### Организация распределённой одноранговой сети с "филиалами" через независимые ISP.

Дмитрий Калинин WiFiMag dk@trtg.ru



#### Презентацию подготовил

Дмитрий Калинин Компания Wifimag.ru Официальный консультант Mikrotik







Сертифицированный тренер Mikrotik





#### Требования к сети

- 1) Единое I2 пространство всех хостов в сети. (mask /16)
- 2) Деление каждых сегментов на диапазоны. (mask /24)
- Независимое использование DHCP-серверов каждым сегментом
- 4) Нецентрализованный выход в интернет каждого «сегмента».



#### Схема построения одноранговой L2-сети



#### Конфигурирование центрального устройства

- 1) Настройка РРТР-сервера для подключений.
- 2) Настройка еоір-соединений.
- 3) Настройка и конфигурирование «бриджа».
- 4) Организация фильтров на «бридже» для изоляции DHCP.



#### Настройка РРТР-сервера для подключений.

/interface pptp-server server set authentication=pap,chap,mschap1,mschap2 default-profile=pptpin-default enabled=yes

/ppp secret
add name=chaplin password=\*\*PASSWORD\*\* profile=requiredencription remote-address=172.19.19.250 service=pptp



#### Настройка РРТР-сервера для подключений.

PPP							
Inter	face PPPoE Servers	Secrets Pro	ofiles Active	Connections	L2TP Sec	crets	
<b>+</b> -			PP Scanner	PPTP Serve	er SST	P Server L	2TP Server
	Name	🛆 Туре		Actual MTU	L2 MTU	Tx	Rx
DR	«-» <pptp-poohliy></pptp-poohliy>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	<-> <pptp-silient></pptp-silient>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-kalinka></pptp-kalinka>	PPTP Serve	PPTP Server Binding			28.2 kbps	0 bps
DR	<-> <pptp-samsonovi></pptp-samsonovi>	PPTP Serve	er Binding	1450		744 bps	0 bps
DR	«-» <pptp-bogachev></pptp-bogachev>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-fedorov></pptp-fedorov>	PPTP Serve	er Binding	1450		688 bps	712 bps
DR	«-» <pptp-fenix></pptp-fenix>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-chaplin></pptp-chaplin>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-ananas></pptp-ananas>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-kotovskiy></pptp-kotovskiy>	PPTP Serve	er Binding	1450		1432 bps	0 bps
DR	«-» <pptp-job></pptp-job>	PPTP Serve	er Binding	1450		402.8 kbps	179.5 kbps
DR	«-» <pptp-admiral></pptp-admiral>	PPTP Serve	er Binding	1450		1432 bps	0 bps



### Настройка еоір-соединений.

/interface eoip add allow-fast-path=no comment=192.168.0.0 !keepalive local-address=\ 172.19.19.1 name=eoip-chaplin remote-address=172.19.19.250 tunnel-id=250



#### Настройка еоір-соединений.

Interface <eoip-cł< th=""><th>naplin&gt;</th><th></th><th></th><th></th></eoip-cł<>	naplin>			
General Status	Traffic			ОК
Name	e: eoip-chaplin			Cancel
Туре	EoIP Tunnel			Apply
MTU	l:		•	Disable
Actual MTU	1408			Comment
L2 MTU	: 65535			Сору
MAC Address				Remove
ARF	enabled		Ŧ	Torch
ARP Timeout	E		•	
Local Address	: 172.19.19.1			
Remote Address	: 172.19.19.250			
Tunnel ID	: 250			
IPsec Secret	::			
Keepalive	: 00:00:10	. 10	<b></b>	
DSCF	: inherit		Ŧ	
Dont Fragment	: no		₹	
	Clamp TCP MSS			
	Allow Fast Path			
enabled		running	slave	

