

Features and usage examples of wAP device

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Overview

- Gift from MikroTik – wAP
- Repeater Setup
- CAPsMAN overview and basic config

WAP



Black and White edition



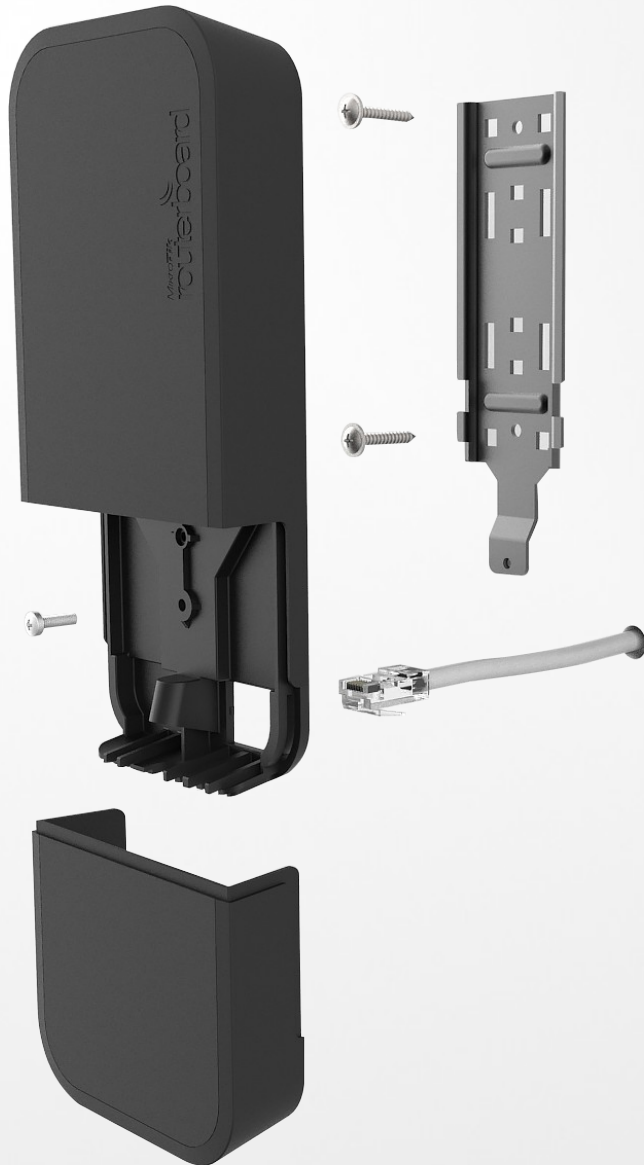
Features

- CPU 650 MHz
- RAM 64 MB
- Flash 16 MB
- Wireless 802.11b/g/n dual-chain
- Gain 2dBi antennas
- Ethernet 10/100Mbps
- Dimensions 185 x 85 x 30 mm

Features cont

- Wide input Voltage (11-57V)
- 802.3af/at, Passive PoE and power jack
- Low Power Consumption (up to 4W)
- High Operating Temp (-40C to +70C)
- Weatherproof case design suitable for indoor and outdoor

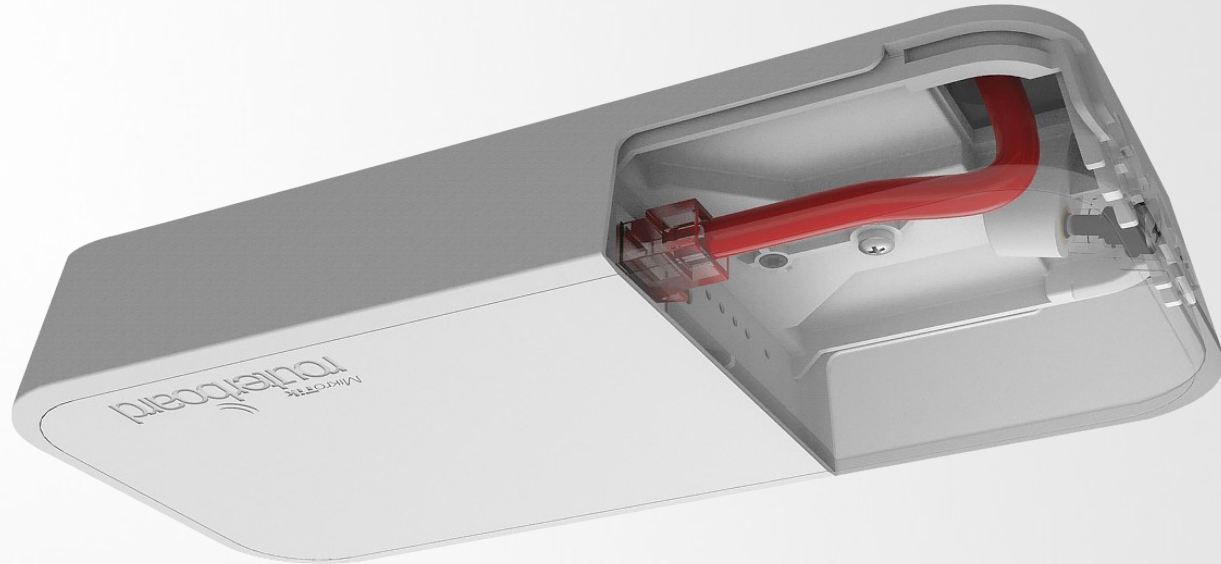
Usage Cases



Use it on the wall!

