



Seamless Wireless Roaming with tunnel

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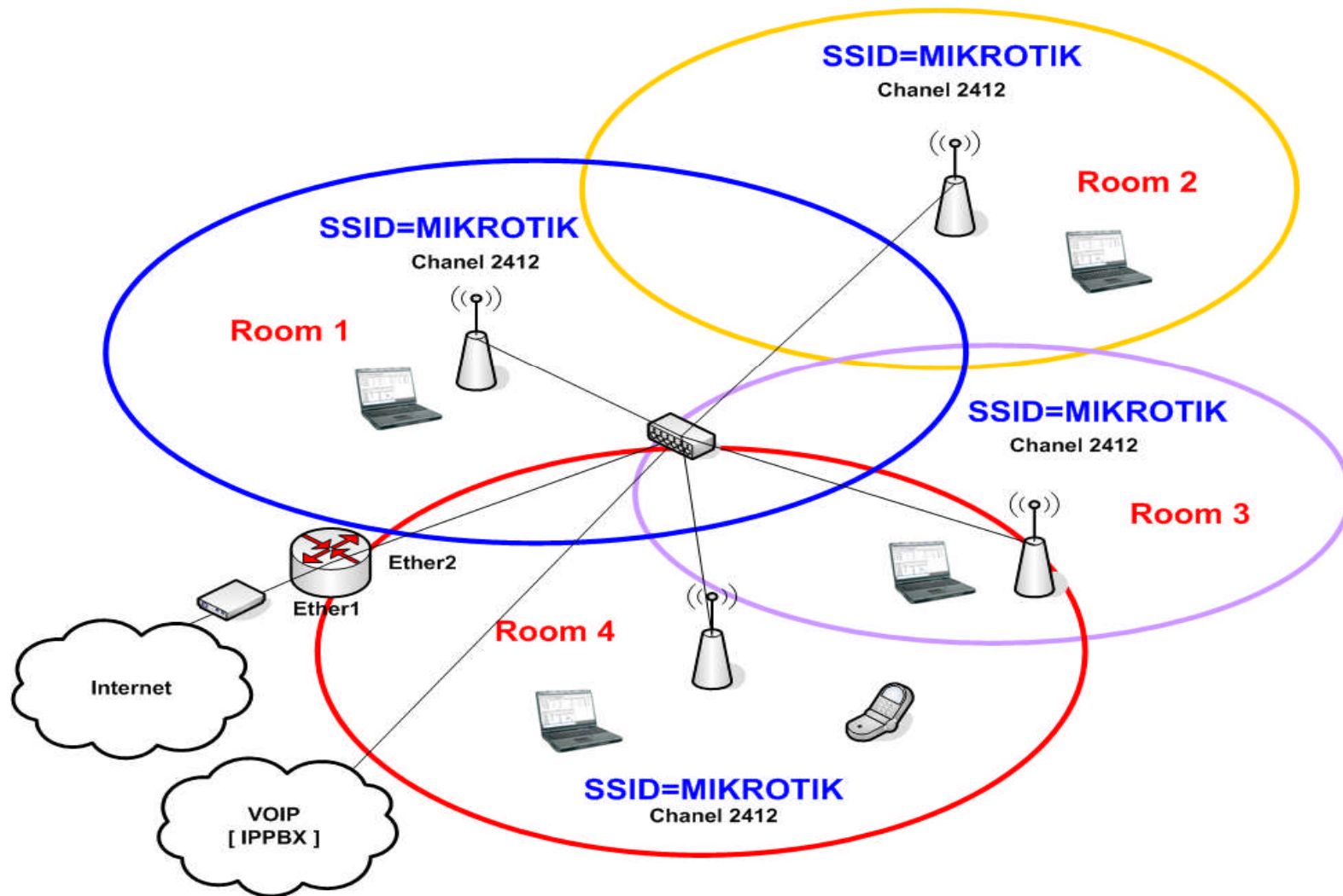
Introduction

- My name Nico Malun
- Graduate from Physics Science
- Working in WISP since 2004
- Mikrotik Certified in Routing
- Mikrotik Certified Trainer TR0044

Plan

- How will we build indoor wireless roaming is integrated with another devices ?.
- Implementation network consist are wireless and cable network.
- Frecuency wireless is used 2,4 Ghz standard.
- Wireless Network used to Hotspot & VOIP.
- Dynamic data communication between AP's

Wireless Network Topology

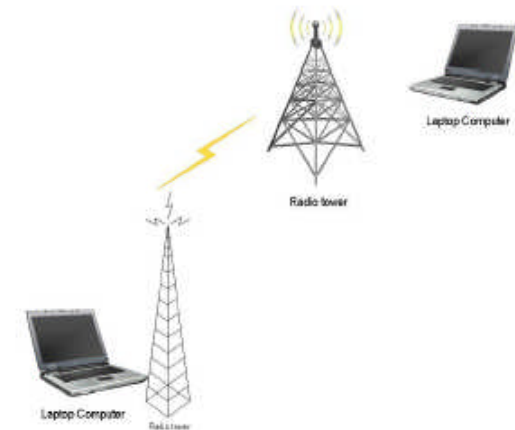


Solution ?

- Transparently wireless bridge with eoip tunnel
- Use Virtual AP
 - Hotspot SSID
 - Another SSID for connectivity another device etc.wifiphone (voip)
- Using IP Dynamic & static
- Segmentation IP
- Roaming System

Basic Concept Wireless

- Connection of 2 or more network devices wirelessly i.e. without cables.
- End points could be connected by a routing or bridging device