WIFI •)) MAG

#### Настройка и конфигурирование «бриджа».

/interface bridge add mtu=1500 name=local.bridge /interface bridge port add bridge=local.bridge interface=eoip-chaplin add bridge=local.bridge interface=ether1 add bridge=local.bridge interface=ether2 add bridge=local.bridge interface=ether3 add bridge=local.bridge interface=ether4 add bridge=local.bridge interface=ether5 add bridge=local.bridge interface=ether6 add bridge=local.bridge interface=ether7 /interface bridge settings set use-ip-firewall=yes



#### Настройка и конфигурирование «бриджа».

Brid	lge Ports Filters NA	T Hosts					
÷		T					Find
	Interface	A Bridge A	Priority (h	Path Cost	Horizon	Role	Root P
DI	12,4Ghz-hotspot	hotspot.bridge	80	10		disabled port	
DI	1-1-5Ghz-hotspot	hotspot.bridge	80	10		disabled port	
	1-teoip-job	job.bridge	80	10		designated port	
	<b>1</b> teoip-admiral	local.bridge	80	10		designated port	
	<b>⊈t</b> eoip-ananas	local.bridge	80	10		designated port	
	1-1eoip-bogachov	local.bridge	80	10		designated port	
	4⊐teoip-chaplin	local.bridge	80	10		designated port	
	1-1eoip fedorov	local.bridge	80	10		designated port	
	11eoip-fenix	local.bridge	80	10		designated port	
	11 eoip-hrust	local.bridge	80	10		disabled port	
	<b>⊈</b> teoip-kalinka	local.bridge	80	10		designated port	
	1 eoip-kotovskiy	local.bridge	80	10		designated port	
	11eoip-poohliy	local.bridge	80	10		designated port	
	tteoip-ppclolgg	local.bridge	80	10		disabled port	
	1-1eoip-samsonovi	local.bridge	80	10		root port	
	1-1 eoip-sandyma	local.bridge	80	10		disabled port	
	1-1eoip-silient	local.bridge	80	10		designated port	
	1-1ether1	local.bridge	80	10		designated port	
	1-tether2	local.bridge	80	10		designated port	
	11 ether3	local.bridge	80	10		disabled port	
	1-1≥ether4	local.bridge	80	10		disabled port	
	11 ether5	local.bridge	80	10		disabled port	
	11 ether6	local.bridge	80	10		disabled port	
	ttether7	local.bridge	80	10		disabled port	
	1 <sup>±1</sup> vlan-voip-job	voip.bridge	80	10		designated port	
	11vlan-voip-kalinka	voip bridge	80	10		designated port	

WIFI •)) MAG

#### Организация фильтров на «бридже» для изоляции DHCP.

#### /interface bridge filter

add action=accept chain=input comment="dhcp allow rule" dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=\

ether1 ip-protocol=udp mac-protocol=ip

add action=accept chain=input dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether3 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether4 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether4 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether5 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether6 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether6 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether6 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether7 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether7 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether7 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=ether7 ip-protocol=udp mac-protocol=ip add action=accept chain=input dst-address=255.255.255/32 dst-port=67-68 in-bridge=local.bridge in-interface=eoip-admiral ip-protocol=udp \ mac-protocol=ip

add action=drop chain=input comment="dhcp blocking rule" dst-address=255.255.255.255/32 dst-port=67-68 in-bridge=local.bridge ip-protocol=udp \

log-prefix="rogue dhcp request" mac-protocol=ip

add action=drop chain=forward dst-port=67-68 in-bridge=local.bridge ip-protocol=udp mac-protocol=ip



#### Организация фильтров на «бридже» для изоляции DHCP.

Bridg	e					
Brid	ge Ports	Filters NAT	Hosts			
÷	- 0	× E	00 Reset Counte	ers 00 Re	eset All Counters	Find all <b>Ŧ</b>
#	Action	Chain	Interfaces/In. Interface	Interfaces	Bridges/In. Bridge	Src. MAC Address Dst 🔻
	dhcp allow	rule				
0	✓acc	input	ether1		local.bridge	
1	✓acc	input	ether2		local.bridge	
2	✓acc	input	ether3		local.bridge	
3	✓acc	input	ether4		local.bridge	
4	✓acc	input	ether5		local.bridge	
5	✓acc	input	ether6		local.bridge	
6	Vacc	input	ether7		local.bridge	
7	✓acc	input	eoip-admiral		local.bridge	
::	dhcp block	ting rule			_	
8	🗙 drop	input			local.bridge	
9	💢 drop	forward			local.bridge	