- Wall mounting is easy thanks to the provided drill template and screw anchor. Everything included

Usage Cases



Use it on the ceiling!

- The WAP comes bundled with all the necessary things to be mounted on ceiling
- Cable breakout provides ability to run cable through the ceiling

Default Configuration

- Ether1 configured as WAN port
 - Firewall protection (only ping allowed)
 - Masquerade enabled
 - DHCP client enabled
 - Neighbour discovery disabled
- Fast-track enabled
- Default local IP: 192.168.88.1/24
- Wireless access point enabled
- SSID: MikroTik-<last 6 chars from MAC>
- DHCP server on wireless AP

How to Connect

Ethernet (WAN) port is protected

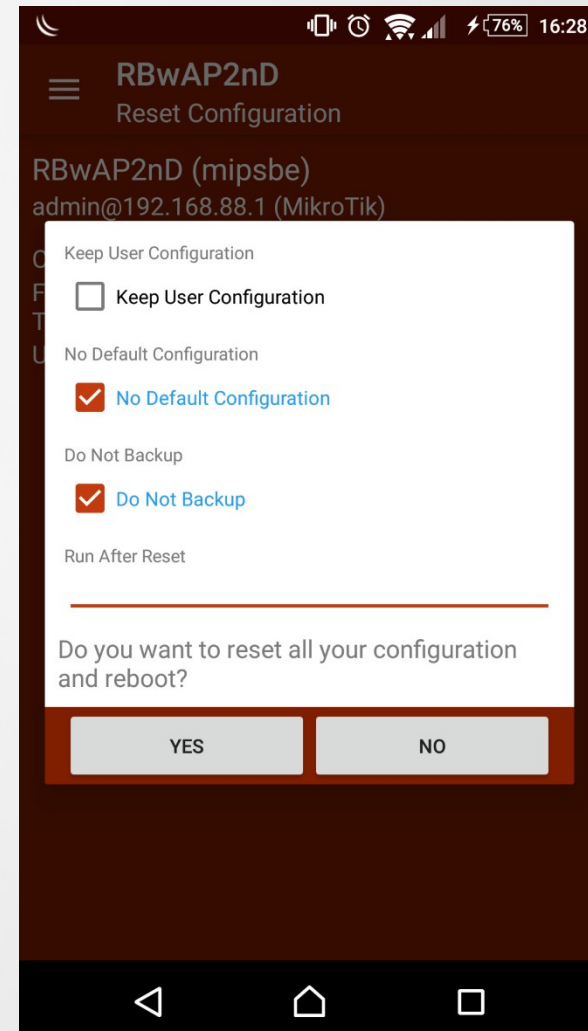
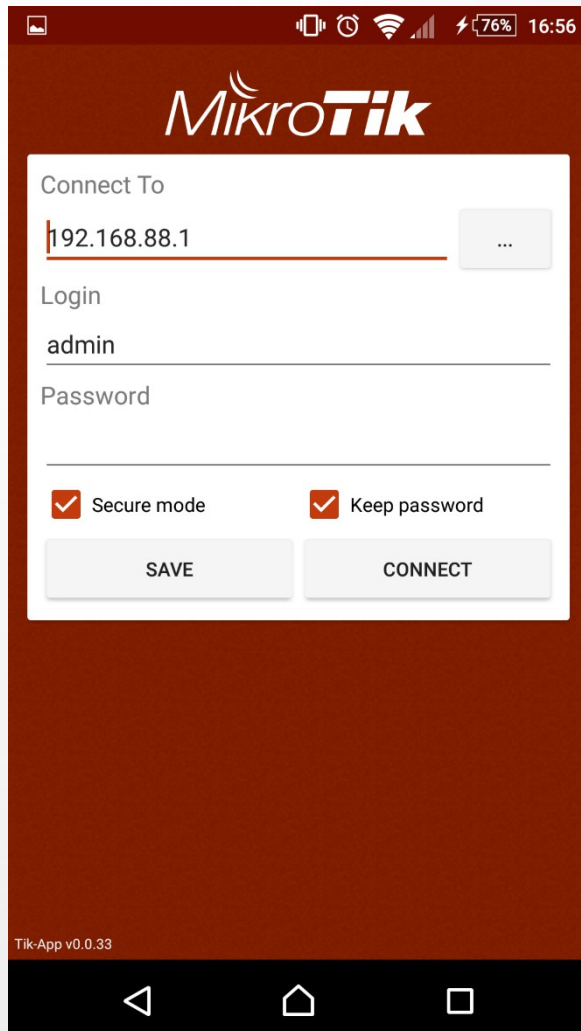
- Connect laptop to wireless and use Winbox/WebFig, telnet or ssh
- Connect android phone to wireless and use TikApp or WebFig
- Default IP address 192.168.88.1
- Default username: admin w/o password

Default configuration can be switched to CAP mode by holding reset button for 10 seconds.

