

# Mikrotik como solución de alta concurrencia

Caso de Éxito – Peru Set./2011

# DESAFÍO

- Garantizar en una área aproximada de 18,000 m<sup>2</sup> conectividad WIFI concurrente para 1200 usuarios.
- Factores a Considerar:
  - Traslape de frecuencias.
  - Interferencia por exceso de emisión RF
  - Centralización de control de acceso, control de ancho de banda y QoS
  - Alta capacidad de procesamiento de datos.

# CONTEXTO:

**28/30**  
Septiembre 2011

**LIMA, PERÚ**



CARACTERISTICAS	EXPOALIMENTARIA		
	2009	2010	2011
Area de Exhibición	6,600 m <sup>2</sup>	12,000 m <sup>2</sup>	18,000 m <sup>2</sup>
Stands Nacionales	195	301	382
Stands Internacionales	10	99	130
Países en Exhibición	1	5	23
Visitantes Nacionales	7,850	19,800	27,273
Visitantes Internacionales	450	740	1,715
Países Visitantes			58
MONTO NEGOCIADO	US\$ 25 M	US\$ 69.1 M	US\$ 471.7 M

↑ 50%  
↑ 27%  
↑ 31%  
↑ 38%  
↑ 132%  
↑ 583%



**538** empresas expositoras.

**148** empresas extranjeras de 22 países: 28% de los expositores fueron internacionales.

**390** empresas peruanas.

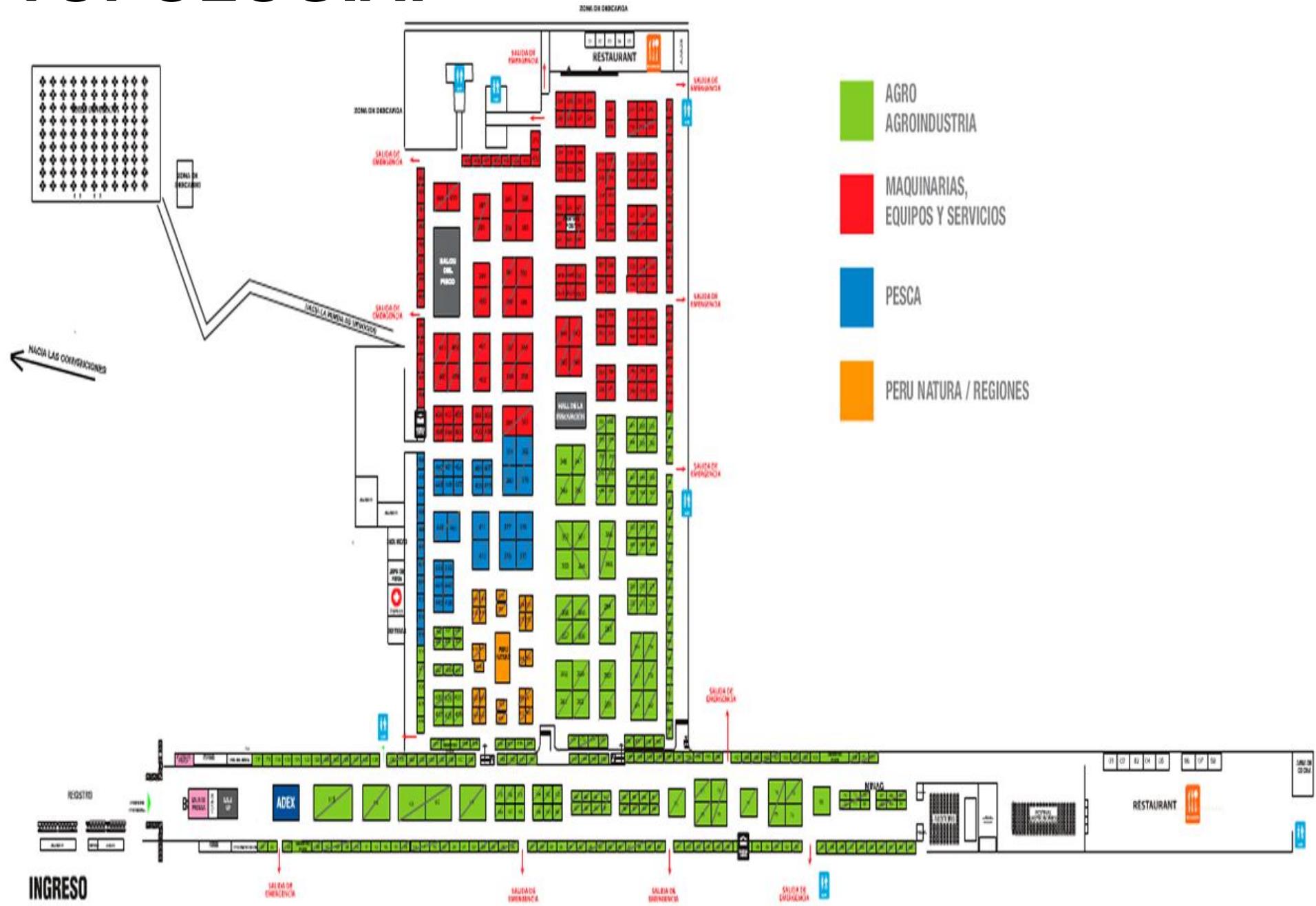
**116** empresas del interior del país.