#### Конфигурирование клиентских устройств

- 1) Настройка клиентского РРТР-подключения.
- 2) Настройка проверки соединения РРТР и «простукивания» для подключения
- 3) Настройка и конфигурирование EoIP-тунеля.
- 4) Настройка проверки EoIP для переподключения в случае «разрыва».
- 5) Настройка «бриджа» на стороне клиента
- 6) Настройка фильтров «бриджа» для блокирования ICMP-трафика.



#### Настройка клиентского РРТР-подключения.

/interface pptp-client add connect-to=domination.pro disabled=no mrru=1600 name=diman-pptp user=chaplin password=\*\*PASSWORD\*\*



#### Настройка клиентского РРТР-подключения.

Interface <diman-ppt< th=""><th>tp&gt;</th><th></th><th></th><th></th></diman-ppt<>	tp>			
General Dial Out	Status Traffic			OK
Connec	t To: domination.pr	ro		Cancel
	User: chaplin			Apply
Pass	word:			Disable
P	rofile: default-encry	ption	₹	Comment
Keepalive Tim	eout: 60		<b>▲</b>	Сору
	Dial On De	emand		Remove
	Add Defau	ult Route		Torch
Default Route Dista	ance: 0			
	Allow: 🗹 mschap2 🔽 chap	▼ mschap1 ▼ pap		
enabled	running	slave	Status: cor	nnected



#### Настройка проверки соединения РРТР

:if ([:len [/interface find name=diman-pptp running=no disabled=no ]] > 0) do={
/ping address=217.197.241.18 count=1 size=\*\*\*
/ping address=217.197.241.18 count=1 size=\*\*\*
/ping address=217.197.241.18 count=1 size=\*\*\*



#### Настройка проверки соединения РРТР

	ptp_checks		
Name:	pptp_check		OK
Start Date:	Sep/28/2016		Cancel
Start Time:	startup	₹	Apply
Interval:	00:00:30		Diaphla
0	Deech		Constant
Owner.			Commen
Policy:	✓ ftp ✓ reboot		Сору
	✓ read ✓ write		Remove
	policy     v test		
	sensitive romon		
	dude		
Run Count:	12659		
Next Run:	Sep /28 /2016 14:20:34		
NEAL HUIT.	360/2012/10 14:30:34		
		On Event:	
if ([:len [/in			
/ping addre /ping addre /ping addre }	efface find name-diman.pdp urining-no disabled=no jj > 0) do={ ss=217.157.241.18 count=1 size= ss=217.157.241.18 count=1 size= ss=217.197.241.18 count=1 size=	^	



#### Настройка и конфигурирование EoIP-тунеля.

/interface eoip add allow-fast-path=no !keepalive local-address=172.19.19.250 name=diman-eiop \ remote-address=172.19.19.1 tunnel-id=250



#### Настройка и конфигурирование EoIP-тунеля.

Interface <diman-ei< th=""><th>iop&gt;</th><th></th><th></th><th></th></diman-ei<>	iop>			
General Status	Traffic			ОК
Name:	diman-eiop			Cancel
Type:	EoIP Tunn	el		Apply
MTU:			•	Disable
Actual MTU:	1408			Comment
L2 MTU:	65535			Сору
MAC Address:				Remove
ARP:	enabled		₹	Torch
ARP Timeout:			•	Toron
Local Address:	172.19.19.	250	<b></b>	
Remote Address:	172.19.19.	1		
Tunnel ID:	250			
IPsec Secret:				
Keepalive:	00:00:10	. 10	<b>▲</b>	
DSCP:	inherit		₹	
Dont Fragment:	no		₹	
	Clamp T	CP MSS		
	Allow Fa	st Path		
enabled		running	slave	

WIFI •)) MAG

Настройка проверки EoIP для переподключения в случае «разрыва».