EOIP (Ethernet Over IP) tunnel

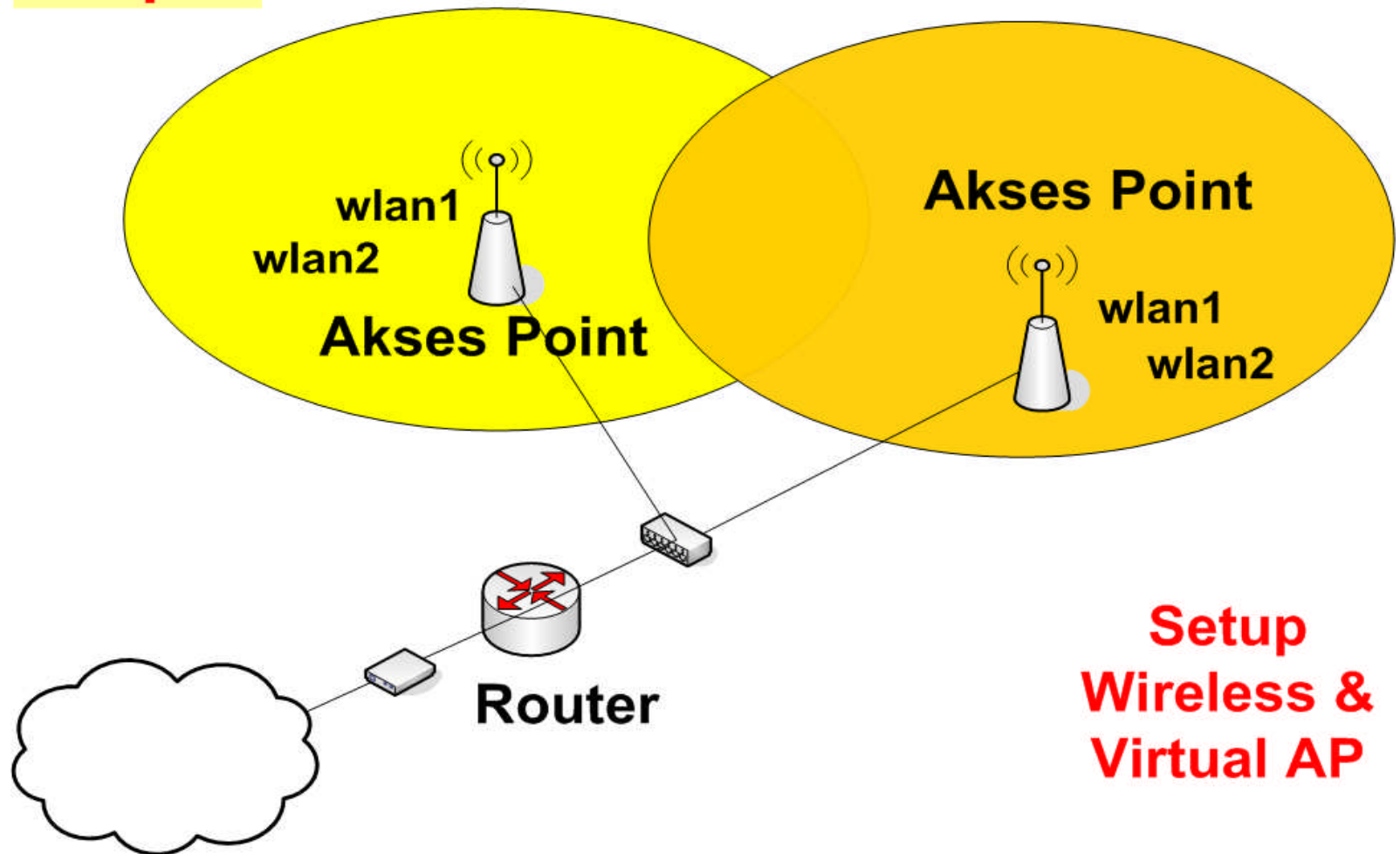
- MikroTik proprietary protocol
- Simple in configuration
- Don't have authentication or data encryption Capabilities
- Encapsulates Ethernet frames into IP protocol 47/gre packets, thus EOIP is capable to carry MAC-addresses
- EOIP is a tunnel with bridge capabilities

EoIP and Bridging

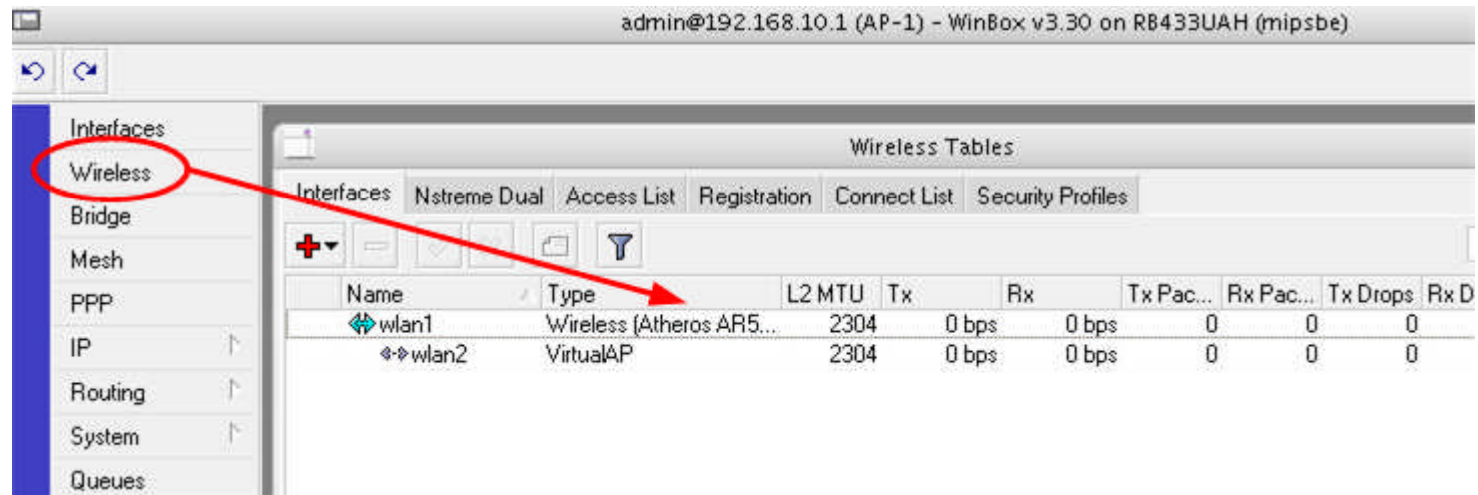
- EoIP Interface can be bridged with any other EoIP or Ethernet-like interface.
- Main use of EoIP tunnels is to transparently bridge remote networks.
- EoIP protocol does not provide data encryption, therefore it should be run over encrypted tunnel interface, e.g., PPTP or PPPoE, if high security is required.

How Do you Wireless Config ?

Step 1



Winbox Configuration All AP !