- Wireless and ethernet bridged
- DHCP client enabled on bridge interface

TikApp

- Sign to testing program, link on Mikrotik forum
- Download TikApp in Play store



Secure the Router

- Connect and set username/password
- Disable 'admin' user
- Set WPA and WPA2 key to secure AP

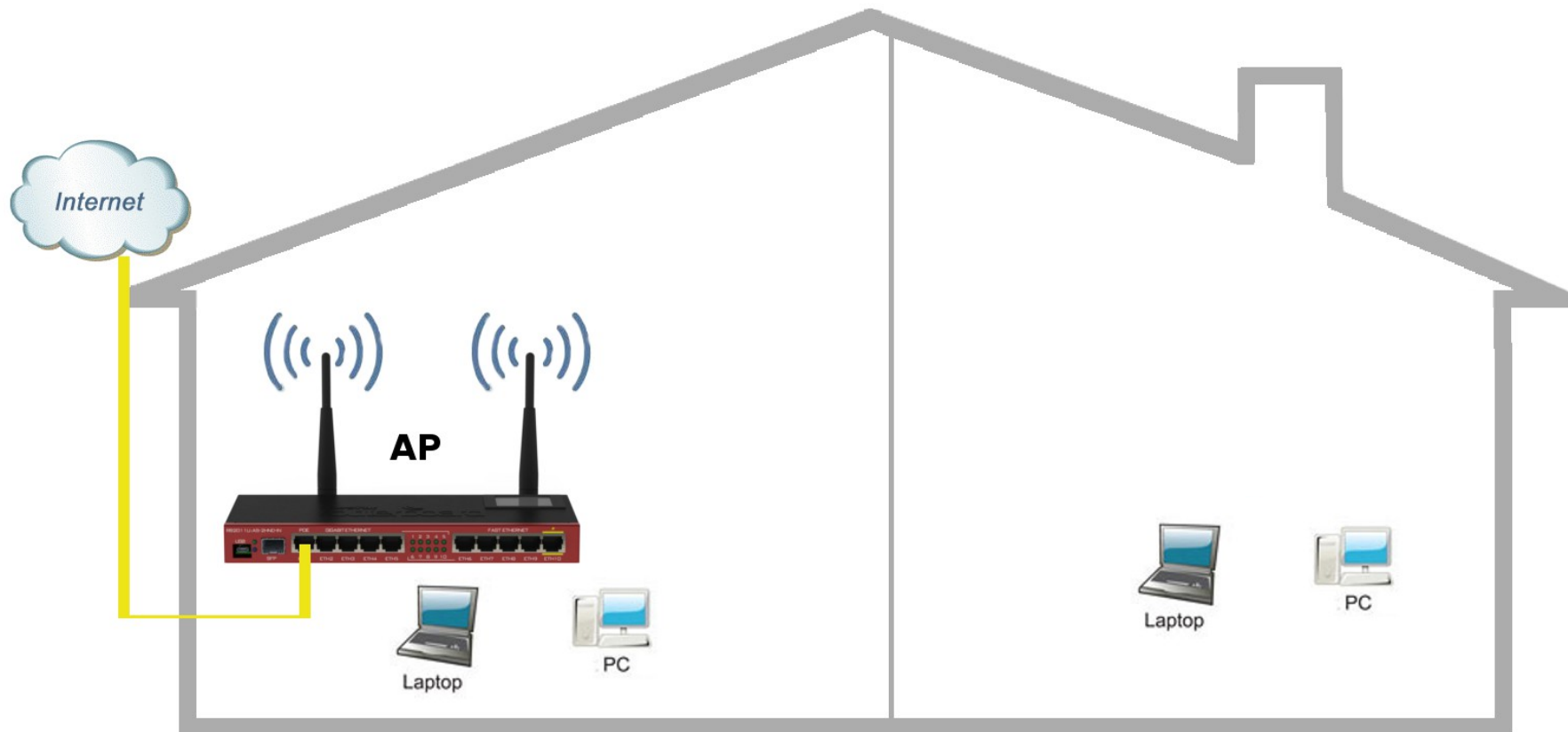
Repeater at Home

Routers have great coverage, but consumer devices (laptops, mobile phones, refrigerators, toilet seats) does not.