:local PingCount 3;

:local CheckIp1 192.168.1.1; :local CheckIp2 172.19.19.1;

:local check1 [/ping \$CheckIp1 count=\$PingCount]; :local check2 [/ping \$CheckIp2 count=\$PingCount];

:if ((\$check1=0) && (\$check2=3) && ([:len [/interface find name=diman-eiop disabled=no ]] > 0)) do={
:log warning "No ping through tunnel, trying to restart eoip-interface!";
/interface set diman-eiop disabled=yes
:delay 30s
/interface set diman-eiop disabled=no



Настройка проверки EoIP для переподключения в случае «разрыва».

Schedule <eo< th=""><th>pip-check&gt;</th><th></th><th></th></eo<>	pip-check>		
Name:	eoip-check		ОК
Start Date:	Sep/28/2016		Cancel
Start Time:	startup	₹	Apply
Interval:	00:02:00		Disable
0	Darah		Constant
Owner.	Deneb	_	Comment
Policy:	✓ ftp ✓ reboot		Сору
	V read V write		Remove
Run Count:	3171		
Next Bun:	Sen/28/2016 14:44:34	5	
		_	
	On Ev	ent:	
local PingC	ount 3;	$\sim$	
local Check	clp1 192.168.1.1;		
local Check	clp2 172.19.19.1;		
local check	:1 [/ping \$Checklp1 count=\$PingCount];		
local check	:2 [/ping \$Checklp2 count=\$PingCount];		
if ((\$check1	1=0) && ( $\c = 0$ ) && ([1en [/interface find name=diman-eiop disabled=no ]] > 0))		
log warning	"No ping through tunnel, trying to restart eoip-interface!";		
/interface se idelay 30s	et diman-eiop disabled=yes		
/interface se	et diman-eiop disabled=no		
1		$\sim$	
enabled			

WIFI •)) MAG

#### Настройка «бриджа» на стороне клиента

/interface bridge add mtu=1500 name=local.bridge /interface bridge port add bridge=local.bridge interface=wlan1 add bridge=local.bridge interface=ether2 add bridge=local.bridge interface=diman-eiop



### Настройка «бриджа» на стороне клиента

Brid	ge						
Brid	dge Ports Filters	NAT Hosts					
÷		T					Find
	Interface /	Bridge	Priority (h	Path Cost	Horizon	Role	Root Pat
	<b>1</b> ⊐tdiman-eiop	local.bridge	80	10		root port	20
	1=tether2	local.bridge	80	10		designated port	
	tstwlan1	local.bridge	80	10		disabled port	
3 ite	ems						

![](_page_23_Picture_2.jpeg)

#### Настройка фильтров «бриджа» для блокирования ICMPтрафика.

/interface bridge filter
add action=drop chain=output mac-protocol=ip out-bridge=local.bridge \
 out-interface=diman-eiop packet-type=multicast

![](_page_24_Picture_2.jpeg)

#### Настройка фильтров «бриджа» для блокирования ICMPтрафика.

Bridge Filt	er Rule <>						
General	Advanced	ARP	STP	Action			ОК
	Chain:	output				₹	Cancel
- 📥 Inte	infaces					-	Apply
Out	. Interface:	dima	n-eiop		Ŧ		Disable
						_	Comment
In. Int	erface List:					•	Сору
Out. Int	erface List:					•	Remove
- bhd	In. Bridge:					-	Reset Counters
c	Out. Bridge:	loca	l.bridge		₹		Reset All Counters
In.	Bridge List:					•	
Out. Int	erface List:					•	
Src	. MAC Addres	55					
-▼- Dst	. MAC Addres	55					
MAC Pro	tocol-Num:	800	(in)		Ŧ	hev	
-A- ID -			(4)				
Sn	c. Address:					•	
	Src. Port: [					-	
Ds	st. Address:					]•	
	Dst. Port: [					]•	
	Protocol:					•	
Pac	ket Mark —						
	D		_				

