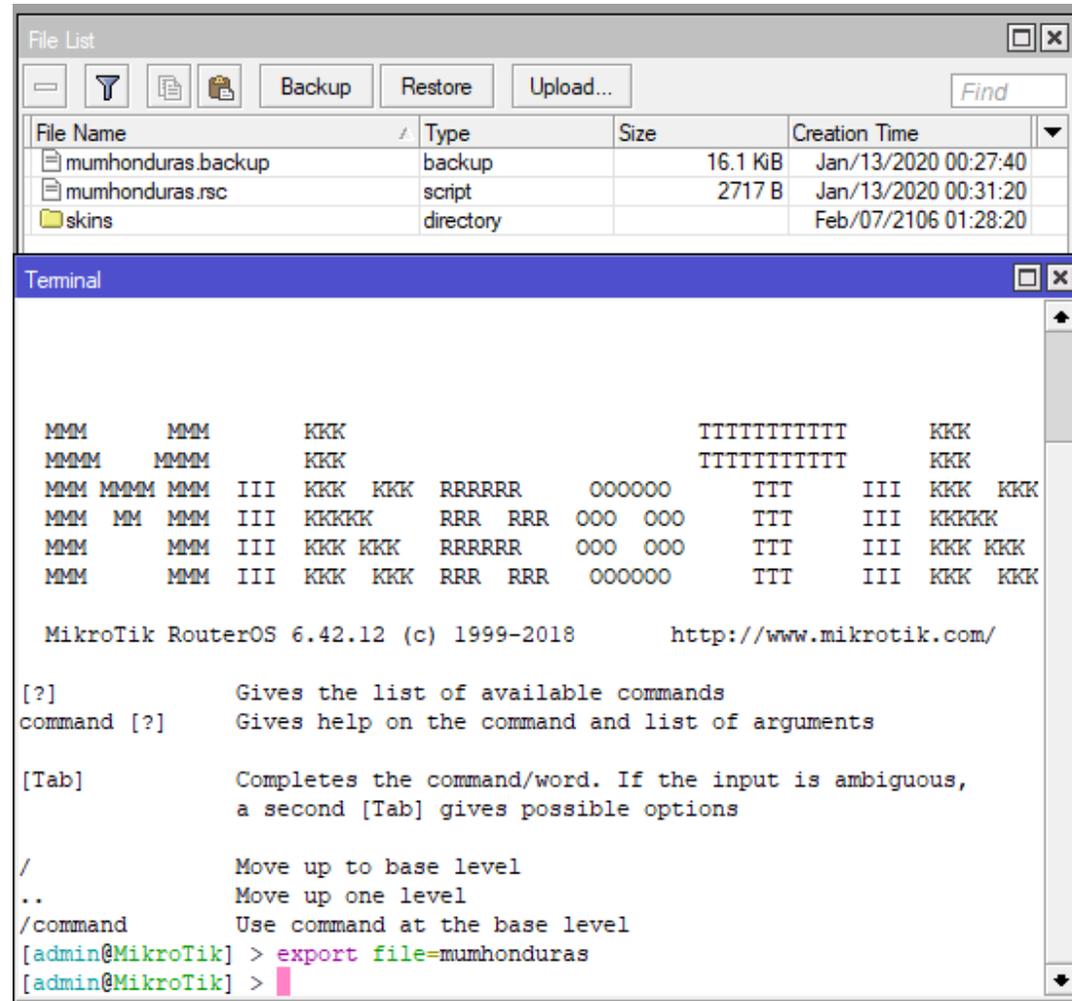
[Tab]       Completes the command/word. If the input is ambiguous,
            a second [Tab] gives possible options

/           Move up to base level
..         Move up one level
/command    Use command at the base level
[vjtt@CCR PPAL HOTEL] > /system backup cloud upload-file action=create-and-upload password=mumhonduras
status: finished

[vjtt@CCR PPAL HOTEL] > /system backup cloud print
0 name="cloud-20200113-004748" size=6.7MiB ros-version="6.46.1" date=jan/13/2020 00:47:56 status="ok"
secret-download-key="w3SLd3QHMO8borYtX07zSKt"
[vjtt@CCR PPAL HOTEL] > █
```

2) .rsc

Por línea de comandos → export file=mumhonduras
(extensión .rsc)



The screenshot shows two windows from the Mikrotik RouterOS interface. The top window, titled 'File List', displays a table of files:

File Name	Type	Size	Creation Time
mumhonduras.backup	backup	16.1 KiB	Jan/13/2020 00:27:40