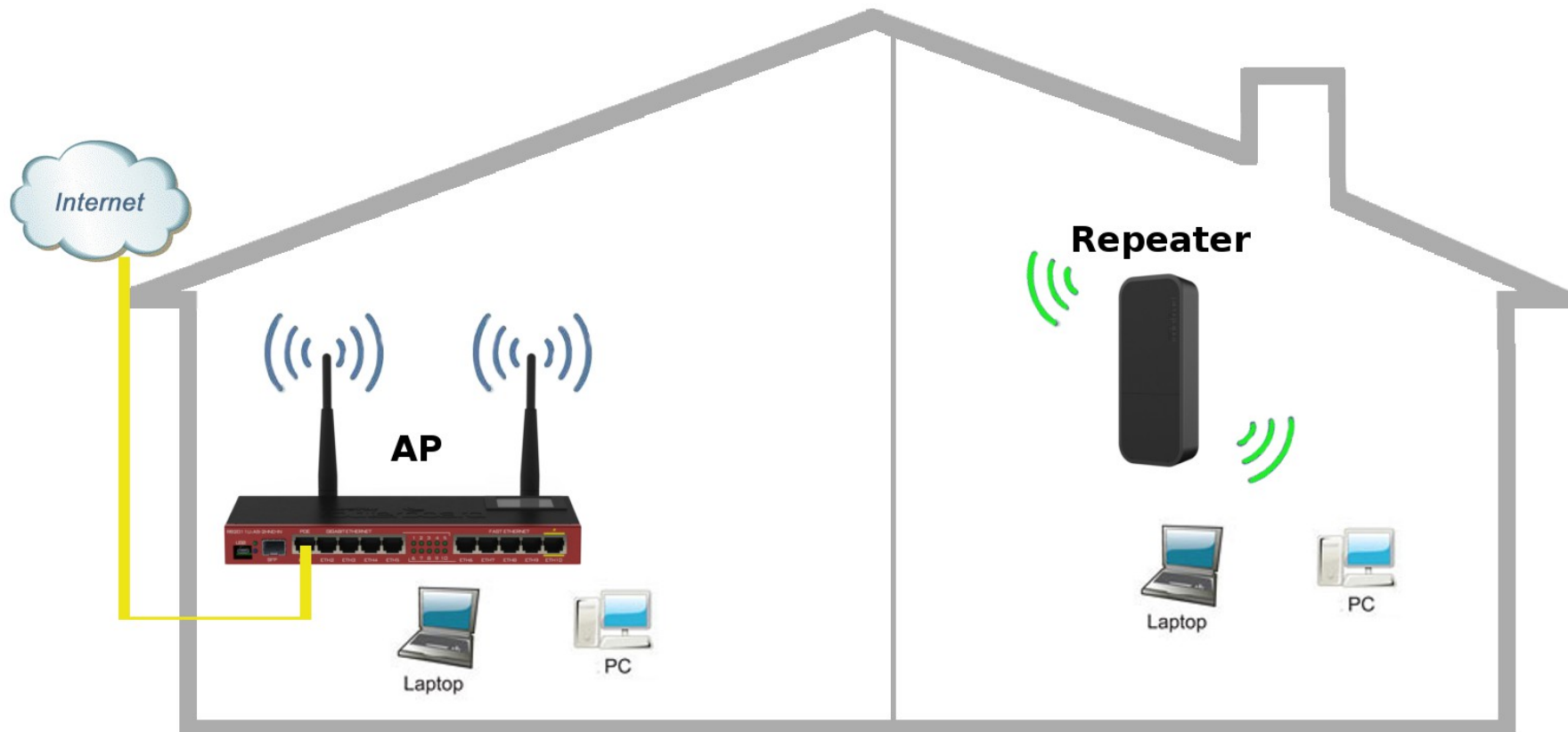
Wireless repeaters extend your wireless network range without requiring you to add any wiring.

Repeater should have two wireless interfaces or set up virtual AP.

Repeater at Home



Repeater at Home



Repeater Setup

Configure wireless settings manually to connect to MikroTik access point:

- Configure security profiles (authentication-type, mode, key)
- Configure wireless settings (station mode, band, SSID)

For repeater setups station mode should be “station-bridge” (works only with MT APs).

Or use wireless scan feature.

Wireless Scan

Fastest way to connect to AP

Wireless Tables

Interfaces Nstreme Dual Access List Registration Connect List Security Profiles Channels

+ - ✓ ✗ 📁 📏 CAP WPS Client Setup Repeater **Scanner** Freq. Usage Alignment Wireless Sniffer Wireless Snooper Find

	Name	Type	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	FP Tx	FP Rx
R	wlan1	Wireless (Atheros AR9...	0 bps	1280 bps	0	2	0 bps	1280

1 item out of 6 (1 selected)