General	Advanced					
		ARP	STP A	ction	ι.,	ОК
- VL	AN					Cancel
VLA	N ID:					Apply
VLAN P	iority:				_▼	Disable
	ncap:			•	hex	Comment
802.3	SAP:			-	hex	Сору
802.3	Type:			•	hex	Remove
- <b>A</b> - Pao	ket Type					Reset Counters
Packet	Type: 🗌 n	nulticast			₹	Reset All Counters
- <b>-</b> - Lim	it					
	•					

WIFI •)) MAG

### Результат I2 скана WinBox'ом

9		WinBox v3.5 (A	ddresses)			×
File Tools						
Connect To:				<b>v</b>	Keep Password	
Lesier [					Secure Mode	
Login:				· · · · · · · · · · · · · · · · · · ·	Autosave Session	
Password:				v	Open In New Win	dow
Session:	(own)		-	Browse		
	(UNIT)		· · ·			
Note:						
Group:				Ŧ		
RoMON Agent:				Ŧ		
-						
	Add/Set		Connect To RoMON	Connect		
Managed Neighb	iors					
Managed Neighb	ors			Find	IPv4 only	Ŧ
Managed Neighb	IP Address	/ Identity	Version	Find	IPv4 only	₹
Managed Neighb T Refresh MAC Address	/ IP Address 192 168 0 1	/ Identity Chaolin	Version 6.37 (stable)	Find Board BB951Ui-2Hr	IPv4 only	•
Managed Neighb	/ IP Address 192.168.0.1 192.158.1.1	/ Identity Chaplin Domination-Core	Version 6.37 (stable) 6.37 (stable)	Eind Board RB951Ui-2Hn CCR1009-8G	IPv4 only ID 15-15+	•
Managed Neighb	/ IP Address 192.168.0.1 192.168.1.1 192.168.1.2	/ Identity Chapin Domination-Core Domination-AP	Version 6.37 (stable) 6.37 (stable)	Eind Board RB951Ui-2Hn CCR1009-8G RB962UiGS-5	IPv4 only ID -1S-1S+ HacT2HnT	
Managed Neighb P Refresh MAC Address	/ IP Address 192.168.0.1 192.168.1.1 192.168.1.2 192.188.1.2	/ Identity Chaplin Domination-Core Domination-AP Adminel-SXT	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Find Board RB951Ui-2Hn CCR1009-8G RB962UIGS-5 RB SXT 5Hol	IPv4 only D 15-15+ 5HacT2Hn T D	] ₹
Managed Neighb	IP Address 192,168,0.1 192,168,1.2 192,168,1.2 192,168,1.3 192,168,1.4	/ Identity ChapIn Domination-Core Domination-AP Admiral-SAT Admiral-SAT	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Find Board RB951Ui-2Hn CCR1009-8G RB962UiGS-8 RB SXT 5Hn RB951Ui-2Hn RB951Ui-2Hn	IPv4 only ID 1S-1S+ SHacT2HnT D	] Ŧ
Managed Neighb T Refresh MAC Address	<ul> <li>IP Address</li> <li>192.168.0.1</li> <li>192.168.1.1</li> <li>192.168.1.2</li> <li>192.168.1.3</li> <li>192.168.1.4</li> <li>192.168.2</li> </ul>	/ Identity Chaplin Domination-Core Domination-AP Admiral-SXT Admiral-SNt K IFenicl	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Eind Board RB951Ui-2Hn CCR1009-8G RB952UiGS-5 RB SXT 5Hn RB951Ui-2Hn RB951Ui-2Hn	D 15-15+ Hac T2Hn T D D	
Managed Neighb T Refresh MAC Address	<ul> <li>IP Address</li> <li>192.168.0.1</li> <li>192.168.1.1</li> <li>192.168.1.3</li> <li>192.168.1.4</li> <li>192.168.1.4</li> <li>192.168.4.1</li> </ul>	/ Identity Chaplin Domination-Core Domination-AP Admiral-SXT Admiral-SXT Admiral-ShtOK Ifenicl Poohliv	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Find Board R8951U-2Hn CCR1009-9G R8952UG-5 R8 SXT 5Hn R8951U-2Hn R8951U-2Hn R8751U-2Hn	IPv4 only ID 15-15+ 5HacT2HnT ID ID D	
Managed Neighb T Refresh MAC Address	IP Address           192.168.0.1           192.168.1.1           192.168.1.2           192.168.1.4           192.168.2.1           192.168.4.4           192.168.4.1           192.168.5.1	/ Identity Chaplin Domination-Core Domination-AP Admiral-SXT Admiral-SXT Admiral-SXT Admiral-SXTOK IfFent! Poohly Ananas	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Eind Board RB951U.2Hn CCR1009-9G RB962UG5-5 RB SXT 5Hal RB951U.2Hn RB951U.2Hn RB951U.2Hn RB951U.2Hn RB951U.2Hn	[IPv4 only iD 15-15+ iHacT2HnT D D D D D	