mumhonduras.rsc	script	2717 B	Jan/13/2020 00:31:20
skins	directory		Feb/07/2106 01:28:20

The bottom window, titled 'Terminal', shows the RouterOS command-line interface. It displays a ASCII art logo, version information, and a list of help commands:

```
MikroTik RouterOS 6.42.12 (c) 1999-2018      http://www.mikrotik.com/

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]       Completes the command/word. If the input is ambiguous,
            a second [Tab] gives possible options

/           Move up to base level
..          Move up one level
/command    Use command at the base level
[admin@MikroTik] > export file=mumhonduras
[admin@MikroTik] >
```

2) .rsc

ccr1036tol: Bloc de notas

Archivo Edición Formato Ver Ayuda

```
# jan/16/2020 12:02:28 by RouterOS 6.46.1
# software id = ZMS5-WZT4
#
# model = CCR1036-12G-4S
# serial number = 5B56011A0F6C
/interface ethernet
set [ find default-name=ether1 ] advertise=\
    10M-half,10M-full,100M-half,100M-full,1000M-half,1000M-full speed=100Mbps
set [ find default-name=ether2 ] comment="PADRE AMAYA" speed=100Mbps
set [ find default-name=ether3 ] comment=WAN speed=100Mbps
set [ find default-name=ether4 ] comment=SERGIO speed=100Mbps
set [ find default-name=ether5 ] speed=100Mbps
set [ find default-name=ether6 ] advertise=10M-full,100M-full comment=\
    "HOTEL CM" speed=100Mbps
set [ find default-name=ether7 ] advertise=\
    10M-half,10M-full,100M-half,100M-full,1000M-half,1000M-full comment=\
    "PADRE AMAYA 2" speed=100Mbps
set [ find default-name=ether8 ] comment=ZARZAL speed=100Mbps
set [ find default-name=ether9 ] speed=100Mbps
set [ find default-name=ether10 ] comment="CLIENTE APTO 402" speed=100Mbps
set [ find default-name=ether11 ] comment="DVR EDIFICIO" speed=100Mbps