Scanner

Interface: wlan1

☐ Background Scan

Start

Stop

Close

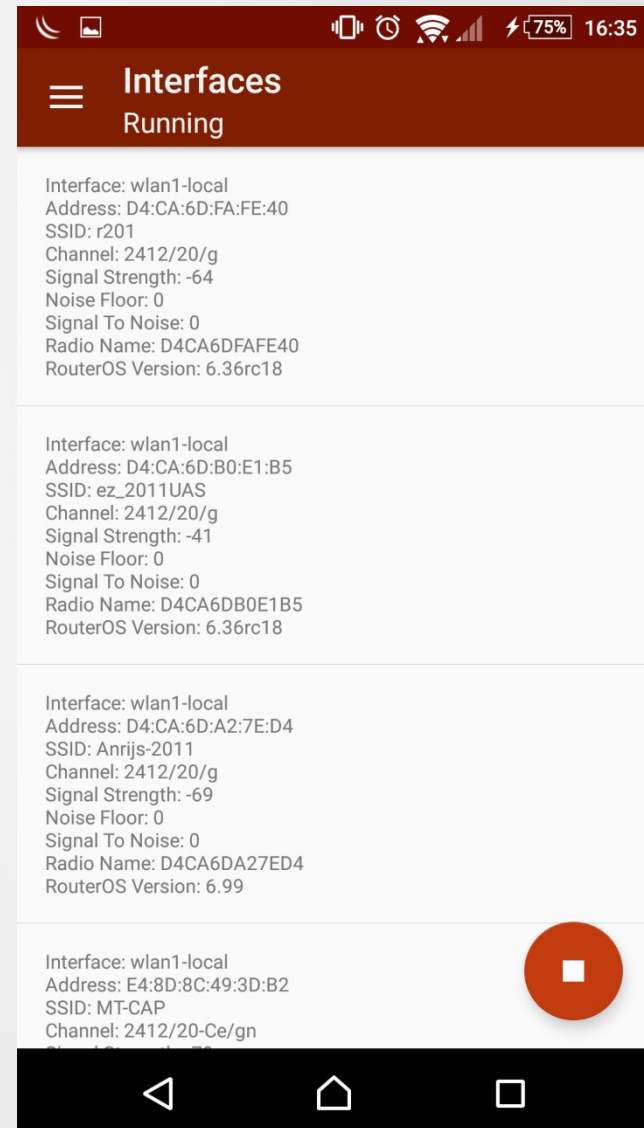
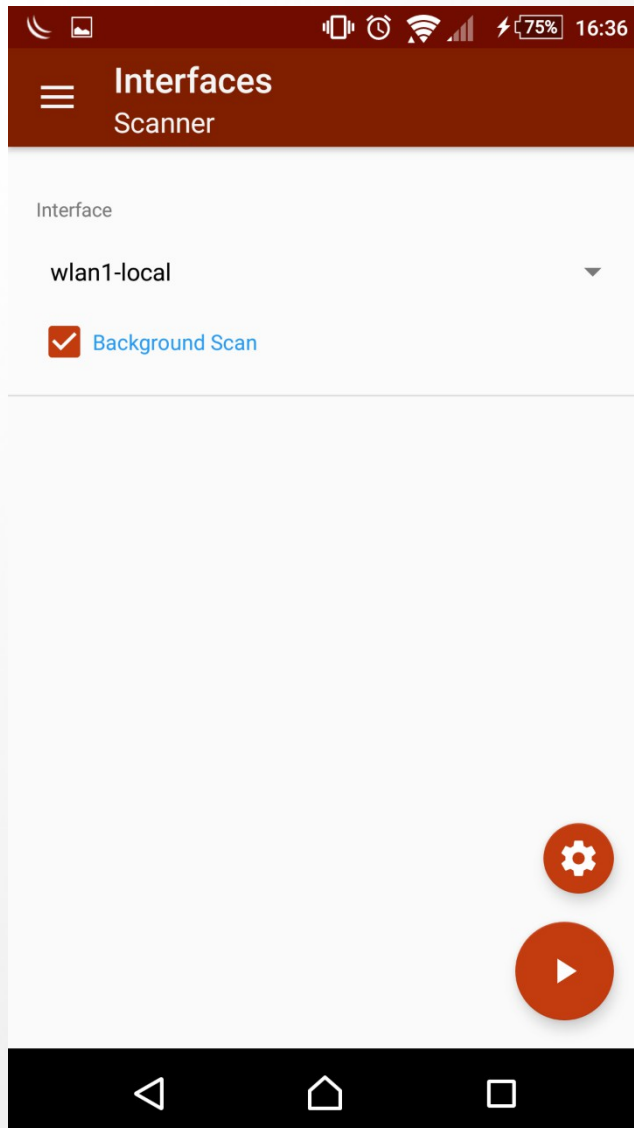
Connect

New Window

	Address	SSID	Channel	Signa...	Noise...	Signa...	Radio Name	RouterO...
AP	30:91:8F:9E:5A:03	TNCAP9...	2437/20-Ce/gn	-77	-108	31		
APRB	D4:CA:6D:83:77:03	BackBone	2447/20-eC/gn	-70	-107	37	D4CA6D837703	6.35.1
APRB	4E:5E:0C:61:B4:63	testAP	2447/20-eC/gn	-44	-107	63	4C5E0C61B463	6.36rc10