**20** regiones del Perú representadas en la feria.

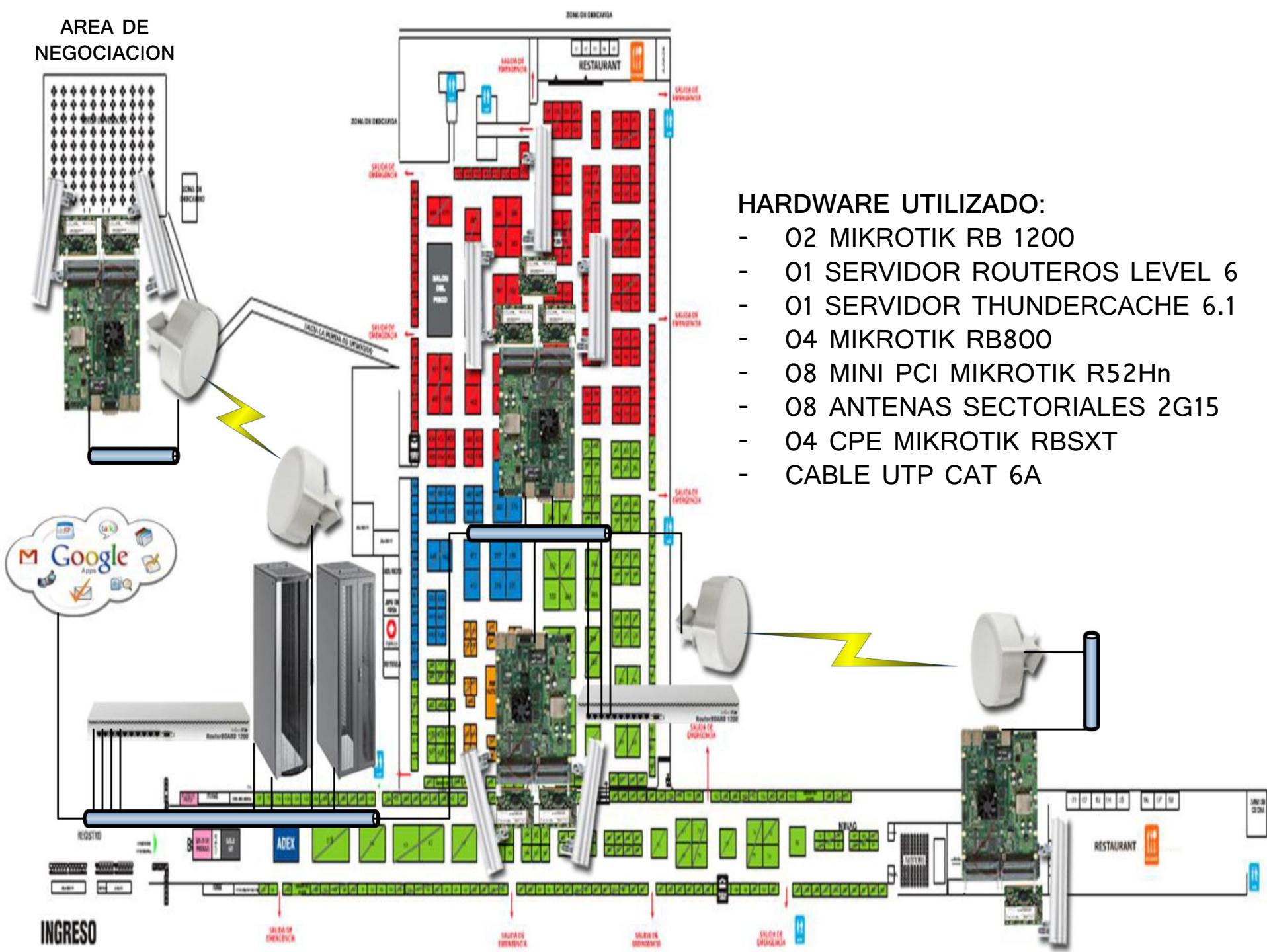
**1212 USUARIOS**

FUENTE: <http://www.expoalimentariaperu.com>