Managed Neighb	V IP Address 192,168,0,1 192,168,1,2 192,168,1,2 192,168,1,3 192,168,1,3 192,168,1,4 192,168,2,1 192,168,4,1 192,168,4,1 192,168,6,1	/ Identity Chaplin Domination-Core Domination-AP Admiral-SXT Admiral-SXT Admiral-SNtOK IFenicl Poohly Ananas fedorov	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Find Board R8951U-2Hn CCR1009-8G R8952UG5-2 R8 SXT 5Hnl R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn	D IS-IS+ HacT2HnT D D D D D D D D	
Managed Neighb T Refresh MAC Address	<ul> <li>IP Address</li> <li>192.168.0.1</li> <li>192.168.1.1</li> <li>192.168.1.3</li> <li>192.168.1.4</li> <li>192.168.1.4</li> <li>192.168.4.1</li> <li>192.168.5.1</li> <li>192.168.5.1</li> <li>192.168.5.1</li> <li>192.168.6.1</li> <li>192.168.6.1</li> </ul>	/ Identity Chaplin Domination-Core Domination-AP Admiral-SXT Admiral-SXT Admiral-SAT Admiral-SATOK If Fenixl Poohily Ananas fedorov Isamsonovil	Version 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable) 6.37 (stable)	Find Board R8951U-2Hn CCR1009.9G R8962UG5-2 R8 SXT 5Hnl R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn	D 15-15+ 5HacT2HnT D D D D D D D 7	
Managed Neighb T Refresh MAC Address	ors / IP Address 192.168.0.1 192.168.1.1 192.168.1.2 192.168.1.3 192.168.2.1 192.168.4.1 192.168.4.1 192.168.5.1 192.168.6.1 192.168.7.1 192.168.7.2 192.168.7		Version 6.37 (stable) 6.37 (stable)	Eind Board RB951U-2Hn CCR1009-8G RB952UG5-1 RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn	IPv4 only D -1S-1S+ HacT2HnT D D D D D D D D D D D D D D D	
Managed Neighb	<ul> <li>IP Address</li> <li>192.168.0.1</li> <li>192.168.1.1</li> <li>192.168.1.2</li> <li>192.168.1.3</li> <li>192.168.1.4</li> <li>192.168.4.1</li> <li>192.168.5.1</li> <li>192.168.6.1</li> <li>192.168.7.1</li> <li>192.168.7.1</li> <li>192.168.7.1</li> <li>192.168.7.1</li> <li>192.168.7.1</li> <li>192.168.7.1</li> </ul>	Identity     Chaplin     Domination-Core     Domination-AP     Admiral-SXT     Admiral-SXT     Admiral-SNtOK     IFenict     Poohly     Ananas     Fedorov     ISamsonovi-API     ISamsonovi-API     IKalinka1	Version 6.37 (stable) 6.37 (stable	Find Board R8951U-2Hn CCR1008-8G R8951U-2Hn R8551	(IPv4 only ID 1S-1S+ HacT2HnT D D D D D T D D T D D D T D D	
Managed Neighb T Refresh MAC Address	IP Address           192.168.0.1           192.168.1.1           192.168.1.1           192.168.1.3           192.168.1.4           192.168.1.4           192.168.1.1           192.168.1.1           192.168.1.1           192.168.1.1           192.168.1.3           192.168.1.4           192.168.1.1           192.168.1.1           192.168.1.1           192.168.1.1           192.168.7.1           192.168.7.2           192.168.8.1           192.168.8.1           192.168.8.1	Identity     Chaplin     Domination-Core     Domination-AP     Admiral-SXT     Admiral-SXT     Admiral-ShtOK     If-Finikl     Poohily     Ananas     fedorov     Isamsonovil     Isamsonovil     Isamsonovi-AP!     IKainkal     IBooachevDI	Version 6.37 (stable) 6.37 (stable	Find Board R8951U-2Hn CCR1009-9G R8962UGS-2 R8 SXT 5Hnl R8951U-2Hn R8951U-2Hn R8951U-2Hn R8951G-2Hn R8951G-2Hn R8951G-2Hn R8951G-2Hn R8951U-2Hn R8951U-2Hn R8951U-2Hn	IPv4 only iD 15-15+ 5HacT2HnT D D D D D D D D D D D D D	
Managed Neighb	Virgent State S	/         Identity           Chaplin         Domination-Core           Domination-AP         Admiral-SXT           Admiral-SXT         Admiral-ShtOK           IFernicl         Poohly           Ananas         fedorov           ISamsonovil         ISamsonovil-API           ISamsonovi-API         IKalinkal           IBogachevDI         ellent	Version 6.37 (stable) 6.37 (stable	Eind Board RB951U-2Hn CCR1009-8G RB952UG5-1 RB SXT 5Hn1 RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB951U-2Hn RB941-2nD	IPv4 only ID -15-15+ HiscT2HnT D D D D D D D D D D D D D	