3 items (1 selected)

TikApp Scan



Background Scan

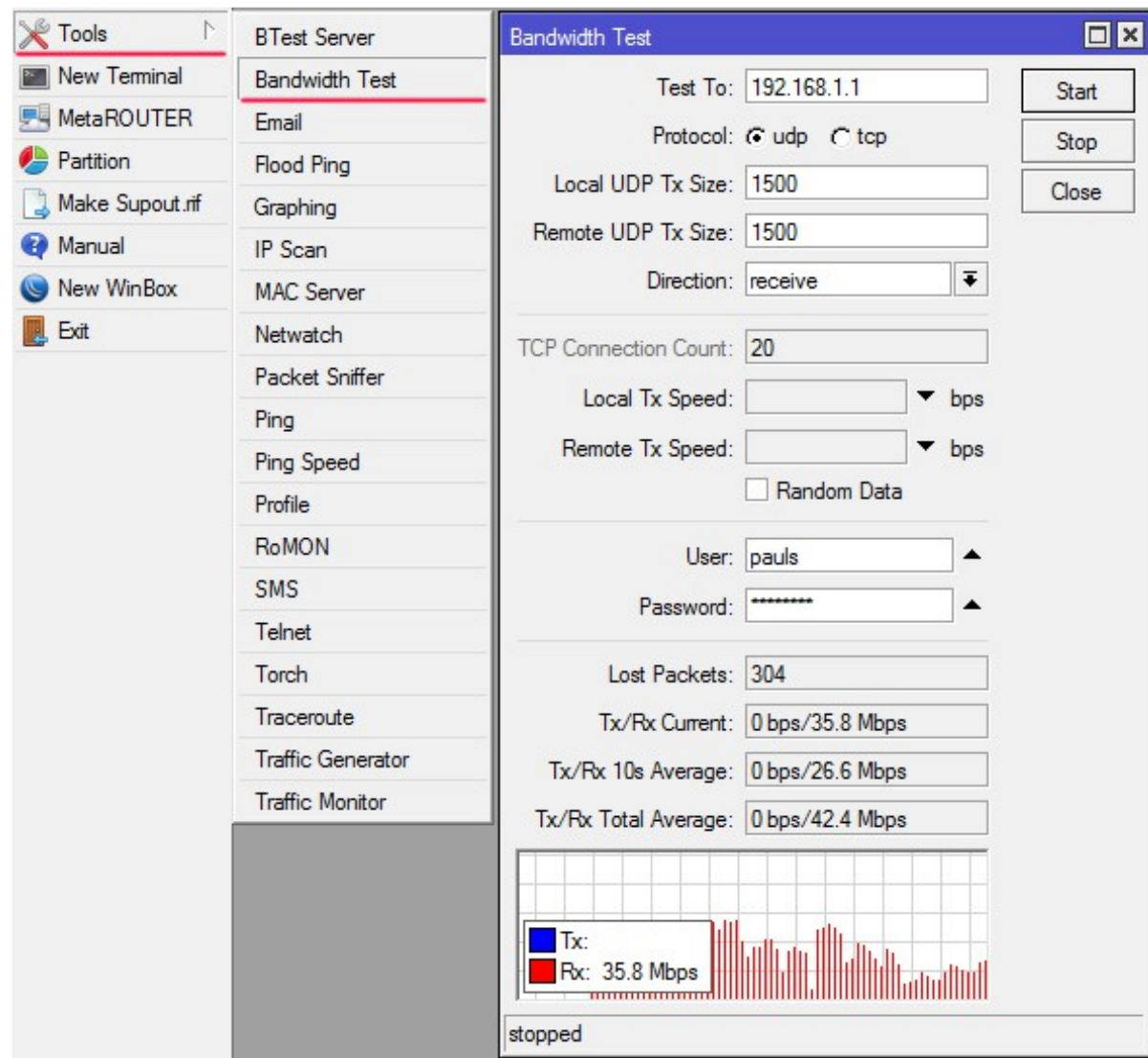
- Supported for 802.11 protocol only
- Working conditions
 - Wireless interface should be enabled
 - For AP mode – when operating on fixed channel
 - For Station mode – when connected to AP
- Supported also on Virtual interfaces
 - Scan is only performed in channel where master interface is running
- Allows to save the scan results in a CSV format file

Repeater Setup

- Add virtual AP interface
- Use the same SSID and security settings
- Add bridge interface with static MAC address
- Bridge physical wireless interface with virtual AP
- Add DHCP client on bridge interface for management(optional)