# **TOPOLOGIA:**

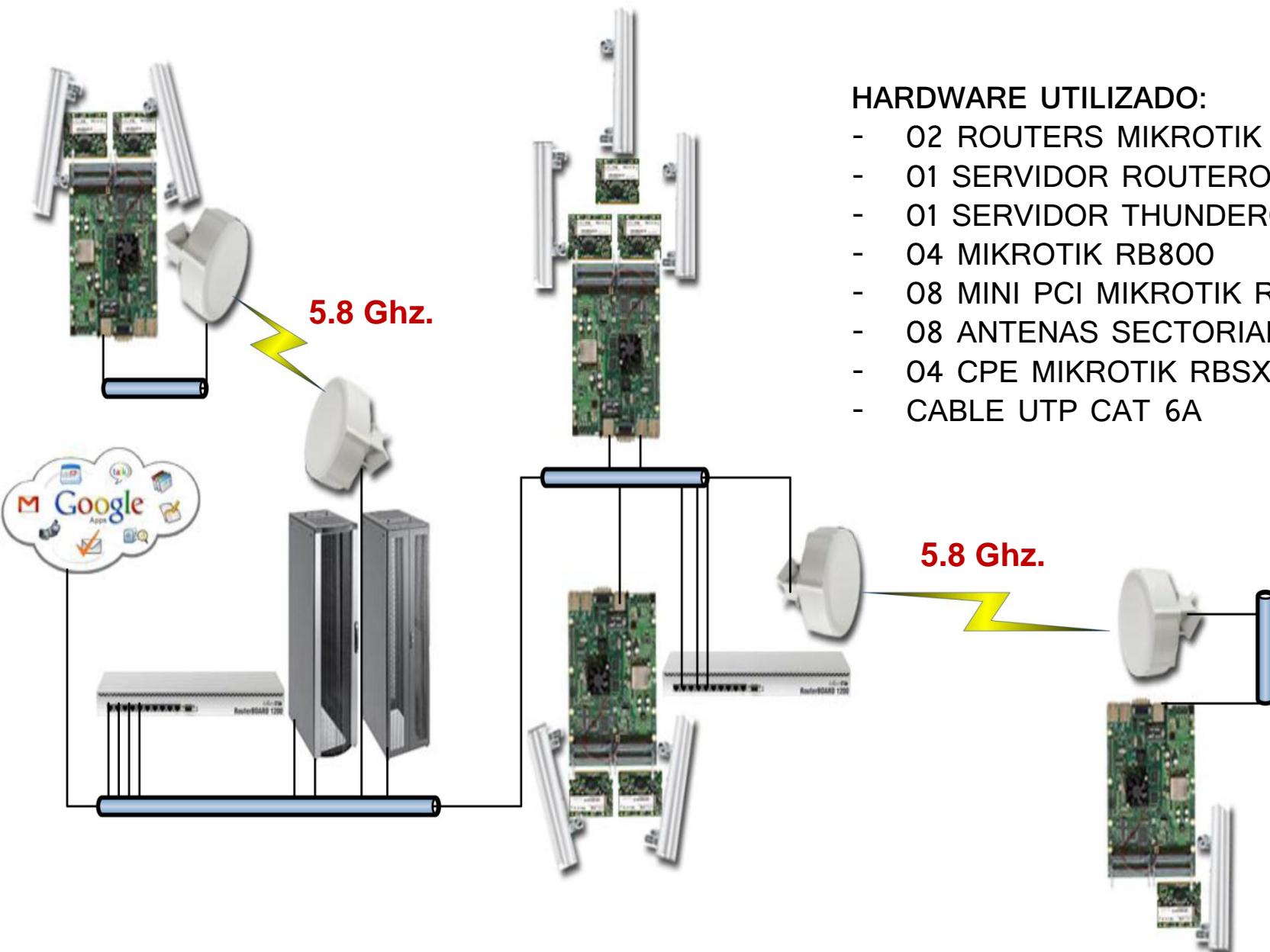


## AREA DE NEGOCIACION



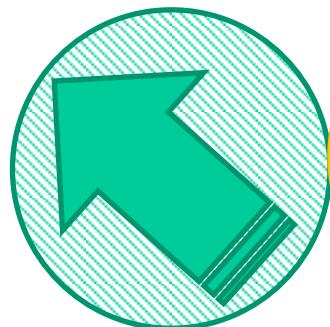
## HARDWARE UTILIZADO:

- 02 MIKROTIK RB 1200
  - 01 SERVIDOR ROUTEROS LEVEL 6
  - 01 SERVIDOR THUNDERCACHE 6.1
  - 04 MIKROTIK RB800
  - 08 MINI PCI MIKROTIK R52Hn
  - 08 ANTENAS SECTORIALES 2G15
  - 04 CPE MIKROTIK RBSXT
  - CABLE UTP CAT 6A

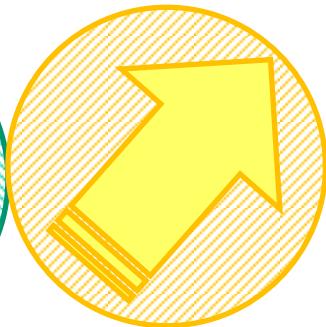


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Canal 6  
2.4 Ghz.



Canal 1  
2.4 Ghz.

Canal 11  
2.4 Ghz.



Canal 6  
2.4 Ghz.

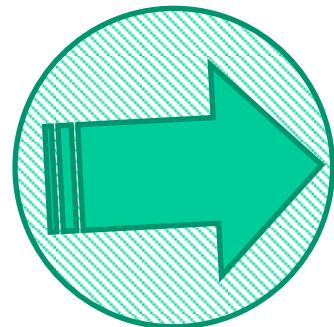
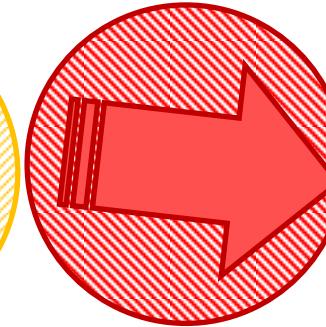


Canal 1  
2.4 Ghz.



Canal 1  
2.4 Ghz.

Canal 11  
2.4 Ghz.



Canal 6  
2.4 Ghz.



```
$(if chap-id)  
$(endif)
```



Ingrese el usuario y password correspondiente para ser validado  
\$(if trial == 'yes')Free trial available, click [here](#).\$(endif)

Usuario

Password

OK

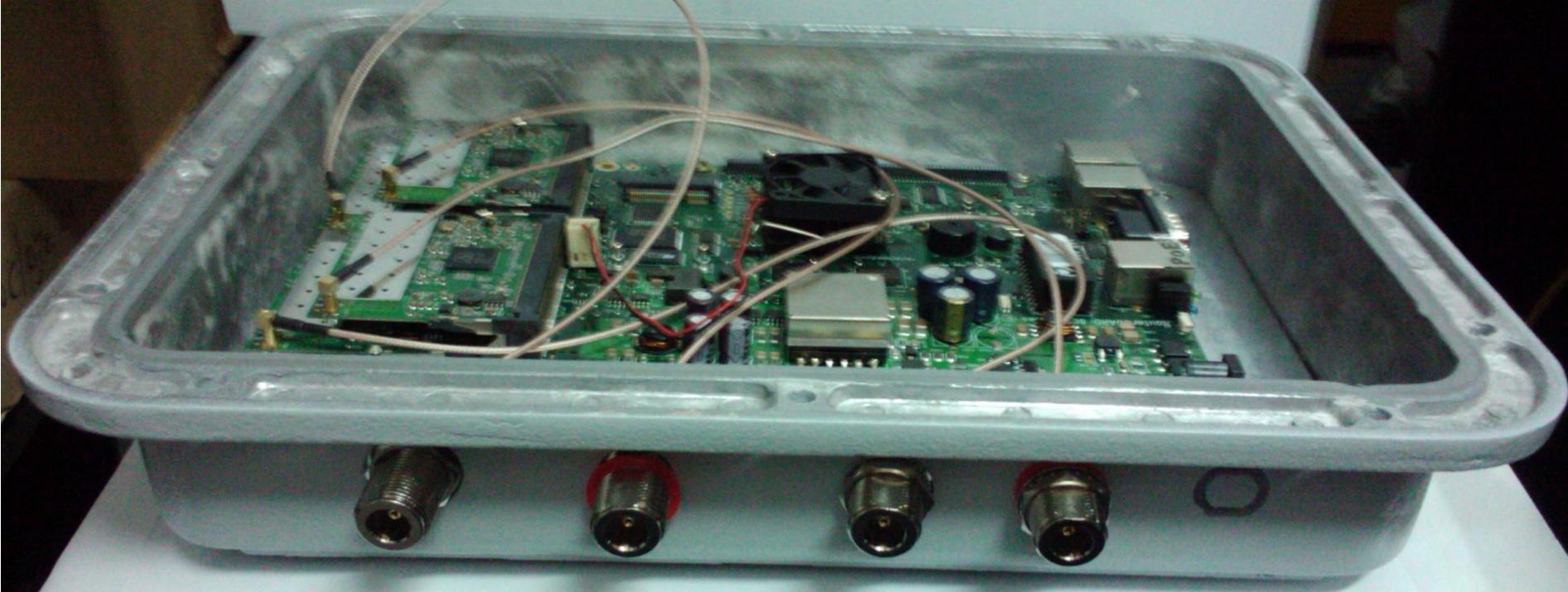
Solucion implementada por:



```
$(if error)  
$(error)  
$(endif)
```