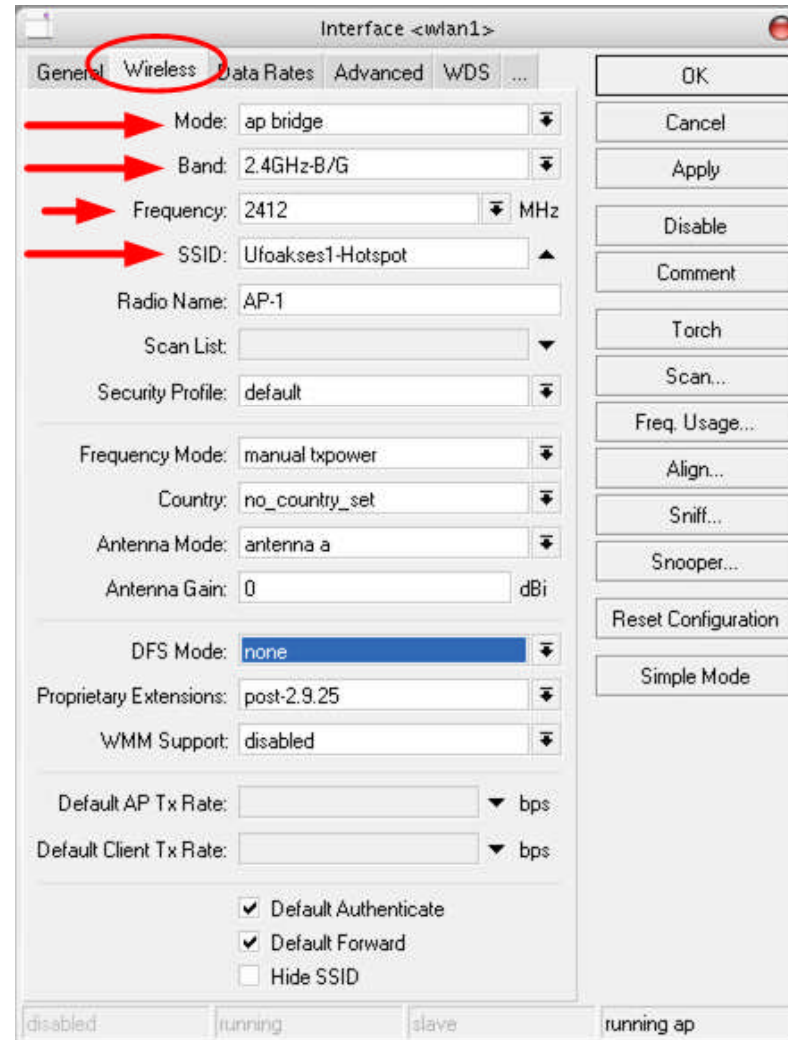
admin@192.168.10.1 (AP-1) - WinBox v3.30 on RB433UAH (mipsbe)

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security Profiles

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx D
wlan1	Wireless (Atheros AR5...	2304	0 bps	0 bps	0	0	0	0
wlan2	VirtualAP	2304	0 bps	0 bps	0	0	0	0

Create All Access Point !



Create VAP !

The image shows two windows from the Mikrotik WinBox interface. The left window, titled "Wireless Tables", has a menu open under the "Interfaces" tab. The "VirtualAP" option is selected and circled in red. A red arrow points to this menu. Below the menu is a table with the following data:

Type	L2 MTU	Tx	Rx
Wireless (Atheros AR5...	2304		0 bps

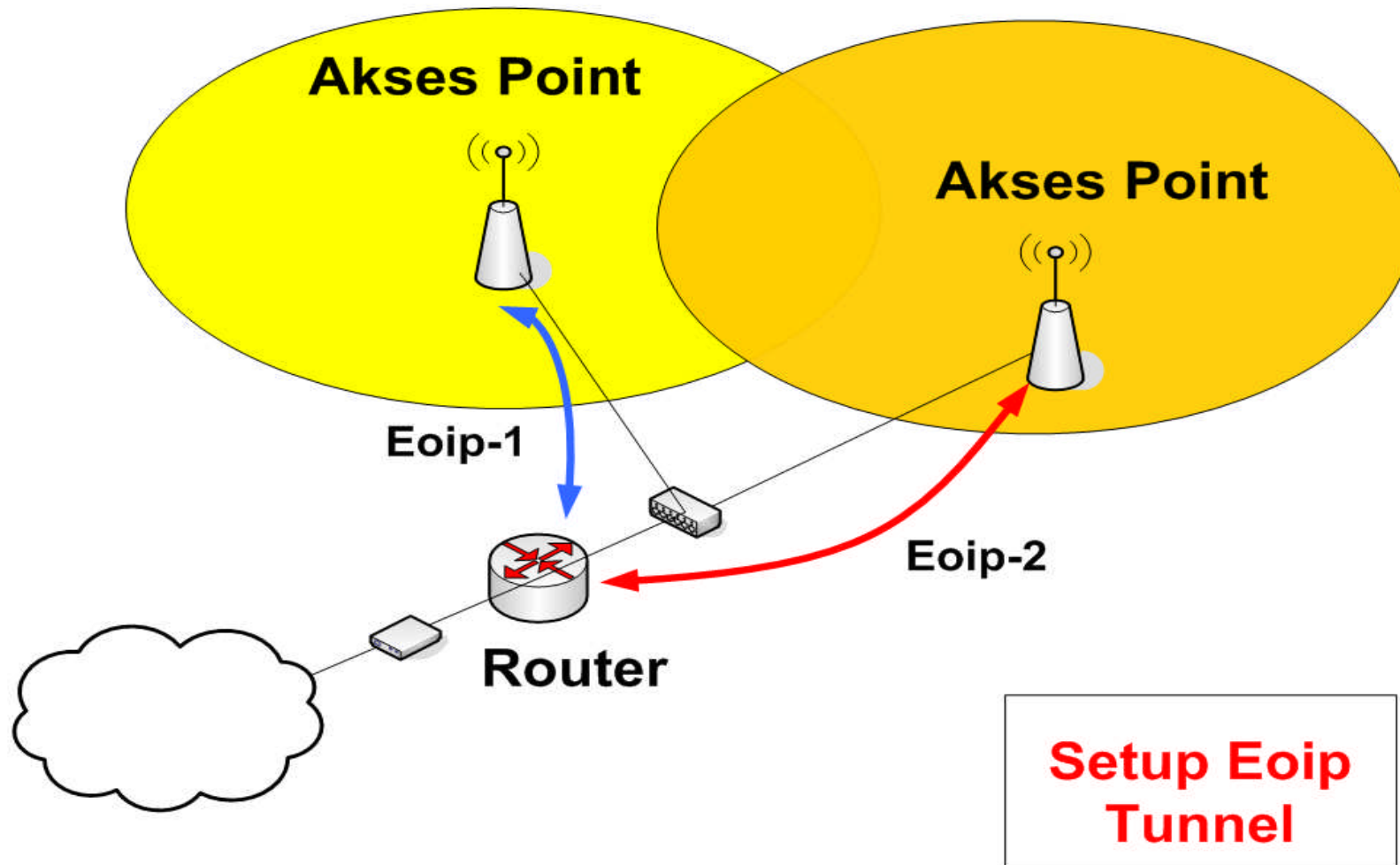
The right window, titled "Interface <wlan2>", has the "Wireless" tab selected and circled in red. A red arrow points to the "Wireless" tab. The "SSID" field is set to "Ufoakses-VOIF" and is also circled in red. Another red arrow points to the "Master Interface" dropdown menu, which is set to "wlan1". A large red curved arrow points from the "VirtualAP" menu in the left window to the "Wireless" tab in the right window.

