



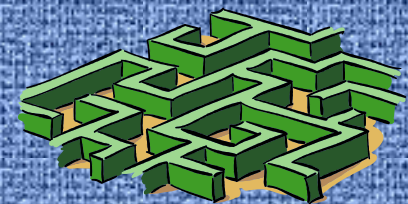
WISP Hotspot: Redes Malladas Metropolitanas

Alessio Garavano
ISPARG S.A.

Soluciones IP Profesionales

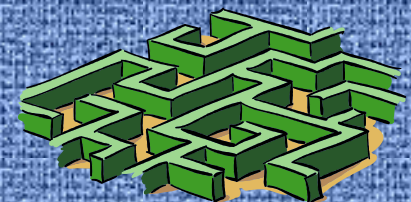
www.isparg.com.ar

info@isparg.com.ar



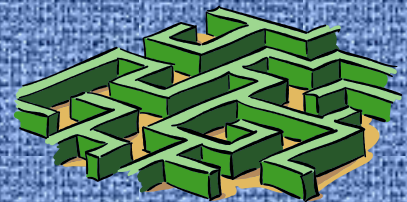
HOTSPOT

Hotspots son comunmente conocidos como lugares publicos(hoteles, aeropuertos, barcos, etc) que ofrecen acceso inalambrico libre a internet para ser accedido por dispositivos móviles como notebooks, celulares, PDAs, consolas, etc



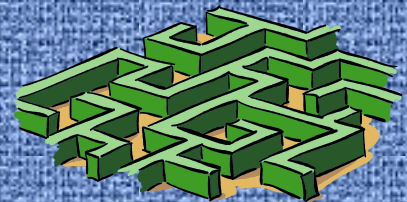
HOTSPOT

Hoy en día, gracias a la funcionalidad y capacidad que nos ofrece el Servidor Hotspot de Mikrotik, podemos utilizar la solución en diversos ambientes en los que parecían imposible de hacerlo...



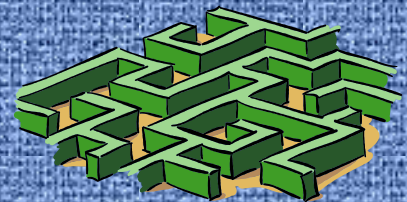
Wireless ISP HotSpot

- Así es! miles de ISPs en el mundo lo recomiendan como la solución mas flexible y fácil de implementar y/o migrar a una red mucho mas dinámica, controlada y segura



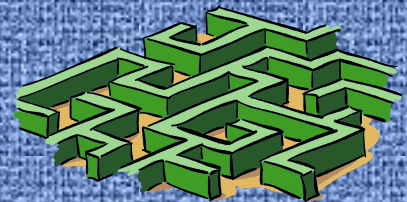
WiFi: Wireless Fidelity

- Las comunicaciones por radio existen desde hace 150 años, y ahora tan sólo hemos unido la tecnología IP con los sistemas de radio y gracias a las ventajas y posibilidades que nos ofrece Mikrotik en Wireless, ¿El resultado es?
“Explosivo!”



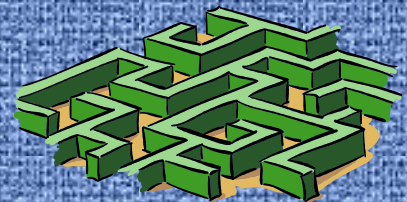
WiFi Mesh

- La tecnología de redes malladas (mesh) es una variante del WiFi tradicional, en la que las clásicas celdas WiFi basadas en cableado Ethernet hasta el switch se sustituyen por una red mallada, donde los nodos se comunican entre sí sin cables, estableciendo una macro-burbuja de cobertura que puede cubrir desde un área controlada hasta un municipio completo



WiFi Mesh

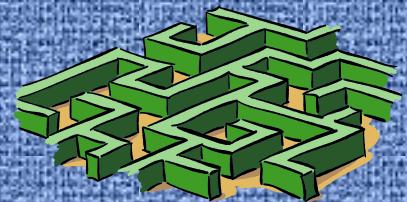
- Cualquier ciudad puede tener su Red Inalámbrica Municipal o Metropolitana.
- Para usos privados, publicos o para ambos.
- No hay que dudar demasiado al pensar en realizar estas inversiones, la tecnología no tiene mucho tiempo de vida, pero está ampliamente probada y aprobada.



Mikrotik

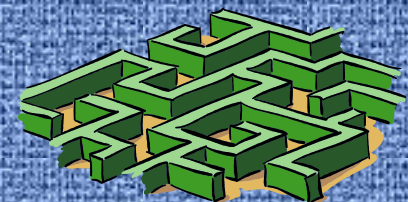
WiFi Mesh & HotSpot ISP

- Fusionando todo el potencial de una Red WiFi Mesh con la poderosa solución Hotspot de Mikrotik, obtenemos resultados sorprendentes a la hora entregar servicios de Internet de Banda Ancha y Telefonía IP en una ciudad



Implementando Mikrotik en un Wireless & Wired ISP

- ❑ **Wireless Mesh Dual Band: Distribución del Servicio**
- ❑ **HotSpot Server: Autenticación y Control de Usuarios**
- ❑ **User Manager: Administración simple. Accesos unificados y Servicios Prepagos**
- ❑ **Web-Proxy Cache: Aceleración Web y ahorro de Ancho de Banda**
- ❑ **Wireless: Tipos de Accesos y Seguridad**
- ❑ **Bridge: Control y Seguridad a nivel de capa 2**
- ❑ **QoS: Calidad y Ecuilibración de Servicios**
- ❑ **Tips de Seguridad Avanzada para ISPs**