# Configuración Lógica: Marcado de contenido

# Configuración Lógica: QoS sobre Layer7

admin@10.111.0.1 (MK-THUNDER) - WinBox v5.7 on x86 (x86)

Interfaces Wireless Bridge PPP Mesh IP IPv6 MPLS Routing System Queues Files Log Radius Tools New Terminal ISDN Channels KVM Make Supout.rif Manual Exit

Safe Mode Uptime: 09:40:15 Memory: 947.7 MiB CPU: 5% Hide Passwords

Queue List

Simple Queues Interface Queues Queue Tree Queue Types

+ - ✓ ✎ Reset Counters 00 Reset All Counters Find

Name	Parent	Packet ...	Limit At (b...)	Max Limit ...	Avg. R...	Queued Bytes	Bytes	Packets	...
INTERNET_IN	global-in		24M	24M	4.0 Mbps	126 B	15.7 GiB	14 178 4...	
100ba...	INTERNET_IN	100ba...		5k	0 bps	0 B	0 B	0	
DC_p2...	INTERNET_IN	DC_p2...		5k	0 bps	0 B	0 B	0	
DNS_in	INTERNET_IN	DNS_in			1912 bps	0 B	32.2 MiB	108 996	
aim_m...	INTERNET_IN	aim_me...			0 bps	0 B	956 B	4	
aim_m...	INTERNET_IN	aim_me...			0 bps	0 B	0 B	0	
appleju...	INTERNET_IN	appleju...			0 bps	0 B	0 B	0	
ares_p...	INTERNET_IN	ares_p...		5k	0 bps	0 B	0 B	0	
bittore...	INTERNET_IN	bittoren...		5k	0 bps	0 B	1452.2 KiB	6 376	
dhcp_in	INTERNET_IN	dhcp_in			0 bps	0 B	0 B	0	
edonk...	INTERNET_IN	edonke...		5k	0 bps	0 B	574.0 KiB	5 913	
fasttra...	INTERNET_IN	fasttrac...		5k	0 bps	0 B	0 B	0	
ftp_in	INTERNET_IN	ftp_in			0 bps	0 B	2197 B	21	
gnu_p...	INTERNET_IN	gnu_p2...		5k	0 bps	0 B	0 B	0	
gnutell...	INTERNET_IN	gnutell...		5k	0 bps	0 B	114.5 KiB	148	
gobog...	INTERNET_IN	gobogy...		5k	0 bps	0 B	0 B	0	
h323...	INTERNET_IN	h323_v...			0 bps	0 B	0 B	0	
http_in	INTERNET_IN	http_in			1994.1 ...	0 B	10.7 GiB	8 352 724	
https...	INTERNET_IN	https...			0 bps	0 B	0 B	0	
ident_in	INTERNET_IN	ident_in			0 bps	0 B	0 B	0	
imap_in	INTERNET_IN	imap_in			0 bps	0 B	33.1 MiB	42 638	
imesh...	INTERNET_IN	imesh...		5k	0 bps	0 B	0 B	0	
irc_in	INTERNET_IN	irc_in			0 bps	0 B	0 B	0	
msn_in	INTERNET_IN	msn_in			4.3 kbps	0 B	7.6 MiB	22 072	
msnfile...	INTERNET_IN	msnfile...			0 bps	0 B	0 B	0	
mute_...	INTERNET_IN	mute_p...		5k	0 bps	0 B	0 B	0	
napste...	INTERNET_IN	napster...		5k	0 bps	0 B	0 B	0	
netbios...	INTERNET_IN	netbios...			0 bps	0 B	0 B	0	
nntp_in	INTERNET_IN	nntp_in			0 bps	0 B	0 B	0	
ntp_in	INTERNET_IN	ntp_in			0 bps	0 B	1608.7 KiB	14 325	
pop3_in	INTERNET_IN	pop3_in			0 bps	0 B	879.7 MiB	736 090	
radmin...	INTERNET_IN	radmin_in			0 bps	0 B	0 B	0	
rdp_in	INTERNET_IN	rdp_in			0 bps	0 B	0 B	0	
rtsp_in	INTERNET_IN	rtsp_in			0 bps	0 B	0 B	0	
sip_in	INTERNET_IN	sip_in			0 bps	0 B	0 B	0	
skype2...	INTERNET_IN	skype2...			43.0 kb...	0 B	107.1 MiB	693 989	
skypeo...	INTERNET_IN	skypeo...			546.0 kb...	0 B	1422.2 MiB	1 442 186	
smtp_in	INTERNET_IN	smtp_in			0 bps	0 B	0 B	0	
smnn_in	INTERNET_IN	smnn_in			0 bps	0 B	0 B	0	