Other fields in the "Wireless" tab include:

- Area: (empty)
- Security Profile: default
- Max Station Count: 2007
- Proprietary Extensions: post-2.9.25
- WMM Support: disabled
- Default AP Tx Rate: (empty) bps
- Default Client Tx Rate: (empty) bps
- Default Authenticate:
- Default Forward:
- Hide SSID:

Buttons on the right include OK, Cancel, Apply, Disable, Comment, Copy, Remove, Torch, and Simple Mode. At the bottom, there are status indicators for "disabled", "running", and "slave".

Create Tunnel ?

Step 2

EoIP Setting [1]

- At Gateway Router:
 - Make EoIP tunnel to AP-1
 - Remote Address 10.10.10.2/29 Tunnel ID=1
- At Router AP-1:
 - Make EoIP Tunnel to Gateway Router
 - Remote Address 10.10.10.1/29 Tunnel ID=1

EoIP Setting [2]

- At Gateway Router:
 - Make EoIP tunnel to AP-2
 - Remote Address 10.10.10.3/29 Tunnel ID=2
- At Router AP-2:
 - Make EoIP Tunnel to Gateway Router
 - Remote Address 10.10.10.1/29 Tunnel ID=2

Winbox Configuration AP-1

admin@192.168.10.1 (AP-1) - WinBox v3.30 on R8433UAH (mipsbe)

Interfaces

Interface Ethernet EoIP Tunnel IP Tunnel VLAN VRRP Bond

Interface	Name	Type	MTU	L2 MTU
R	eoip-tunnel1-T...	EoIP Tunnel	1500	65535

Address List

Address	Network	Broadcast	Interface
10.10.10.2/29	10.10.10.0	10.10.10.7	ether1
192.168.10.1/24	192.168.10.0	192.168.10.255	ether3

Route List

Routes	Rules				
Destination	Gateway	Gateway ...	Interface	Distance	R
AS 0.0.0.0/0	10.10.10.1		bridge2-VOIP	1	
DAC 10.10.10.0/29			bridge2-VOIP	0	
DAC 192.168.10.0/...			ether3	0	

Interface < eoip-tunnel1-To-Router >

General Traffic

Name: eoip-tunnel1-To-Router

Type: EoIP Tunnel

MTU: 1500

L2 MTU: 65535

MAC Address: 02:F5:A0:3F:42:DC

ARP: enabled

Remote Address: 10.10.10.1

Tunnel ID: 1

disabled running slave

Winbox Configuration AP-2

The screenshot shows the Winbox configuration window for an interface named "eoip-tunnel1-To-Router". The window has two tabs: "General" and "Traffic". The "General" tab is active, showing the following configuration:

- Name: eoip-tunnel1-To-Router
- Type: EoIP Tunnel
- MTU: 1500
- L2 MTU: 65535
- MAC Address: 02:F5:A0:3F:42:DC
- ARP: enabled
- Remote Address: 10.10.10.1
- Tunnel ID: 2

At the bottom of the window, there are three status indicators: "disabled", "running", and "slave". The "running" indicator is highlighted, indicating the interface is active.

On the right side of the window, there are several control buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove, and Torch.

Winbox Configuration Router-Gateway

We Must Create 2 Eoip Tunnel !

The screenshot displays the Winbox configuration interface for a Router-Gateway. The main window is titled "Interface List" and shows a table of configured interfaces. Below the table, two configuration windows are open for "eoiP-tunnel1-AP1" and "eoiP-tunnel2-AP2".

Name	Type	MTU	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors
R eoiP-tunnel1-AP1	EoIP Tunnel	1500	65535	642 bps	0 bps	1	0	0	0	0
R eoiP-tunnel2-AP2	EoIP Tunnel	1500	65535	0 bps	0 bps	0	0	0	0	0

Interface < eoiP-tunnel1-AP1 >

General

Name: eoiP-tunnel1-AP1
Type: EoIP Tunnel
MTU: 1500
L2 MTU: 65535
MAC Address: 02:88:DD:98:35:85
ARP: enabled