WIFI •)) MAG

15 item

#### ARP таблица с адресами из «удалённых» сегментов

ARP List		
÷	- 🖉 💥 📇 🍸	Find
	IP Address 🛛 🛆 MAC Address	Interface
D	8	job.bridge
D	8	job.bridge
D	0	job.bridge
D	<b>a</b>	job.bridge
D	8	job.bridge
D	0	hotspot.bridge
D	8	hotspot.bridge
D	192.168.0.1	local.bridge
D	192.168.0.101	local.bridge
D	192.168.1.2	local.bridge
D	192.168.1.3	local.bridge
D	192.168.1.4	local.bridge
D	192.168.1.10	local.bridge
D	192.168.1.14	local.bridge
D	192.168.1.74	local.bridge
D	192.168.1.236	local.bridge
D	□ 192.168.2.1	local.bridge
D	192.168.2.2	local.bridge
D	192.168.4.1	local.bridge
D	192.168.5.1	local.bridge
D	192.168.6.1	local.bridge
D	192.168.7.1	local.bridge
D	192.168.8.1	local.bridge
D	192.168.8.104	local.bridge
D	□ 192.168.9.1	local.bridge
D	192.168.10.1	local.bridge
D	192.168.11.1	local.bridge
D	192.168.88.253	local.bridge
	192.168.0.0/16 network broadcast address	_
	192.168.254.254 FF:FF:FF:FF:FF:FF	local.bridge

![](_page_27_Picture_2.jpeg)

## Ваши вопросы?

Web: http://wifimag.ru/teaching/ Email: dk@trtg.ru Tel: +7(495)226-37-87 Tel: 8(800)250-37-87

Компания WiFimag проводит набор в группы для проведения тренингов по курсам: MTCMA, MTCWE, MTCTCE, MTCRE Более точная информация на нашем сайте - http://wifimag.ru/teaching/

![](_page_28_Picture_3.jpeg)

# Спасибо за внимание!

![](_page_29_Picture_1.jpeg)