91 items out of 94 126 B queued 0 packets queued

# Configuración Lógica: HotSpot

admin@10.111.0.1 (MK-THUNDER) - WinBox v5.7 on x86 (x86)

Interfaces Wireless Bridge PPP Mesh IP IPv6 MPLS Routing System Queues Files Log Radius Tools New Terminal ISDN Channels KVM Make Supout.rif Manual Exit

Safe Mode

Uptime: 09:40:39 Memory: 717.7 MiB CPU: 24% Hide Passwords

Hotspot

Servers Server Profiles Users User Profiles Active Hosts IP Bindings Service Ports Walled Garden Walled Garden IP List Cookies

Find

Server	User	Domain	Address	Uptime	Idle Time	Session Time ...	Rx Rate	Tx Rate
hotspot1	asiser		10.111.2.45	00:04:09	00:00:01		49.0 kbps	3.0 Mbps
hotspot1	kossodo		10.111.2.84	01:15:19	00:00:00		15.6 kbps	1076.8 kbps
hotspot1	meetpoint10		10.111.2.136	00:02:27	00:00:01		24.5 kbps	941.8 kbps
hotspot1	silva2		10.111.1.108	02:24:24	00:00:00		7.9 kbps	535.4 kbps
hotspot1	adex2		10.111.2.128	03:41:48	00:00:00		19.9 kbps	173.6 kbps
hotspot1	admin		10.111.1.187	02:15:35	00:00:01		24.5 kbps	102.6 kbps
hotspot1	tensid		10.111.1.94	06:44:50	00:00:01		118.8 kbps	46.9 kbps
hotspot1	istecex		10.111.0.172	00:15:29	00:00:01		9.7 kbps	24.1 kbps
hotspot1	buyer		10.111.2.186	01:50:35	00:00:00		6.6 kbps	11.5 kbps
hotspot1	sierra		10.111.0.46	08:36:34	00:00:00		11.1 kbps	1980 bps
hotspot1	gian		10.111.0.183	04:20:04	00:00:00		580 bps	1976 bps
hotspot1	union		10.111.0.138	01:43:12	00:00:00		2.0 kbps	1729 bps
hotspot1	ar		10.111.1.240	05:32:01	00:00:00		40.1 kbps	1256 bps
hotspot1	akufru		10.111.1.155	01:57:53	00:00:00		26.4 kbps	986 bps
hotspot1	bcenter1		10.111.2.5	07:25:58	00:00:00		1033 bps	850 bps
hotspot1	cepibo		10.111.0.174	03:44:30	00:00:00			
hotspot1	mistral		10.111.1.151	02:48:16	00:00:00			
hotspot1	siuva		10.111.0.32	08:11:48	00:00:00			
hotspot1	sun		10.111.2.73	01:46:02	00:00:00			
hotspot1	cedepa2		10.111.2.32	00:26:41	00:00:01			
hotspot1	aduana		10.111.1.3	00:20:42	00:00:00			
hotspot1	cacesf		10.111.0.233	05:13:49	00:00:00			
hotspot1	adexpresna4		10.111.255.254	09:28:36	00:00:01			
hotspot1	embajadafr...		10.111.0.199	05:41:43	00:00:00			
hotspot1	quimsa2		10.111.0.169	00:19:45	00:00:00			
hotspot1	frio		10.111.0.110	02:02:08	00:00:00			
hotspot1	imo		10.111.0.245	00:06:59	00:00:00			
hotspot1	geodis		10.111.2.75	04:44:00	00:00:00			
hotspot1	domiruth		10.111.0.238	04:53:12	00:00:00			
hotspot1	lactom2		10.111.1.159	00:15:35	00:00:00			
hotspot1	piura2		10.111.2.207	00:16:57	00:00:01			
hotspot1	lactom		10.111.2.56	00:08:54	00:00:01			
hotspot1	adex1		10.111.0.181	06:18:08	00:02:02			
hotspot1	adex10		10.111.0.182	07:27:05	00:01:52			
hotspot1	adex6		10.111.1.122	01:25:29	00:00:16			
hotspot1	adex8		10.111.0.243	01:23:49	00:00:01			
hotspot1	adex9		10.111.0.194	06:09:57	00:00:07			
hotspot1	adexpresna1		10.111.0.84	09:28:55	00:00:27			