Test throughput

Measure throughput between wireless devices



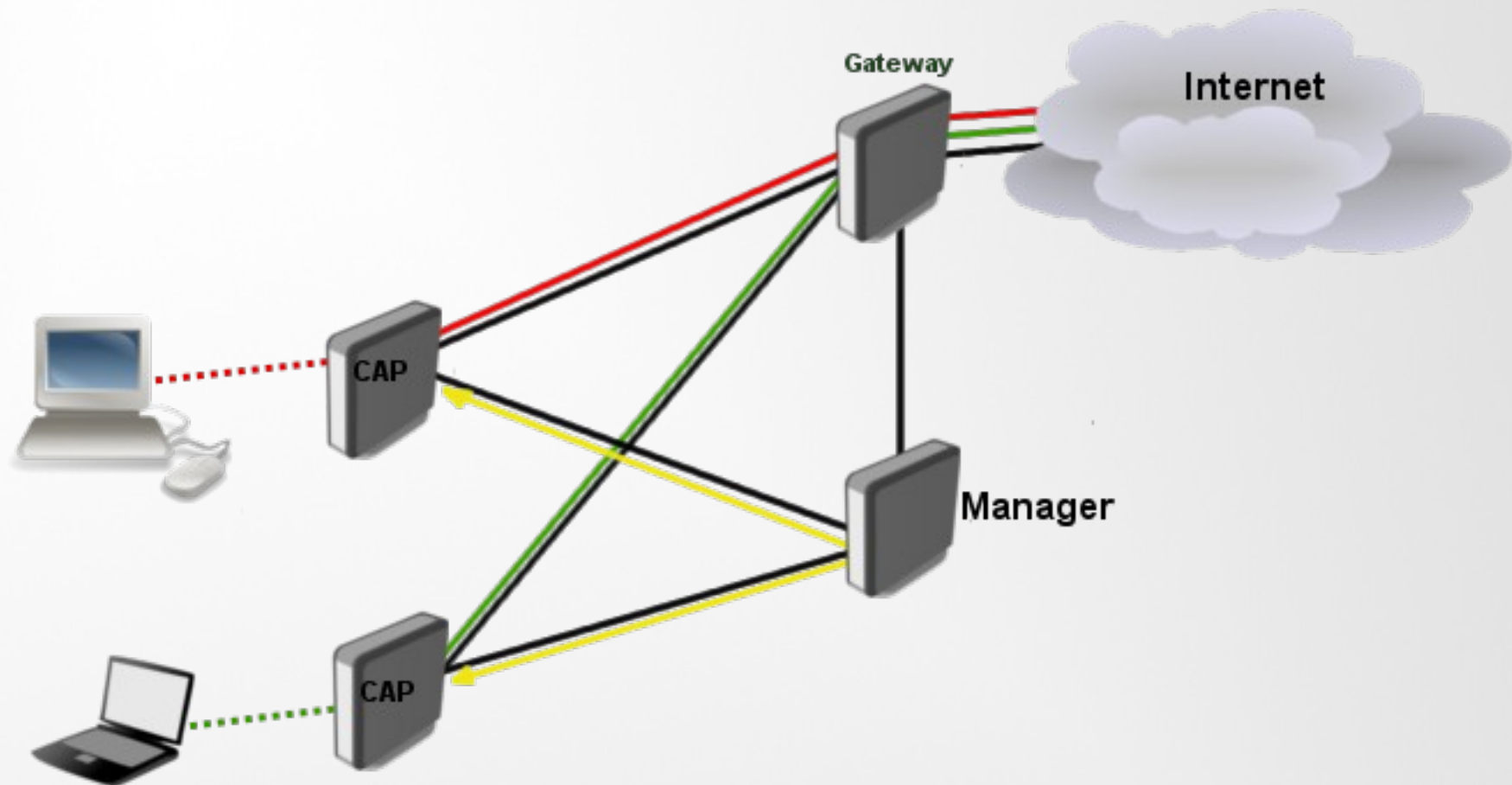
WPS Client Support

- Allows wireless client to get Pre-Shared Key configuration of the AP that has WPS Server enabled
- Gets information from any WPS Server running or can be specified to get only with specific SSID or MAC address
- Received configuration is shown on the screen and can be also saved to a new wireless security profile

CAPsMAN

- Controlled Access Point system Manager (CAPsMAN)
- Network consists of a number of 'Controlled Access Points' (CAP)
- CAP requires almost no configuration
 - connectivity to CAPsMAN (IP or MAC)
 - wireless lock to capsman
- Packet processing:
 - central (default),
 - local forwarding.