Wireless Mesh Dual Band

admin@192.168.1.1 (RB1-SUPPORT) - WinBox v2.9.45

19:48:30 Memory: 17.8 MiB CPU: 70%

RouterOS WinBox

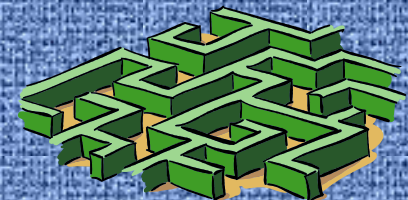
Interfaces
Wireless
Bridge
IP
Ports
Queues
Drivers
System
Files
Log
SNMP
Users
Radius
Tools
New Terminal
Telnet
Password
Certificate
Make Supout.rif
Manual
Exit

Wireless Tables

Interfaces Access List Registration Connect List Security Profiles

	Name	Type	MTU	MAC Address	Mode	Band	Frequency	SSID
R	↔SUPPORT-AP400	Wireless (Athero...	1500	00:40:96:3F:3C:34	ap bridge	2.4GHz-B/G	2417MHz	SUPPORT
R	↔SUPPORT5G	Wireless (Athero...	1500	00:40:96:05:0D:0A	ap bridge	5GHz-turbo	5760MHz	SUPPORT5G
DRA	↔wds1	WDS	1500	00:40:96:05:0D:0A				
DRA	↔wds2	WDS	1500	00:40:96:05:0D:0A				
DRA	↔wds3	WDS	1500	00:40:96:05:0D:0A				
DRA	↔wds4	WDS	1500	00:40:96:05:0D:0A				

- Es la manera mas eficiente y economica de distribuir Internet en un municipio.
- En un mismo RB, se integra una red WDS bridgeada con RSTP en 5Ghz-Turbo y Nstreme, para la interconexion entre nodos y al backbone
- Y una red 2.4Ghz como AP para el acceso de los clientes con un mismo SSID en todos los nodos y diferentes canales si es necesario.



HotSpot: Control de Acceso

Alessio@... (MTx86-SUPPORT) - WinBox v2.9.45

1d 15:02:52 Memory:92.3 MiB CPU:4%

Interfaces

- PPP
- Bridge
- IP
- Ports
- Queues
- Drivers
- System
- Files
- Log
- SNMP
- Users
- Radius
- Tools
- New Terminal
- Telnet
- Password
- Certificate
- Make Supout.rif
- Manual
- Exit

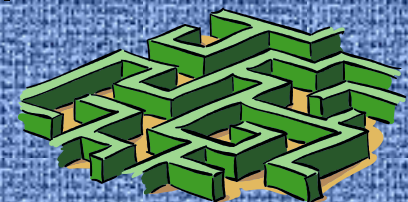
Hotspot

Servers Users Active Hosts IP Bindings Service Ports Walled Garden Cookies

Profiles 00 Reset Counters

Server	Name	Address	MAC Address	Profile	Uptime
HS-WIRELESS	daseragro		00:0E:2E:AE:46:CB	192k	176d 09:44:03
HS-WIRELESS	spiamontesa		00:0E:2E:43:2D:6B	192k	175d 13:29:32
HS-WIRELESS	atorres		00:0E:2E:AD:AC:15	192k	166d 02:52:56
HS-WIRELESS	gvales		00:0E:2E:7A:33:E0	192k	159d 18:36:26
HS-WIRELESS	camelias		00:0E:2E:AE:46:F3	192k	131d 18:59:45
HS-WIRELESS	santivero		00:0E:2E:AE:5D:F1	192k	128d 12:31:17
HS-WIRELESS	portela		00:02:72:4C:EE:31	192k	122d 01:55:09
HS-WIRELESS	fiirpo		00:0E:2E:7A:44:6A	192k	116d 10:56:04
HS-WIRELESS	5bocas		00:0E:2E:7A:73:6B	192k	112d 02:00:17
HS-WIRELESS	osde		00:0E:2E:B2:0C:EE	192k	110d 23:30:53
HS-WIRELESS	multa		00:0E:2E:93:CE:3F	192k	102d 06:58:00
HS-WIRELESS	insumos		00:0E:2E:43:32:16	192k	100d 08:53:12
HS-WIRELESS	tigrecito		00:60:B3:8C:60:4C	192k	81d 07:57:29
HS-WIRELESS	malagueno		00:50:FC:D6:EE:12	192k	80d 22:33:01
HS-WIRELESS	seol		00:0E:2E:AE:46:C7	192k	80d 20:14:42
HS-WIRELESS	leveal		00:0E:2E:8D:3B:0F	192k	79d 22:48:14
HS-WIRELESS	schanton		00:0E:2E:7C:F8:1C	192k	70d 14:27:50
HS-WIRELESS	coopelec		00:0E:2E:93:93:4A	192k	61d 16:48:08
HS-WIRELESS	mgutierrez		00:0E:2E:B4:19:59	192k	61d 12:35:20
HS-WIRELESS	mdominguez		00:0A:E9:04:D9:2E	192k	59d 03:27:50
HS-WIRELESS	frios		00:0E:2E:7A:30:15	192k	45d 23:27:49
HS-WIRELESS	sancristobal		00:02:6F:35:51:54	192k	38d 18:38:15
HS-WIRELESS	pluggren		00:0E:2E:AD:F6:7A	192k	37d 00:41:23
HS-WIRELESS	vanhaeze		00:0E:2E:AE:46:F4	192k	29d 11:04:14
HS-WIRELESS	santalucia		00:60:B3:8C:A7:08	192k	26d 03:22:26
HS-WIRELESS	mollicentro		00:0E:2E:AD:EF:5E	192k	20d 11:01:23
HS-WIRELESS	jmfurio		00:0A:E9:06:2F:8C	192k	19d 23:24:22
HS-WIRELESS	agroaerea		00:0E:2E:8D:2A:46	192k	18d 04:08:27
HS-WIRELESS	comejo		00:0E:2E:84:8F:6A	192k	16d 15:08:17
HS-WIRELESS	mcarina		00:02:6F:37:D6:16	192k	14d 04:13:14
HS-WIRELESS	agonzalez		00:0E:2E:AF:30:83	192k	13d 08:15:39
HS-WIRELESS	quaranta		00:0E:2E:B2:0D:26	192k	3d 08:40:02
HS-WIRELESS	guaragna		00:0E:2E:AA:B7:F2	192k	1d 12:09:45
HS-WIRELESS	sanmartin		00:0E:2E:B2:0C:EE	256k	250d 02:47:26
HS-WIRELESS	yaguane		00:0E:2E:8D:00:F7	256k	221d 16:12:24
HS-WIRELESS	semycer		00:0E:2E:85:2A:FE	256k	204d 10:35:41
HS-WIRELESS	uner		00:0E:2E:8D:23:2C	256k	146d 10:43:44
HS-WIRELESS	empcomercio		00:0E:2E:AA:B8:01	256k	75d 02:34:59