1147 items

Interface List

Interface Ethernet EoIP Tunnel IP Tunnel GRE Tunnel VLAN VRRP Bonding

Find

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors
Internet	Ethernet		538.6 kbps	8.6 Mbps	469	672	0	0	0
LOCAL	Ethernet		16383	15.4 Mbps	460.2 kbps	591	431	0	0
THUNDER	Ethernet		16383	13.4 Mbps	2.8 Mbps	422	437	0	25

3 items

# Configuración Lógica: Canales no traslapados

admin@00:15:6D:69:59:09 (EMISOR 4 SECTORIALES) - WinBox v5.7 on RB800 (powerpc)

Uptime: 11:48:16 Memory: 224.7 MiB CPU: 2% Hide Passwords

Safe Mode

Interfaces Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security Profiles

Freq. Usage Alignment Wireless Sniffer Wireless Snooper

Find

	Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors	Rx Errors	MAC Address	ARP	Mode	Band	Chann...	Frequen...	SSID	
R	wlan5	Wireless (Atheros AR5...)	2290	112.3 kbps	51.9 kbps	63	55	0	0	0	0	00:15:6D:69:59:86	enabled	ap bri...	2GHz...	20MHz	2462	ADEX-EX...	
R	wlan6	Wireless (Atheros AR5...)	2290	110.6 kbps	36.4 kbps	90	57	0	0	0	0	00:15:6D:69:59:05	enabled	ap bri...	2GHz...	20MHz	2412	ADEX-EX...	
R	wlan7	Wireless (Atheros AR5...)	2290	82.9 kbps	2.4 kbps	40	3	0	0	0	0	00:15:6D:69:59:09	enabled	ap bri...	2GHz...	20MHz	2437	ADEX-EX...	

Interface List

Interface Ethernet EoIP Tunnel IP Tunnel GRE Tunnel VLAN VRRP Bonding

Find

	Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors	Rx Errors	
R	bridge1	Bridge	1600	79.2 kbps	75.2 kbps	11	41	0	0	0	0	
	ether1	Ethernet	1600	0 bps	0 bps	0	0	0	0	0	0	
R	ether2	Ethernet	1600	170.0 kbps	149.3 kbps	126	117	0	0	0	0	
	ether3	Ethernet	1600	0 bps	0 bps	0	0	0	0	0	0	
R	wlan5	Wireless (Atheros AR5...)	2290	112.3 kbps	51.9 kbps	63	55	0	0	0	0	
R	wlan6	Wireless (Atheros AR5...)	2290	110.6 kbps	36.4 kbps	90	57	0	0	0	0	
R	wlan7	Wireless (Atheros AR5...)	2290	82.9 kbps	2.4 kbps	40	3	0	0	0	0	

7 items

3 items out of 7

RouterOS WinBox

Inicio Bandeja de ... Windows Li... Skype™ - c... Banco de Cr... Banco de Cr... Conexiones... ThunderCe... admin@10.... admin@00... admin@00... Documento... 06:09 p.m.