2 Remote Address: 10.10.10.2
Tunnel ID: 1

disabled running slave

Interface < eoiP-tunnel2-AP2 >

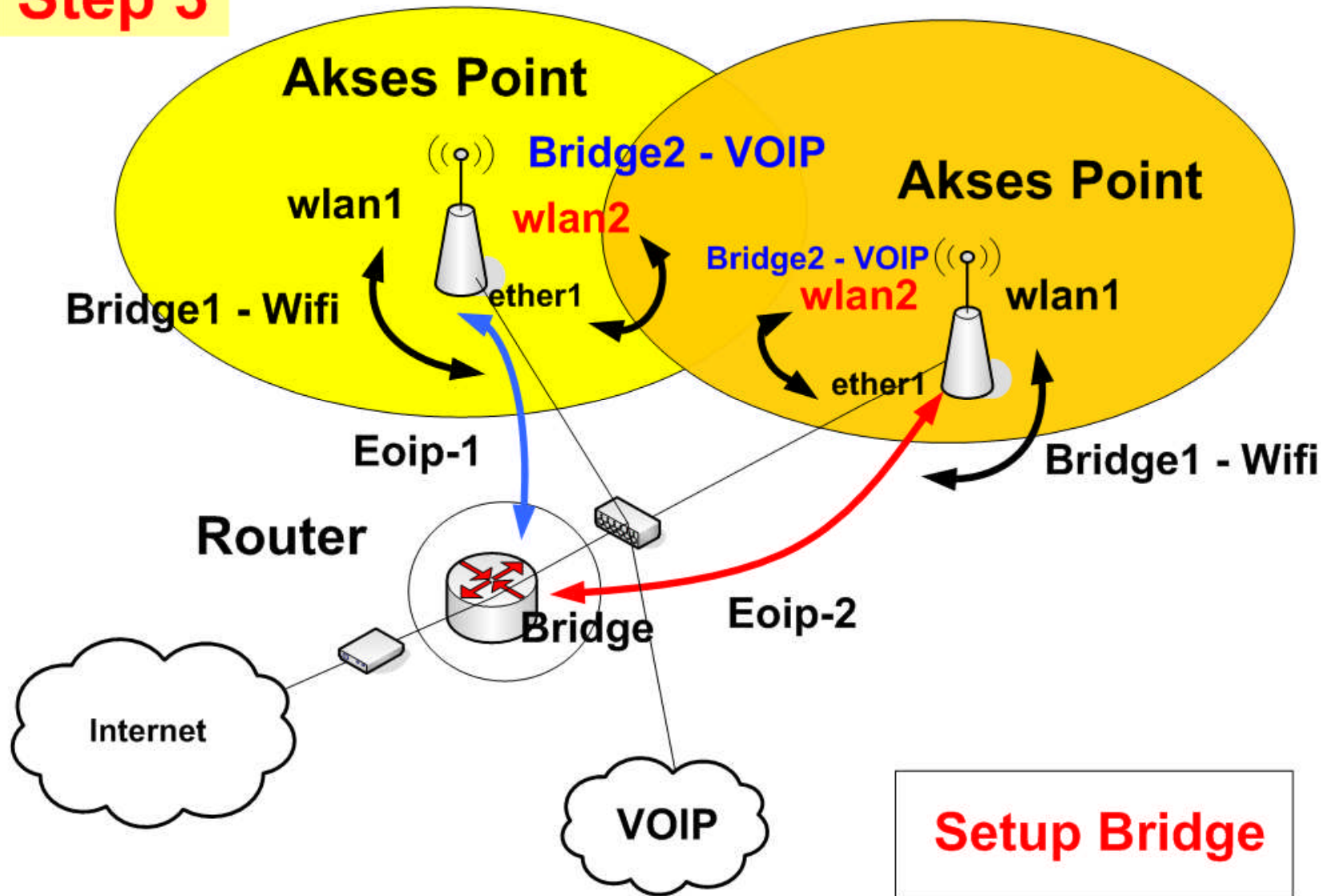
General

Name: eoiP-tunnel2-AP2
Type: EoIP Tunnel
MTU: 1500
L2 MTU: 65535
MAC Address: 02:F8:64:85:5E:62
ARP: enabled

Remote Address: 10.10.10.3
Tunnel ID: 2

disabled running slave

OK
Cancel
Apply
Disable
Comment
Copy
Remove
Torch

Step 3

Plan Bridge

- RSTP have to activated
- At Router-Gateway we can create 1 bridge
 - Port assign just eoip-tunnel
- At AP we create 2 bridge
 - Bridge1 : port assign wlan + eoip for Internet
 - Bridge2 : port assign VAP + ether1 for VOIP (Wifiphone / ip-camera)

Winbox Configuration [Router]

The screenshot shows the WinBox configuration interface for a Router. The left sidebar contains a menu with the following items: Interfaces, Wireless, Bridge, Mesh, PPP, IP, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, Make Supout.rif, Manual, and Exit. The 'Bridge' item is highlighted with a red circle and a red arrow pointing to it.

The main window displays the configuration for the 'Internet' interface. The 'Name' field is set to 'Internet' and is circled in red. The 'Type' is set to 'Bridge'. The 'MTU' is set to 1500, and the 'L2 MTU' is set to 65535. The 'MAC Address' is set to 02:88:DD:98:35:85. The 'ARP' is set to 'enabled'. The 'Admin. MAC Address' field is empty.

Name	Type	L2 MTU	Tx	Rx
R Internet	Bridge	65535	27.7 kbps	1941

Interface <Internet>

General STP Status Traffic

Name: Internet

Type: Bridge

MTU: 1500

L2 MTU: 65535

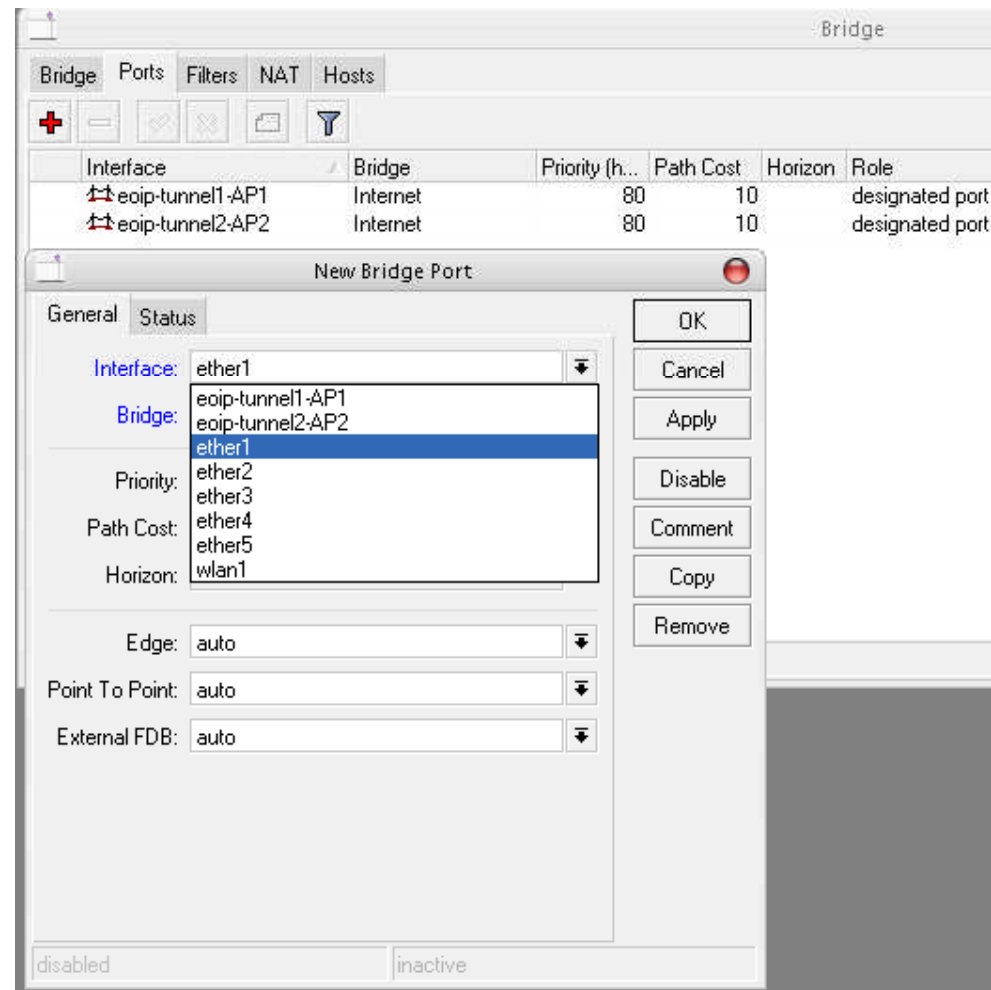
MAC Address: 02:88:DD:98:35:85

ARP: enabled















Admin. MAC Address:

OK Cancel Apply Disable Comment Copy Remove Torch

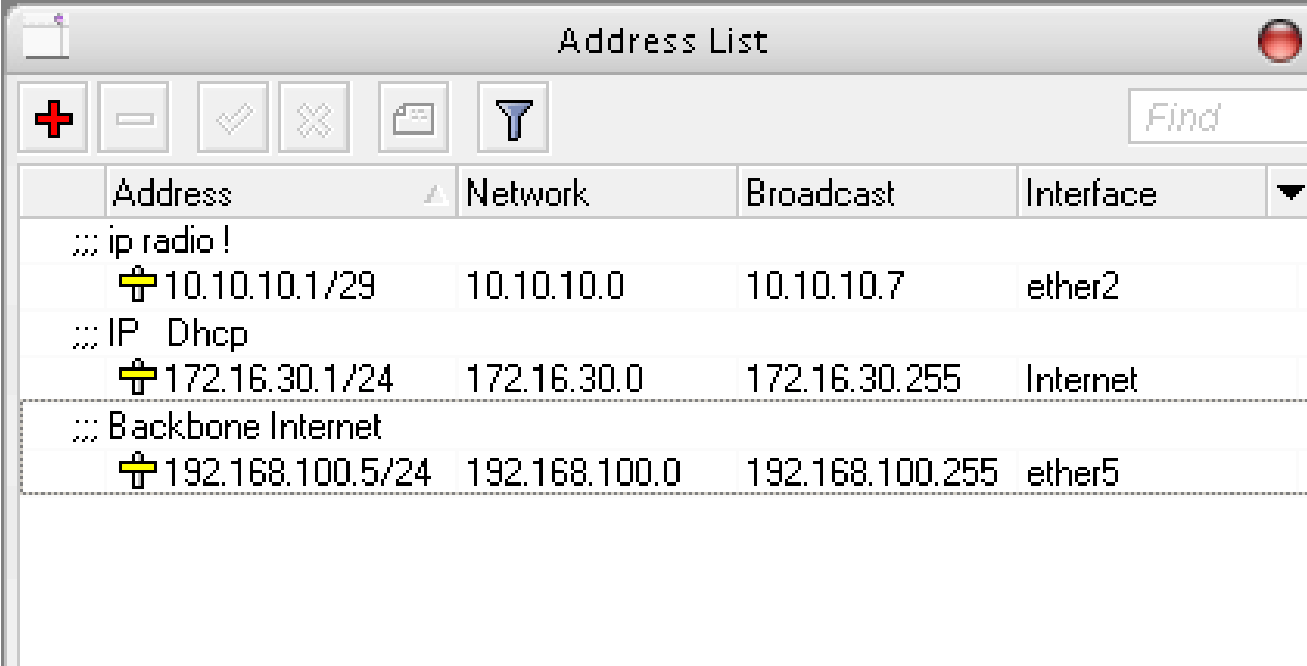
Port Assign !



Interface List [router-Gateway]

Interface List									
Interface									
Ethernet EoIP Tunnel IP Tunnel VLAN VRRP Bonding									
     									
	Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx	
R	 Internet	Bridge	65535	27.7 kbps	1592 bps	3	3		
R	 eoip-tunnel1-AP1	EoIP Tunnel	65535	28.9 kbps	1830 bps	4	3		
R	 eoip-tunnel2-AP2	EoIP Tunnel	65535	0 bps	0 bps	0	0		
	 ether1	Ethernet	1518	0 bps	0 bps	0	0		
R	 ether2	Ethernet	1518	30.5 kbps	2.9 kbps	7	3		
	 ether3	Ethernet	1518	0 bps	0 bps	0	0		
	 ether4	Ethernet	1518	0 bps	0 bps	0	0		
	 ether5	Ethernet	1518	0 bps	0 bps	0	0		

Segmentation IP !



The screenshot shows a window titled "Address List" with a toolbar containing icons for adding (+), removing (-), checking (✓), deleting (✗), saving (floppy), and filtering (funnel), along with a "Find" search box. The main content is a table with columns for Address, Network, Broadcast, and Interface. The table lists three IP configurations: "ip radio !" (10.10.10.1/29 on ether2), "IP Dhcp" (172.16.30.1/24 on Internet), and "Backbone Internet" (192.168.100.5/24 on ether5). The "Backbone Internet" row is highlighted with a dashed border.

Address	Network	Broadcast	Interface
ip radio ! + 10.10.10.1/29	10.10.10.0	10.10.10.7	ether2
IP Dhcp + 172.16.30.1/24	172.16.30.0	172.16.30.255	Internet
Backbone Internet + 192.168.100.5/24	192.168.100.0	192.168.100.255	ether5

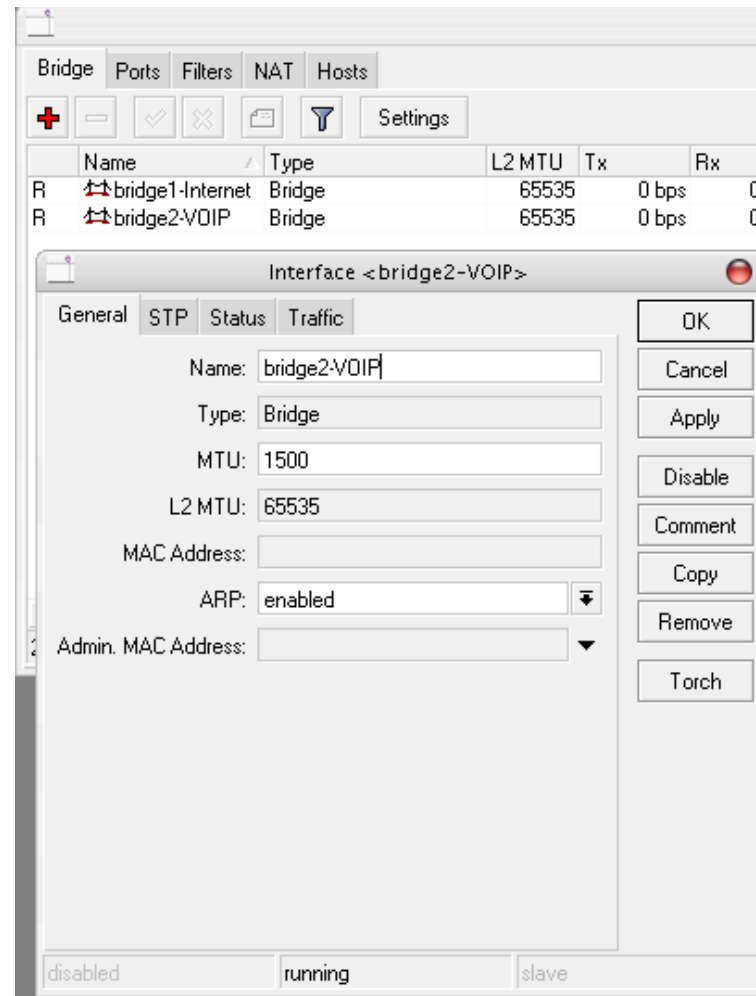
Now can create dhcp-server for access internet !