- Manteniendo una buena gestión en la carga de Usuarios y sus MACs, se establece una excelente seguridad en el acceso de los mismos.



User Manager: Acceso Prepago

MikroTik RouterOS User Manager

Per page: 500

<input type="checkbox"/>	Username	Prepaid	Used	Left	Price	Download	Upload
<input type="checkbox"/>	teste1	1h	13m:50s	1h	3.00	14.6 MiB	1665.4 KiB
<input type="checkbox"/>	teste6	6h	24m:3s	0s	8.00	2.6 MiB	641.3 KiB
<input type="checkbox"/>	teste12	12h	10m:54s	0s	10.00	805.5 KiB	135.2 KiB
<input type="checkbox"/>	mni6e	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	2fub8	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	c77au	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	7n8p9	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	qiv56	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	4x2rt	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	xmvz3	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	axexk	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	htais	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	enbih	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	zvpuu	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	asv57	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	uid9v	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	r3i85	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	48cck	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	i9ucu	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	r6z8z	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	dfvmb	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	6imew	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	ixdrm	1h	0s	1h	3.00	0 B	0 B
<input type="checkbox"/>	aaagq	1h	0s	1h	3.00	0 B	0 B

Terminado

- Ahora con User Manager, Mikrotik incorporó la funcionalidad de Servidor RADIUS que tanta falta hacía en el sistema para centralizar la administración de nuestras redes.
- Podemos crear multiples cuentas en un solo click, vender tickets impresos, y permitir a los clientes ingresar a su cuenta vía Web para ver su estado, consumo, cambiar su contraseña y sus datos y tambien cargar crédito a su cuenta vía PayPal o Autorize.net



User Manager: Wireless MAC Control

Mozilla Firefox

Archivo Editar Ver Historial Marcadores Herramientas Ayuda

http://.../userman

Hotmail gratuito Personalizar vinculos Windows Media Windows

MikroTik
RouterOS User Manager

Status
Routers
Credits
Users
Sessions
Customers
Reports
Logs
Logout

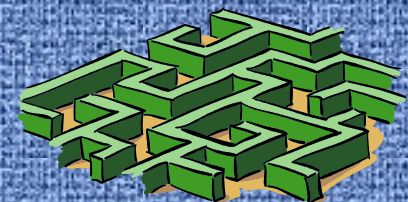
Users

1 2 3 4 5 6 7 8 9 10 >> Last (Total: 112) Per page: 10

<input type="checkbox"/>	▼ Username ▲	▼ Prepaid ▲	▼ Used ▲	Left	▼ Price ▲	▼ Download ▲	▼ Upload ▲
<input type="checkbox"/>	00:0E:2E:42:BE:B8	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:42:BF:48	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:42:C0:42	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:42:C0:43	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:43:2D:6B	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:43:2D:73	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:43:2D:7B	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:43:31:FE	unlimited	0s	0s	0.00	0 B	0 B
<input type="checkbox"/>	00:0E:2E:43:94:3A	unlimited	0s	0s	0.00	0 B	0 B
<input checked="" type="checkbox"/>	teste1	1h	13m:50s	1h	3.00	14.6 MiB	1665.4 KiB

Edit Generate Search

- ❑ Otra de las ventajas de User Manager, es la de permitirnos unificar la gestión de MAC de todos los CPEs que integran la red en único lugar.
- ❑ De esta manera, nos facilita la administración y permite a los clientes conectarse a cualquier nodo de la red (fail-over)



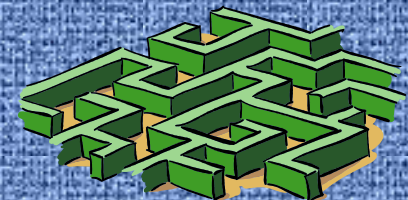
WebProxy Caché: Aceleración Web

The screenshot displays the WinBox v2.9.45 interface. The main window shows the Firewall configuration page with a list of rules. A 'Web Proxy Settings' dialog box is open, showing statistics for the proxy service. The 'Web Proxy' section is also visible in the left sidebar.

#	Action	Chain	Src. Address	Src. Port	In. Interface	Dst. Address	Dst. Port	Out. Int...	Protocol	Bytes	Packets
...	HTTPS										
...	accept	dstnat					443		6 (tcp)	2893.1 KiB	59 429
...	WEBPROXY										
...	redirect	dstnat					3128		6 (tcp)	106.2 KiB	2 273
...	WEBPROXY										
...	redirect	dstnat					8080		6 (tcp)	341.4 KiB	7 105
...	WEBPROXY										
...	redirect	dstnat					80		6 (tcp)	32.9 KiB	703
...	WEBPROXY										
...	redirect	dstnat			BRIDGE-CLIENTES		123		17 (udp)	2700.7 KiB	36 381
...	NTP										
...	redirect										
...	NAT VNC a SPI						5902		6 (tcp)	2734 B	39
...	dst-nat						5905		6 (tcp)	1724 B	37
...	NAT VNC a LEV						5906		6 (tcp)	1240 B	24
...	dst-nat										
...	NAT RADMIN a										
...	dst-nat										