set [ find default-name=ether12 ] advertise=\
    10M-half,10M-full,100M-half,100M-full,1000M-half,1000M-full comment=CS
```

VPN's

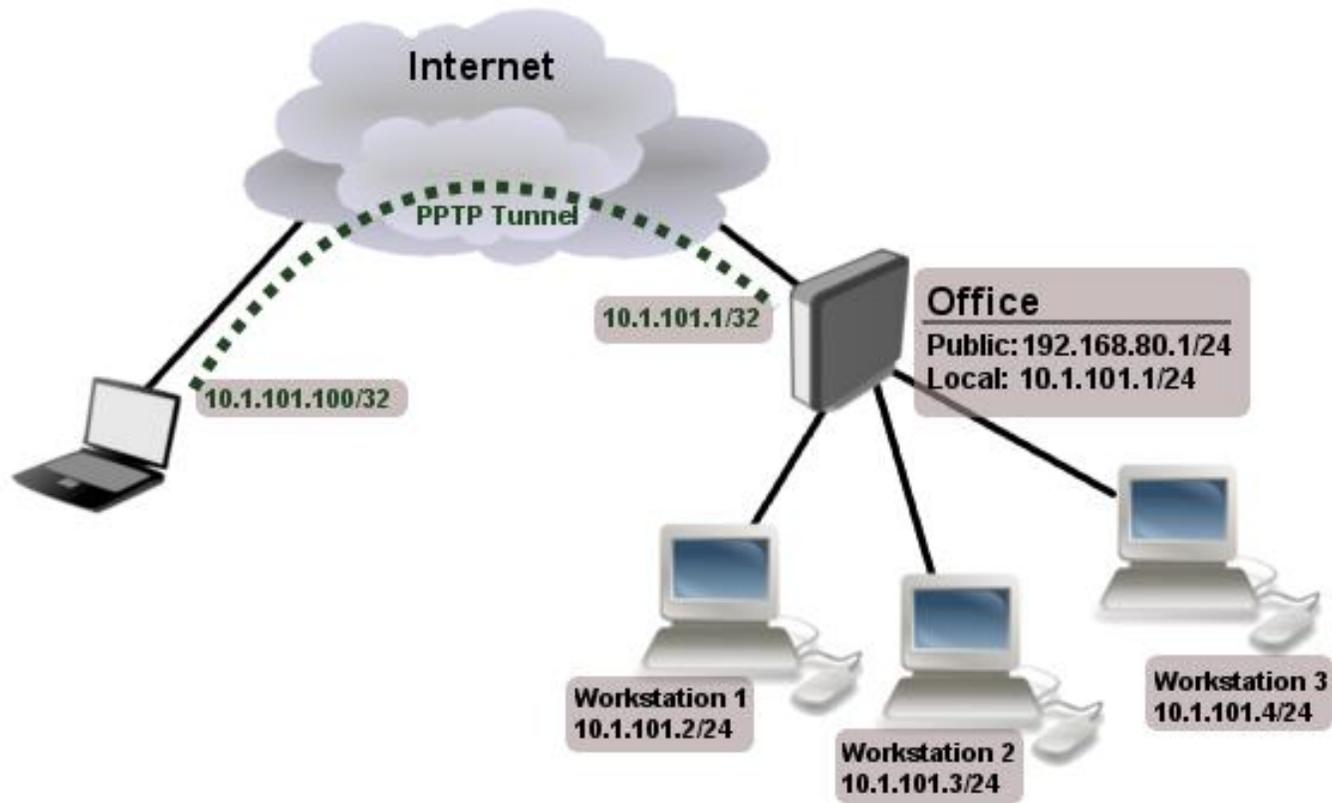
MikroTik

1) Múltiples opciones de VPN

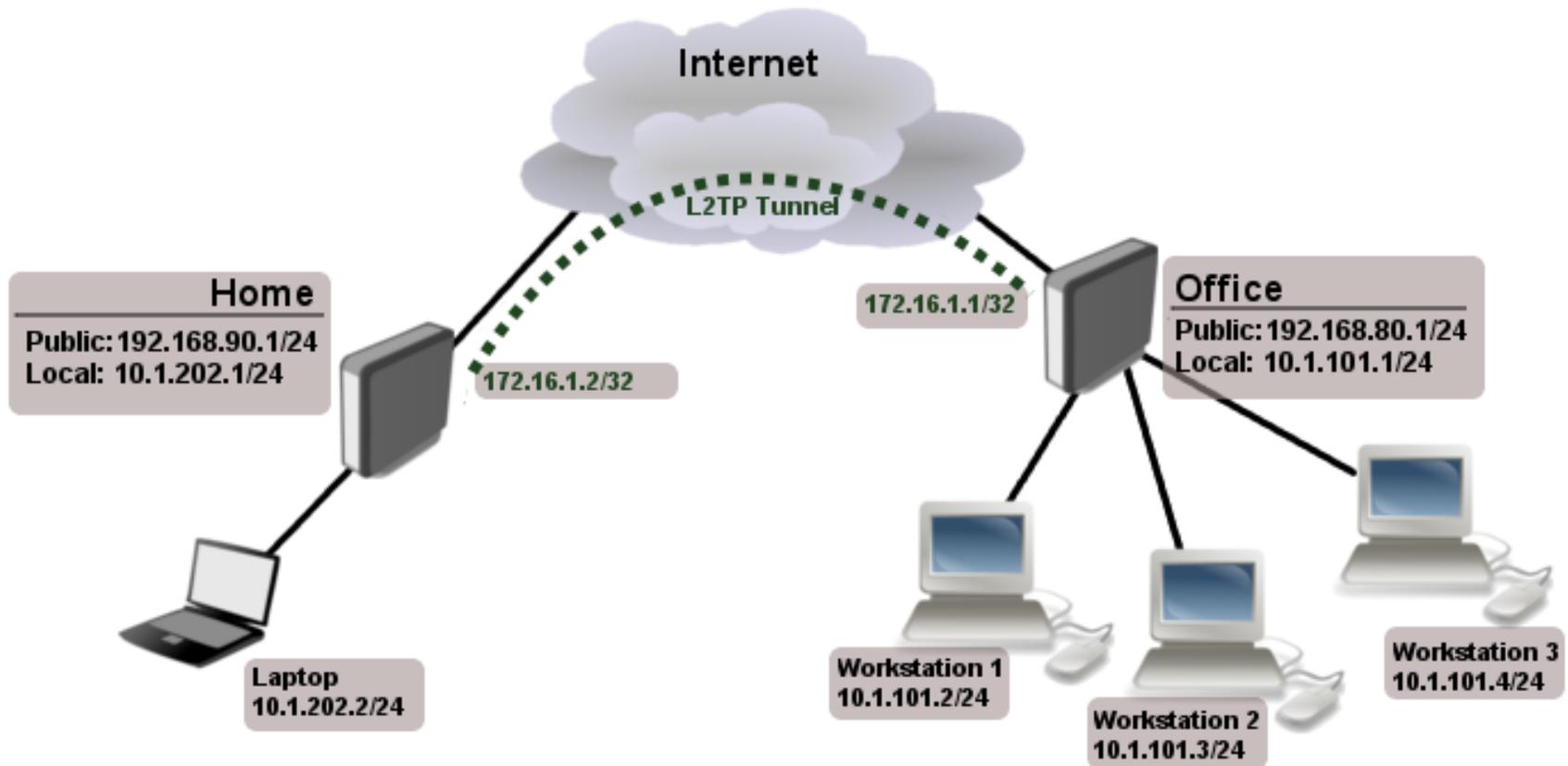


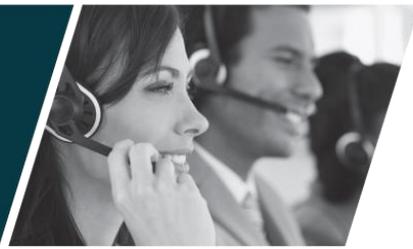
fuelle: <https://es.vpnmentor.com/blog/comparacion-de-protocolos-de-vpn-pptp-vs-l2tp-vs-openvpn-vs-sspt-vs-ikev2/>

2) Conexión cliente - Servidor



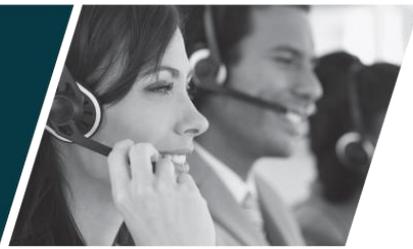
3) Site to Site





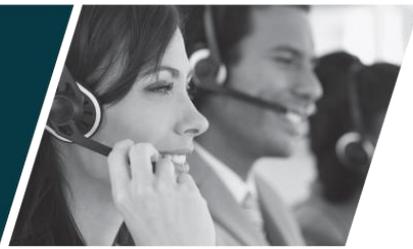
¿PREGUNTAS?





LINKS DE REFERENCIA

- <https://wiki.mikrotik.com/wiki/Manual:Queue>
- [https://wiki.mikrotik.com/wiki/Manual:Queues - PCQ](https://wiki.mikrotik.com/wiki/Manual:Queues_-_PCQ)
- <https://wiki.mikrotik.com/wiki/Manual:System/Backup>
- <https://wiki.mikrotik.com/wiki/Tunnels>
- <https://axiomcyber.com/shield/>



Los esperamos en Colombia!!!



Gracias