The screenshot displays a DHCP Server configuration window. At the top, there are tabs for 'DHCP', 'Networks', 'Leases', 'Options', and 'Alerts'. Below the tabs are several icons and buttons: a red plus sign, a blue minus sign, a blue checkmark, a red X, a funnel icon, 'DHCP Config', and 'DHCP Setup'. A table lists the DHCP server configuration:

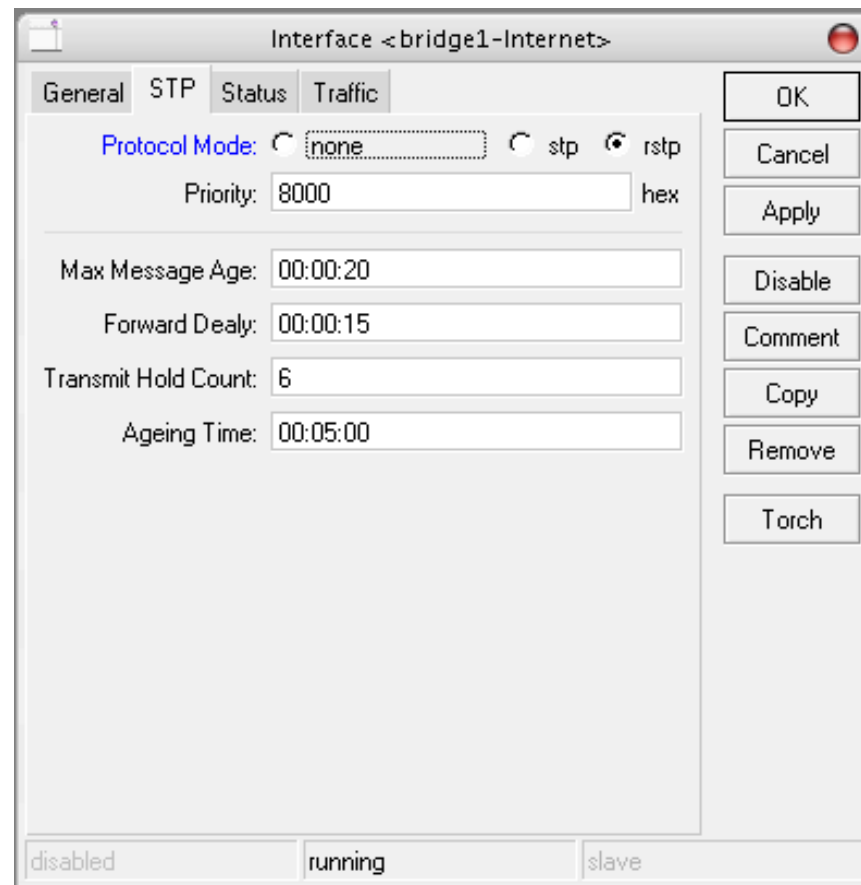
Name	Interface	Relay	Lease Time	Address Pool	Add
dhcp1	Internet		3d 00:00:00	dhcp_pool1	no

Below the table, a 'DHCP Setup' dialog box is open, titled 'DHCP Setup'. It contains the text 'Select interface to run DHCP server on' and a dropdown menu labeled 'DHCP Server Interface:' with 'Internet' selected. The dropdown menu is open, showing a list of interfaces: 'Internet', 'eip-tunnel1-AP1', 'eip-tunnel2-AP2', 'ether1', 'ether2', 'ether3', 'ether4', 'ether5', and 'wlan1'. A 'Back' button is visible in the dialog box. At the bottom of the main window, it says '1 item (1 selected)'.

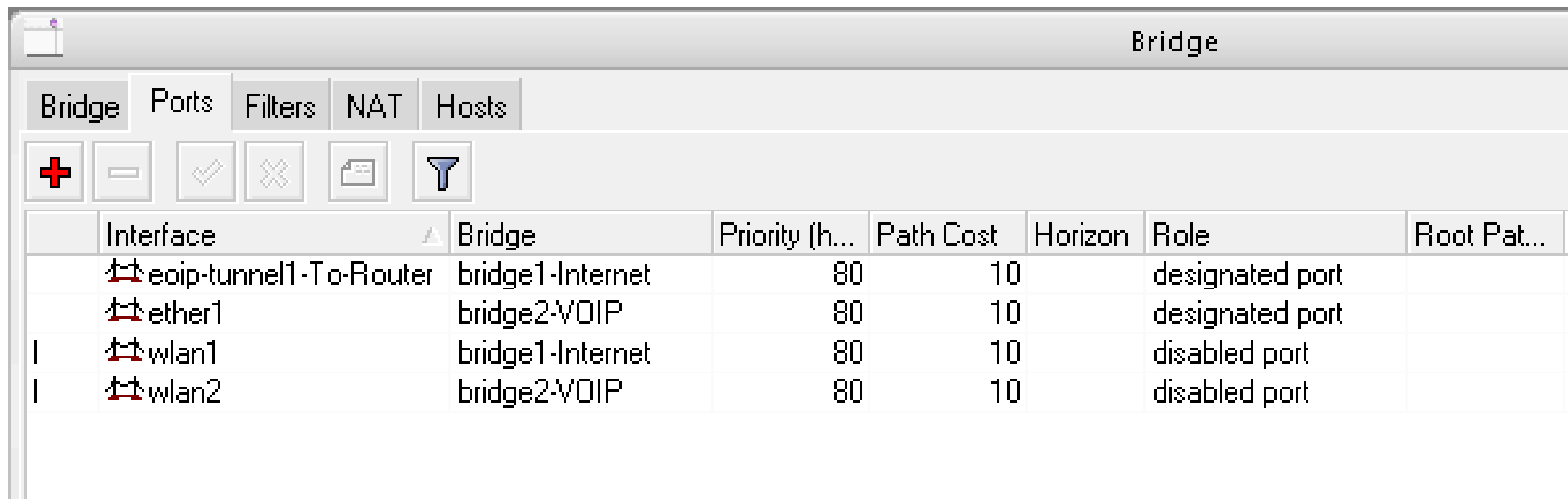
Winbox Configuration [AP-1 & AP-2]



Bridge RSTP !