Path	Method	Action	Redirect To	Hits
		deny		0
		deny		0
	CONNECT	allow		1325
		deny		0
		allow		4172967
		allow		96
		allow		0
		allow		0
		allow		0
		allow		2842
		allow		0
		deny		2568

- WebProxy nos permite ahorrar ancho de banda (~40%) y acelerar la velocidad de navegación por Internet, ya que guarda las páginas visitadas anteriormente en su caché.
- Otra buena función es la de permitir realizar control de contenido mediante reglas de filtrado URL



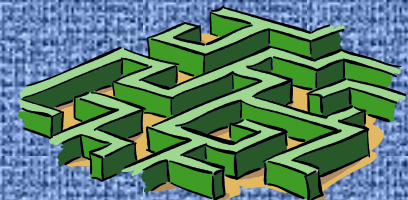
Wireless Mesh: WDS y RSTP

The screenshot shows the RouterOS WinBox interface. The main window displays the 'Wireless Tables' configuration, which includes a table of wireless interfaces and WDS links. Below the table is a network diagram illustrating a mesh topology with nodes A through F and a central server icon.

Name	Type	MTU	MAC Address	Mode	Band	Frequency	SSID
SUPPORT-AP400	Wireless (Athero...	1500	00:40:96:3F:3C:34	ap bridge	2.4GHz-B/G	2417MHz	SUPPORT
SUPPORT5G	Wireless (Athero...	1500	00:40:96:05:0D:0A	ap bridge	5GHz-turbo	5760MHz	SUPPORT5G
wds1	WDS	1500	00:40:96:05:0D:0A				
wds2	WDS	1500	00:40:96:05:0D:0A				
wds3	WDS	1500	00:40:96:05:0D:0A				
wds4	WDS	1500	00:40:96:05:0D:0A				

The network diagram shows a central server icon connected to node A. Node A is connected to nodes B and C. Node B is connected to nodes C, D, and E. Node C is connected to nodes D and E. Node D is connected to nodes E and F. Node E is connected to node F. Node F is connected to a laptop icon.

- En una red Wireless Mesh, para obtener alta disponibilidad, cada nodo debe interconectarse con al menos 2 o más nodos por enlaces WDS dinámicos.
- Para controlar la red, evitando loops y adicionando tolerancia a fallas, utilizaremos Bridge con Protocolo RSTP en toda la red.



Wireless Mesh: Características

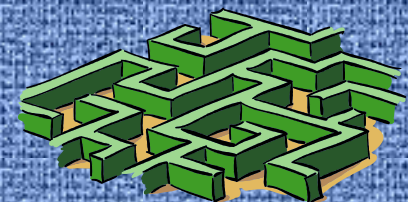
The screenshot displays the RouterOS WinBox interface for configuring a wireless mesh network. The main window is titled 'Interface <RB3-SUPPORT5G>' and shows the following configuration details:

- Band:** 5GHz-turbo
- Frequency:** 5760 MHz
- Tx/Rx Rate:** 54Mbps
- SSID:** SUPPORT5G
- BSSID:** 00:40:96:05:0D:0A
- Radio Name:** AP1-SUPPORT-5G
- Tx/Rx Signal Strength:** -66/-65 dBm
- Noise Floor:** -102 dBm
- Signal To Noise:** 37 dB
- Tx/Rx CCQ:** 89/91 %
- Overall Tx CCQ:** 0 %
- Ack. Timeout:** us
- RouterOS Version:** 2.9.45
- Last IP:** 201.255.245.55
- WDS Link
- Compression

The 'Security Profile <securemesh>' window is also visible, showing the following settings:

- Name:** securemesh
- Mode:** dynamic keys
- Authentication Types:**
 - WPA PSK
 - WPA2 PSK
 - WPA EAP
 - WPA2 EAP
- Unicast Ciphers:**
 - tkip
 - aes ccm
- Group Ciphers:**
 - tkip
 - aes ccm
- WPA Pre-Shared Key:** [Empty field]
- WPA2 Pre-Shared Key:** [Empty field]
- Group Key Update:** 00:05:00
- RADIUS MAC Authentication

- La interconexión entre nodos debe caracterizarse por ser de alto rendimiento, disponibilidad y seguridad, por lo que es recomendable realizarlo en modo 5Ghz-Turbo con Nstreme, WDS Dinámico y Seguridad WPA2-EAP con AES



Wireless Mesh: APs y Clientes

admin@ (RB1-SUPPORT) - WinBox v2.9.45

19:50:50 Memory: 18.0 MiB CPU: 79%

RouterOS WinBox

Interfaces

Wireless

Bridge

IP

Ports

Queues

Drivers

System

Files

Log

SNMP

Users

Radius

Tools

New Terminal

Telnet

Password

Certificate

Make Supout.tif

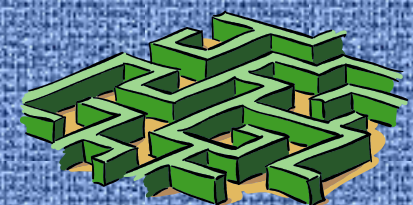
Manual

Exit

Scan <SUPPORT-AP400> [running]