# Configuración Lógica: Servidor ThunderCache

The screenshot shows the ThunderCenter web interface. At the top, there's a banner with the text "THUNDERCACHE PROFESSIONAL". Below it, a navigation bar includes links for System, Statistics, Monitoring, Settings, Users, About, and Logout (admin). A status message "ThunderCache Service: Running" is displayed. The main content area has a title "ThunderCenter" and a subtitle "System". It displays various system metrics:

CPU Model	Cores	Temperature
Intel(R) Core(TM) i7 CPU 870 @ 2.93GHz	8	25 °C
Total Memory	Used Memory	Free Memory
7941MB	7169MB (90.28%)	768MB

Plan (Threads)	In Use
Thunder Mensal (100000)	57

SWAP Total	SWAP Used	SWAP Free
15508MB	0MB (0%)	15508MB

Uptime	CPU Use	Disks Load	Platform
07:43:22	1%	0%	64 bit

Internet	Intranet	Cache
5.7 Mbps	5.65 Mbps	0 bps

Below this, there's a "Version Control" section with tabs for Graphics, Overall Traffic, Dynamic Traffic, and Static Traffic. The "Version Control" tab is selected, showing the following table:

ThunderCenter		ThunderCache		Service Pack	
Current	Available	Current	Available	Current	Available
3.1.2	3.1.2	809	809	2.1	2.1

The right side of the interface also shows a summary of the ThunderCache service status.

The screenshot shows the ThunderCenter web interface. At the top, there's a banner with the text "THUNDERCACHE PROFESSIONAL". Below it, a navigation bar includes links for System, Statistics, Monitoring, Settings, Users, About, and Logout (admin). A status message "ThunderCache Service: Running" is displayed. The main content area has a title "ThunderCenter" and a subtitle "Statistics Domains". It displays various system metrics:

Domain	Cache Static	Internet Static	HIT Static	MISS Static	Effic. (%) Static	Cache Dynamic	Internet Dynamic	HIT Dynamic	MISS Dynamic	Effic. (%) Dynamic	Total Requests
megaupload.com	326.22KB	475.23KB	11	73	68.65	1.93GB	902.89MB	6	6	219.21	96
youtube.com	46.01KB	151.62MB	3	170	0.03	51.9MB	51.13GB	43	513	9.88	729
windowsupdate.com	0B	1.58GB	0	9007	0.00	128MB	418.23MB	3347	2824	30.61	15178
eset.com_mod32	0B	73.62KB	0	190	0.00	85.02MB	53.49MB	96	95	158.92	381
kaspersky.com	4.84MB	2.73MB	72	53	177.53	40.8MB	21.74MB	3948	1733	187.67	5806
vimeo.com	0B	0B	0	0	0.00	13.7MB	12.97MB	5	1	105.60	6
pornhub.com_videos	0B	0B	0	0	0.00	5.7MB	5.57MB	6	12	102.27	18
terra.com_TerraTV	0B	572.29KB	0	7	0.00	4.33MB	61.74MB	2	20	7.01	29
redtube.com_videos	0B	0B	0	0	0.00	3.88MB	208.74MB	2	16	1.88	18
avast.com	0B	263.77KB	0	20	0.00	3.33MB	7.75MB	246	231	42.95	497
googleearth.com_extension	0B	0B	0	0	0.00	2.37MB	625.57KB	4	6	387.37	10
av.com_avd.cz	0B	0B	0	0	0.00	521.97KB	3.91MB	44	53	13.02	97
focdn.net	46.73MB	332.27MB	2207	11107	14.06	0B	0B	0	0	0.00	13314
elcomercio.e3.pe	159.76MB	151.31MB	6870	1556	105.58	0B	0B	0	0	0.00	8426
facebook.com	44.53MB	1.38MB	3123	68	3275.23	0B	0B	0	0	0.00	3191
adobe.com	1.13MB	428.34MB	36	3103	0.26	0B	0B	0	0	0.00	3139
videotron.ca	0B	0B	0	2207	0.00	0B	0B	0	0	0.00	2207
adexpn.org.pe	97.07MB	17.31MB	937	1231	560.84	0B	0B	0	0	0.00	2168
ymq.com	63.9MB	21.93MB	905	1188	290.94	0B	0B	0	0	0.00	2093
s-msn.com	18.58MB	18.44MB	866	880	100.71	0B	0B	0	0	0.00	1726

# GRACIAS.