Port Assign !



The screenshot shows a network configuration window titled "Bridge". It has tabs for "Bridge", "Ports", "Filters", "NAT", and "Hosts". Below the tabs is a toolbar with icons for adding (+), removing (-), saving (checkmark), deleting (X), and filtering (funnel). The main area contains a table with the following columns: Interface, Bridge, Priority (h...), Path Cost, Horizon, Role, and Root Pat... The table lists four entries:

Interface	Bridge	Priority (h...)	Path Cost	Horizon	Role	Root Pat...
↕ eoip-tunnel1-To-Router	bridge1-Internet	80	10		designated port	
↕ ether1	bridge2-VOIP	80	10		designated port	
↕ wlan1	bridge1-Internet	80	10		disabled port	
↕ wlan2	bridge2-VOIP	80	10		disabled port	

Interface List !

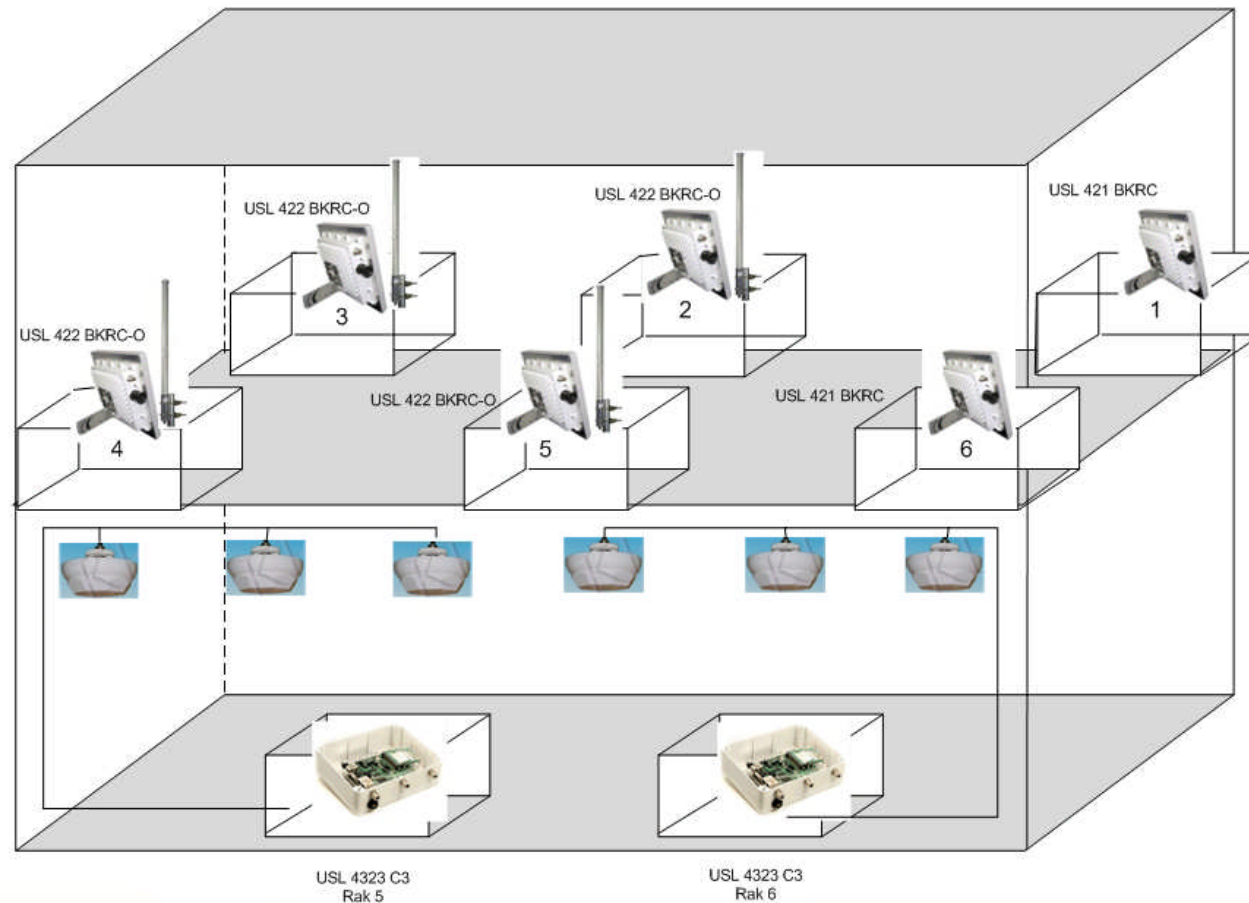
Interface List

Interface Ethernet EoIP Tunnel IP Tunnel VLAN VRRP Bonding

+ - ✓ ✗ 📄 🔍

	Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	T
R	↕↕ bridge1-Internet	Bridge	65535	0 bps	0 bps	0	0	
R	↕↕ bridge2-VOIP	Bridge	1526	0 bps	0 bps	0	0	
R	↕↕ eoip-tunnel1-T...	EoIP Tunnel	65535	0 bps	0 bps	0	0	
R	↕↕ ether1	Ethernet	1526	0 bps	0 bps	0	0	
	↕↕ ether2	Ethernet	1522	0 bps	0 bps	0	0	
R	↕↕ ether3	Ethernet	1522	37.8 kbps	2.6 kbps	4	3	
	↕↕ wlan1	Wireless (Atheros AR5...	2304	0 bps	0 bps	0	0	
	↕↕ wlan2	VirtualAP	2304	0 bps	0 bps	0	0	

Example Implementation Wireless Roaming !



Contoh Tolologi perangkat jaringan Wireless Indoor Hotspot Roaming

Special Thanks !

- MikroTik
- Eddy Ismail
- And My Clickers ! 😊

Thank You !

- Q&A.....
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- nituxlinux@yahoo.com