	Address	SSID	Band	Fre...	Signa...	Radio Name	RouterO...	
BP	00:02:6F:21:CE:2F	CENTER	2.4GHz-G	2412	-92			
ABR	00:0C:42:0C:D8:A3	SUPPORT	2.4GHz-G	2412	-74	RB1-SUPPORT-AP2G	2.9.45	
ABP	00:11:3B:02:02:30	default	2.4GHz-G	2412	-85			
AB	00:02:6F:44:8D:58	lan16	2.4GHz-G	2412	-82			
AB	00:02:6F:35:35:25	lan2	2.4GHz-G	2412	-83			
AB	00:19:E0:96:15:7C		2.4GHz-G	2417	-76			
AB	00:02:6F:07:5F:4B	lan3	2.4GHz-G	2422	-83			
ABR	00:0A:E9:06:2E:BB	support2	2.4GHz-G	2422	-87	AP-RB-S-SUPPORTCA	2.9.42	
ABR	00:40:96:51:05:5A	SUPPORT	2.4GHz-G	2427	-77	SUPPORT-AP2	2.9.41	
ABR	00:0C:42:0C:D8:9A	SUPPORT	2.4GHz-G	2437	-75	RB9-AP-SUPPORT	2.9.43	
AB	00:02:2D:65:EE:0A	lan4	2.4GHz-G	2437	-88			
AB	00:02:6F:44:2E:D9	SUPPORT	2.4GHz-G	2447	-74			
AB	00:02:6F:44:8D:51	support2	2.4GHz-G	2447	-81			
AB	00:40:96:44:2E:CE	SUPPORT	2.4GHz-G	2462	-84			

Para brindar alta disponibilidad a los clientes (fail-over), se deben configurar todos los APs con un mismo SSID y la misma seguridad. No necesitan soportar WDS ni estar en la misma frecuencia.



Wireless Mesh: Acceso Libre

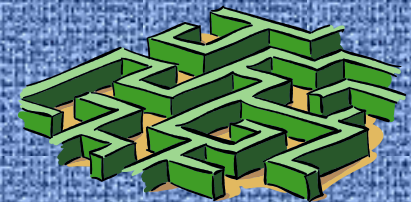
The screenshot shows the WinBox v2.9.45 interface. The main window displays the 'Wireless Tables' configuration page, which includes a table of wireless interfaces and their properties. A 'Security Profile <Clientes-WPA2-AES>' dialog box is open, showing configuration options for WPA2-AES security.

Name	Type	MTU	MAC Address	Mode	Band	Frequency	SSID
SUPPORT-AP400	Wireless (Atheros AR5213)	1500	00:40:96:3F:3C:34	ap bridge	2.4GHz-B/G	2417MHz	SUPPORT
APVirtual-Libre	VirtualAP	1500	02:40:96:3F:3C:34				SUPPORT-Libre
SUPPORT5G	Wireless (Atheros AR5413)	1500	00:40:96:05:0D:0A	ap bridge	5GHz-turbo	5760MHz	SUPPORT5G
wds1	WDS	1500	00:40:96:05:0D:0A				
wds2	WDS	1500	00:40:96:05:0D:0A				
wds3	WDS	1500	00:40:96:05:0D:0A				
wds4	WDS	1500	00:40:96:05:0D:0A				

The 'Security Profile <Clientes-WPA2-AES>' dialog box shows the following configuration:

- Name: Clientes-WPA2-AES
- Mode: dynamic keys
- Authentication Types: WPA PSK, WPA EAP
- Unicast Ciphers: tkip, aes ccm
- Group Ciphers: tkip, aes ccm
- WPA Pre-Shared Key: [Empty]
- WPA2 Pre-Shared Key: support se re k h st kl st t
- Group Key Update: 00:05:00
- RADIUS MAC Authentication

- Por medio de APs Virtuales, se permite acceso libre a la red, para usuarios que quieren probar el sistema.
- Estos son atendidos por otro HotSpot Server en el mismo Servidor e invitados en la web de autenticación Hotspot a utilizar el servicio en forma limitada en la modalidad "Trial"



QoS: Ecuando Servicios

admin@ (MTx86-NETSERVER) - WinBox v2.9.46 CPU:40%

Interfaces
PPP
Bridge
IP
Ports
Queues
Drivers
System
Files
Log
SNMP
Users
Radius
Tools
New Terminal
Telnet
Password
Certificate
Make Supout.rif
Manual
Exit

Queue List

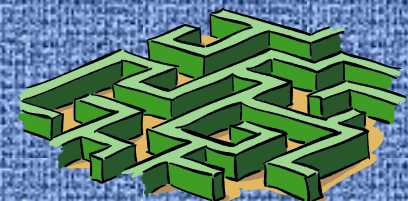
Simple Queues Interface Queues Queue Tree Queue Types

Reset Counters Reset All Counters

Name	Parent	Packet Mark	Limit At	Max Limit	Rate	Queued Bytes	Bytes	Packets
CLIENTES-IN	global-total		0	10M	5.6 Mbps	0 B	62922.9 MiB	154 814 743
DNS	CLIENTES-IN	dnsp	128k	256k	0 bps	0 B	0 B	0
FTP-In	CLIENTES-IN	ftpf	128k	256k	0 bps	0 B	37.5 MiB	74 260
ICMP	CLIENTES-IN	icmpp	320k	512k	4.6 kbps	0 B	82.0 MiB	1 116 428
MSN-In	CLIENTES-IN	msrf	500k	1M	65.9 kbps	0 B	632.1 MiB	3 278 644
Otros-In	CLIENTES-IN	other	0	2M	1072.6 kbps	0 B	14693.5 MiB	51 328 946
P2P-In	CLIENTES-IN	p2p	0	128k	110.3 kbps	0 B	3657.7 MiB	19 536 279
POP3-In	CLIENTES-IN	pop3f	5M	10M	0 bps	0 B	264.9 MiB	422 576
PPTP	CLIENTES-IN	pptp	512k	1M	72 bps	0 B	9.3 MiB	42 945
SMTP-In	CLIENTES-IN	smtpf	5M	10M	920 bps	0 B	142.8 MiB	266 921
VOIP-In	CLIENTES-IN	voip	512k	1M	37.7 kbps	0 B	1923.3 MiB	3 103 224
Web-In	CLIENTES-IN	webp	2M	4M	194.2 kbps	0 B	2343.2 MiB	17 711 916
WebDirect-IN	CLIENTES-IN	web-directp	1M	2M	6.4 kbps	0 B	885.4 MiB	1 959 489
WebProxy-IN	CLIENTES-IN	webproxyf	3M	4M	1959.8 kbps	0 B	17496.6 MiB	17 067 484
Webproxy-In	CLIENTES-IN	webproxyf-out	2M	4M	2.1 Mbps	0 B	20758.4 MiB	38 920 675
PUBLICA-OUT	WAN4-TELECOM		0	4M	556.8 kbps	0 B	7283.9 MiB	50 028 161
DNS-OUT	PUBLICA-OUT	dnsp	128k	256k	0 bps	0 B	0 B	0
FTP-Out	PUBLICA-OUT	ftpf	128k	256k	0 bps	0 B	5.9 MiB	35 125
ICMP-OUT	PUBLICA-OUT	icmpp	320k	512k	1808 bps	0 B	16.2 MiB	156 357
MSN-Out	PUBLICA-OUT	msrf	500k	1M	23.5 kbps	0 B	280.9 MiB	1 694 904
Otros-Out	PUBLICA-OUT	other	0	1M	286.9 kbps	0 B	3445.0 MiB	26 622 021
P2P-Out	PUBLICA-OUT	p2p	0	128k	0 bps	0 B	751.3 MiB	2 454 382
POP3-OUT	PUBLICA-OUT	pop3f	5M	10M	0 bps	0 B	8.2 MiB	151 832
PPTP-OUT	PUBLICA-OUT	pptp	512k	1M	32 bps	0 B	4551.0 KiB	22 280
SMTP-OUT	PUBLICA-OUT	smtpf	5M	10M	864 bps	0 B	137.9 MiB	140 055
VOIP-OUT	PUBLICA-OUT	voip	256k	512k	1592 bps	0 B	167.4 MiB	1 299 692
Web-Out	PUBLICA-OUT	webp	2M	4M	0 bps	0 B	1240.2 KiB	5 899
WebDirect-OUT	PUBLICA-OUT	web-directp	1M	2M	920 bps	0 B	43.0 MiB	605 711
WebProxy-OUT	PUBLICA-OUT	webproxyf-out	2M	4M	228.8 kbps	0 B	2294.5 MiB	16 535 705
Webproxy-out	PUBLICA-OUT	webproxyf	2M	4M	12.2 kbps	0 B	127.4 MiB	304 198

215.9 KiB queued | 196 packets queued

Mikrotik nos ofrece una excelente posibilidad de detectar y marcar múltiples protocolos para luego en las Queues Tree realizar una ecuación de servicios, garantizando y priorizando ancho de banda acorde a las necesidades de cada uno.



QoS: Acelerando Servicios

Alessio@... (MTx86-SUPPORT) - WinBox v2.9.45

1d 10:57:15 Memory: 85.8 MiB CPU: 11%

Queue List

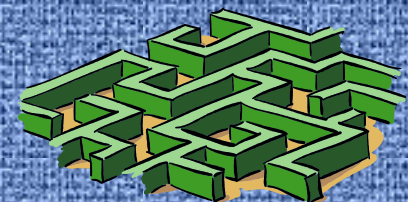
Simple Queues Interface Queues Queue Tree Queue Types

00 Reset Counters 00 Reset All Counters

#	Name	Target Address	Packet Marks	Max Upl...	Max Do...	Upload Rate	Download Rate	Queued Bytes	Uploaded Bytes	Downl...
	SERVIDOR			4M	4M	0 bps	0 bps	0 B/0 B	194.4 MiB	424.5 M
	SERVIDOR1	200...168.130		4M	4M	0 bps	0 bps	0 B/0 B	425.0 MiB	189.3 M
	WEBPROXY		webdirectp	3M	3M	5.0 kbps	0 bps	0 B/0 B	80.9 MiB	0 B
	WEBPROXY-11		webdirectp-out	3M	3M	0 bps	3.4 kbps	0 B/0 B	0 B	62.2 M
D	<hotspot-garcia>	192.168.10.69		64k	128k	4.8 kbps	13.3 kbps	0 B/0 B	19.5 KiB	64.3 KiB
D	<hotspot-schierloh>	192.168.10.166		64k	128k	11.6 kbps	109.5 kbps	0 B/8.8 KiB	62.9 KiB	549.1 M
D	<hotspot-eayala>	192.168.11.29		64k	128k	776 bps	1032 bps	0 B/0 B	171.5 KiB	591.8 M
D	<hotspot-quinteros>	192.168.11.177		64k	128k	1152 bps	3.7 kbps	0 B/0 B	86.6 KiB	550.2 M
D	<hotspot-lasliebres>	192.168.10.27		64k	128k	168 bps	592 bps	0 B/0 B	26.7 KiB	410.5 M
D	<hotspot-fsolis>	192.168.11.224		64k	128k	1400 bps	18.7 kbps	0 B/8.8 KiB	115.5 KiB	2548.5 M
D	<hotspot-sanchezs>	192.168.10.67		64k	128k	568 bps	416 bps	0 B/0 B	474.7 KiB	408.9 M
D	<hotspot-cretton>	192.168.11.96		64k	128k	2.0 kbps	3.6 kbps	0 B/0 B	357.5 KiB	827.7 M
D	<hotspot-schiavoni>	192.168.11.189		64k	128k	1248 bps	1312 bps	0 B/0 B	736.3 KiB	565.2 M
D	<hotspot-reibel>	192.168.10.127		64k	128k	8.0 kbps	39.1 kbps	0 B/0 B	842.3 KiB	1273.9 M
D	<hotspot-maidanas>	192.168.11.82		64k	128k	6.2 kbps	60.2 kbps	0 B/0 B	1156.4 KiB	9.4 MiB
D	<hotspot-viscontini>	192.168.11.176		64k	128k	0 bps	0 bps	0 B/0 B	62.4 KiB	118.5 M
D	<hotspot-segovia>	192.168.11.104		64k	128k	48 bps	280 bps	0 B/0 B	592.2 KiB	1989.7 M
D	<hotspot-collins>	192.168.11.138		64k	128k	0 bps	0 bps	0 B/0 B	53.1 KiB	86.3 KiB
D	<hotspot-farias>	192.168.10.119		64k	128k	5.4 kbps	30.6 kbps	0 B/0 B	688.1 KiB	6.0 MiB
D	<hotspot-vanopstalm>	192.168.11.108		64k	128k	0 bps	0 bps	0 B/0 B	160.8 KiB	1184.7 M
D	<hotspot-bmiotti>	192.168.10.84		64k	128k	728 bps	7.1 kbps	0 B/0 B	590.0 KiB	1823.5 M
D	<hotspot-marchisio>	192.168.11.98		64k	128k	0 bps	0 bps	0 B/0 B	1115.0 KiB	4020.5 M
D	<hotspot-hnass>	192.168.11.130		64k	128k	696 bps	3.0 kbps	0 B/0 B	545.1 KiB	1629.9 M
D	<hotspot-caballero>	192.168.11.171		64k	128k	1672 bps	1120 bps	0 B/0 B	503.4 KiB	726.8 M
D	<hotspot-mbaroli>	192.168.10.156		64k	128k	0 bps	0 bps	0 B/0 B	73.9 KiB	1927.2 M
D	<hotspot-jalemandi>	192.168.10.97		64k	128k	4.9 kbps	2.4 kbps	0 B/0 B	1941.2 KiB	7.5 MiB
D	<hotspot-beckmanj>	192.168.11.20		64k	128k	8 bps	0 bps	0 B/0 B	1099.7 KiB	2012.0 M
D	<hotspot-fmimpacto>	192.168.10.101		64k	128k	720 bps	14.4 kbps	0 B/5.8 KiB	648.8 KiB	5.9 MiB
D	<hotspot-jpedrotti>	192.168.10.112		64k	128k	1744 bps	17.0 kbps	0 B/0 B	1381.5 KiB	6.1 MiB
D	<hotspot-carullab>	192.168.11.17		64k	128k	56 bps	16 bps	0 B/0 B	263.8 KiB	522.1 M
D	<hotspot-ojedae>	192.168.10.30		64k	128k	0 bps	0 bps	0 B/0 B	319.7 KiB	2015.9 M
D	<hotspot-rgauna>	192.168.10.208		64k	128k	904 bps	0 bps	0 B/0 B	111.7 KiB	115.4 M
D	<hotspot-fabriciusd>	192.168.10.110		64k	128k	2.4 kbps	127.7 kbps	0 B/4428 B	609.3 KiB	29.6 M
D	<hotspot-lencina>	192.168.11.117		64k	128k	24 bps	8 bps	0 B/0 B	194.6 KiB	934.9 M
D	<hotspot-lapuyade>	192.168.10.124		64k	128k	2.2 kbps	832 bps	0 B/0 B	943.3 KiB	1593.6 M
D	<hotspot-hmeichtryr>	192.168.10.148		64k	128k	16 bps	8 bps	0 B/0 B	478.9 KiB	1203.2 M
D	<hotspot-molem>	192.168.10.160		64k	128k	16 bps	136 bps	0 B/0 B	1970.0 KiB	6.6 MiB

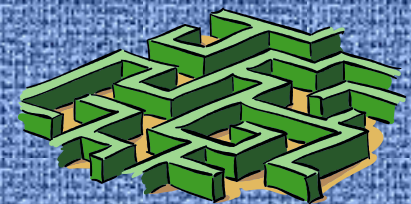
121.6 KiB queued 124 packets queued

Podemos permitir el acceso a los Servidores de Mail, Web y FTP locales y ciertas páginas importantes, a velocidades muy superiores a las contratadas por los usuarios; brindando de esta manera una Calidad de Servicio inigualable y muy perceptible.



TIPs Adicionales de Seguridad

- ❑ Interfaces con ARP de sólo respuesta(reply-only)
- ❑ DHCP Leases Estáticos (con add ARP for Leases)
- ❑ Solución Anti-SPAM (para virus o spammers)



TIPs: Seguridad DHCP

Interfaces
PPP
Bridge
IP
Ports
Queues
Drivers
System
Files
Log
SNMP
Users
Radius
Tools
New Terminal
Telnet
Password
Certificate
Make Supout.rif
Manual
Exit

DHCP Server

DHCP Networks Leases Options Alerts

Name	Interface	Relay	Address Pool	Lease Time	Add ARP
DHCP-Wireless	BRIDGE-CLIENT...		static-only	01:00:00	yes

DHCP Server <BRIDGE-CLIENTES>

Name: DHCP-Wireless
Interface: BRIDGE-CLIENTES
Relay: []
Lease Time: 01:00:00
Address Pool: static-only
Src. Address: []
Delay Threshold: []
Authoritative: yes
 Bootp Support
 Add ARP For Leases
 Always Broadcast
 Use RADIUS

Interfaces
PPP
Bridge
IP
Ports
Queues
Drivers
System
Files
Log
SNMP
Users
Radius
Tools
New Terminal
Telnet
Password
Certificate
Make Supout.rif
Manual
Exit

DHCP Server

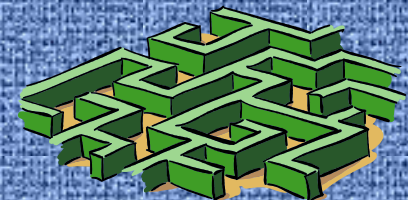
DHCP Networks Leases Options Alerts

Make Static Check Status

IP Address	MAC Address	Client ID	Hostname	Expires After	Server	Status
192.168.11.192	00:11:58:D0:D9:37		Facundo	00:00:19	DHCP-Wireless	bound
192.168.11.41	00:0F:3D:31:58:0C		DLA502i	00:08:59	DHCP-Wireless	bound
192.168.10.90	00:15:F2:E5:76:8D		pc	00:18:01	DHCP-Wireless	bound
200.1.1.133	00:E0:7D:DE:9A:78		radiointernet	00:20:42	DHCP-Wireless	bound
192.168.10.223	00:19:66:16:F2:6C	1:0:19:66:16f2:6c	desktop	00:26:18	DHCP-Wireless	bound
192.168.10.167	00:0E:2E:B2:0A:63			00:28:41	DHCP-Wireless	bound
192.168.11.112	00:14:2A:E2:62:A5		XIPPO	00:29:08	DHCP-Wireless	bound
192.168.10.220	00:0B:B4:00:0A:0F		NAT Router1	00:30:08	DHCP-Wireless	bound
192.168.10.215	00:08:54:B0:23:3E		Y20911	00:30:13	DHCP-Wireless	bound
192.168.10.34	00:0A:E6:FE:1A:EA		molino	00:30:18	DHCP-Wireless	bound
192.168.10.70	00:0B:6A:A9:79:86		desktop	00:30:19	DHCP-Wireless	bound
192.168.10.20	00:11:38:06:F9:91		setup	00:30:26	DHCP-Wireless	bound

Para adicionar mas de seguridad en la red, debemos configurar:

- ARP=reply-only en la interfase por la que ingresan los clientes
- DHCP-Server: Address-Pool=static-only y Add ARP For Leases=yes para que unicamente adicione en la tabla ARP a los hosts estáticos en Leases
- DHCP-Server Leases: debemos hacer estáticos a todos los hosts que pertenecen a nuestra red (marcar todos y dar click en Make Static)



TIPs: Anti-SPAM

The screenshot shows the Mikrotik WinBox interface. The top bar displays the user 'Alessio@' and system information: '(MTx86-SUPPORT) - WinBox v2.9.45'. The system status shows '1d 10:06:17', 'Memory: 73.3 MiB', and 'CPU: 28%'. The left sidebar contains a tree view of system components: Interfaces, PPP, Bridge, IP, Ports, Queues, Drivers, System, Files, Log, SNMP, Users, Radius, Tools, New Terminal, Telnet, Password, Certificate, Make Supout.rf, Manual, and Exit.

The main window is divided into two panes. The top pane is titled 'Firewall' and shows the 'Filter Rules' tab. It contains a table of firewall rules with columns for Action, Chain, Src. Address, Src. Port, In. Interface, Dst. Address, Dst. Port, Out. Int..., Protocol, Bytes, and Packets. The rules are as follows:

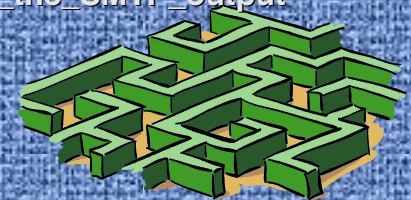
#	Action	Chain	Src. Address	Src. Port	In. Interface	Dst. Address	Dst. Port	Out. Int...	Protocol	Bytes	Packets
LOG SMTP ACTIVITY	log	forward					25		6 (tcp)	0 B	0
BLOQUEA SPAMMERS O INFECTADOS	drop	forward					25		6 (tcp)	1542.2 KiB	31 958
Detecta y enlista SMTP virus o spammers	add src to address list	forward					25		6 (tcp)	176 B	4
Permite envio de mails solo desde IPs Permitidas	drop	forward					25		6 (tcp)	2496 B	46
Drop Bittorrent(encrypted) and UDP port 0	drop	forward		0					17 (udp)	0 B	0
WAREZ BLOCK	drop	forward					0		17 (udp)	1279.5 KiB	22 996
BIT-TORRENT BLOCK	drop	forward								534.9 MiB	6 021 883
WAREZ LIMIT	drop	forward								845.4 KiB	9 962
	drop	forward							6 (tcp)	0 B	0

The bottom pane is titled 'Log' and shows a list of system events. The log entries include:

- Sep/07/2007 20:29:17 system info simple queue moved by admin
- Sep/07/2007 20:29:17 system info simple queue moved by admin
- Sep/07/2007 20:29:17 system info simple queue moved by admin
- Sep/07/2007 20:29:26 dhcp info debug DHCP-Wireless deassigned 192.168.11.18 from 00:14:2A:24:84:5D
- Sep/07/2007 20:29:44 dhcp info debug DHCP-Wireless assigned 192.168.10.160 to 00:13:8F:BD:CE:4C
- Sep/07/2007 20:30:00 script error -----Usuarios detectados como SPAMMERS-----
- Sep/07/2007 20:30:00 script error wolter
- Sep/07/2007 20:30:00 script error 192.168.10.23
- Sep/07/2007 20:30:00 script error 5bocas
- Sep/07/2007 20:30:00 script error 192.168.11.140
- Sep/07/2007 20:30:07 hotspot info debug delsol (192.168.10.180): logged out: keepalive timeout
- Sep/07/2007 20:30:09 hotspot info debug ramat (192.168.11.193): trying to log in by cookie
- Sep/07/2007 20:30:09 hotspot account in... ramat (192.168.11.193): logged in
- Sep/07/2007 20:30:09 system info simple queue moved by admin
- Sep/07/2007 20:30:09 system info simple queue moved by admin

❑ Solución a los problemas de usuarios infectados por algun Virus Gusano (Worm) o a usuarios que quieren realizar actividades de envío masivo de correo electrónico (SPAM)

❑ Pueden encontrar mas info en el artículo publicado en el Wiki de Mikrotik.
http://wiki.mikrotik.com/wiki/How_to_autodetect_infected_or_spammer_users_and_temporary_block_the_SMTP_output



Muchas gracias por su atención!



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