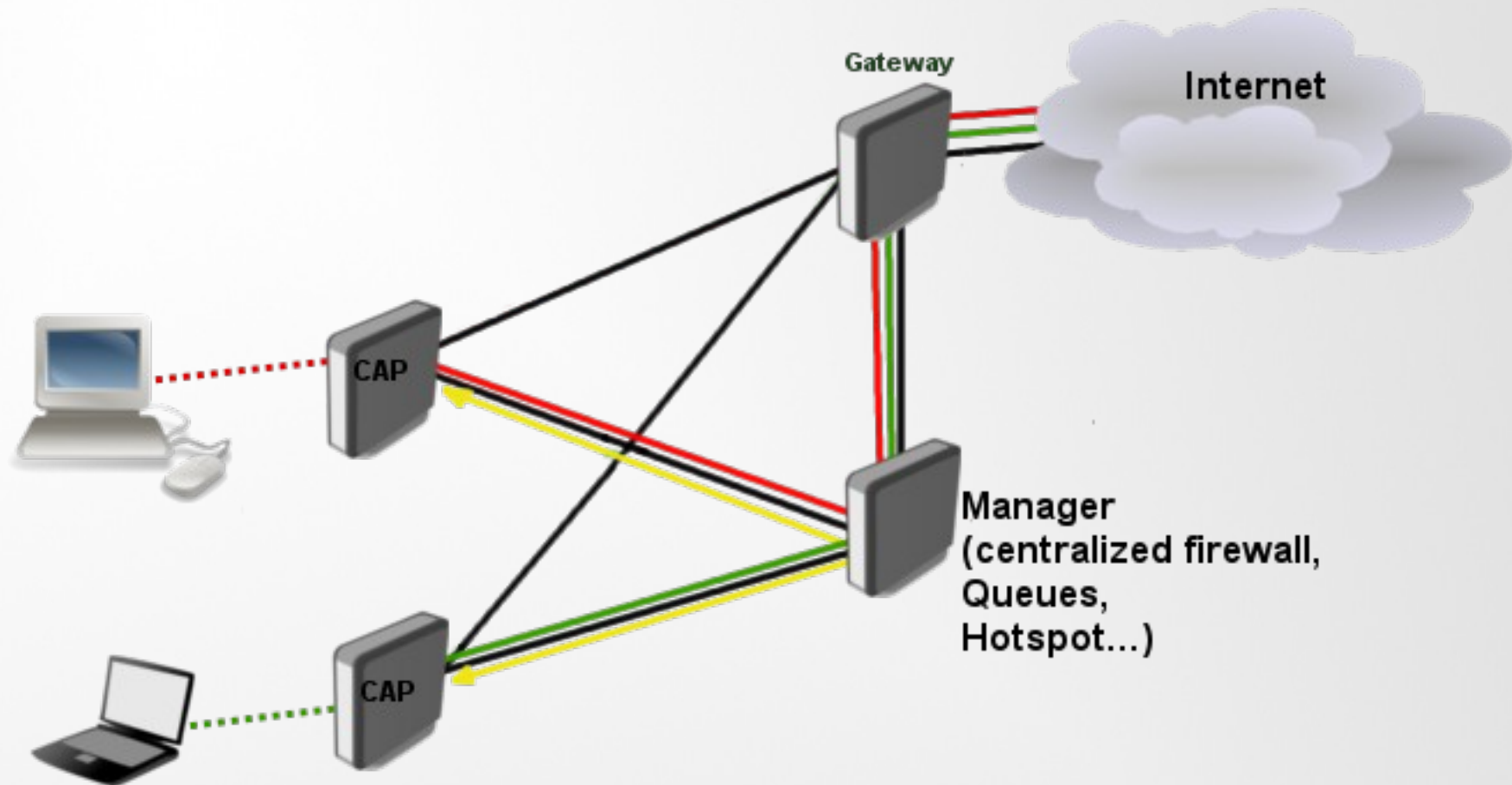
Local Forwarding



Local Forwarding

- Pros:
 - Manager can be router with weak CPU
 - Link between manager and gateway not so important
 - Clients do not loose connectivity to internet after CAPsMAN failure
- Cons:
 - Not so friendly for central management
 - Hotspot, firewall, queues, DHCP server in most cases handled locally by CAPs

Central Forwarding



Central Forwarding

- Pros:
 - Easy service management on single router
 - Hotspots, DHCP servers, firewall etc can be controlled by groups on single machine
- Cons:
 - Single point of failure (backup CAPsMAN can be set)
 - Hardware must be powerful with fast CPU
 - Link between Manager and Gateway must be stable and fast.

CAP Configuration

Wireless Tables

Interfaces | Nstreme Dual | Access List | Registration | Connect List | Security Profiles | Channels

+ - ✓ ✕ [icon] [icon] CAP WPS Client Setup Repeater Scanner Freq. Usage Alignment

Name	Type	Actual MTU	Tx	Rx	Tx Packet (p/s)
--- managed by CAPsMAN					
--- channel: 2427/20-Ce/gn(30dBm), SSID: cap_test_localhost, local forwarding					
RS wlan1	Wireless (Atheros AR...	1500	1200 bps	0 bps	
wlan2	Virtual		0 bps	0 bps	

CAP

☒ Enabled

Interfaces: wlan1

Certificate: CAPsMAN-CA-000C4200635C

Discovery Interfaces: lo

☐ Lock To CAPsMAN

CAPsMAN Addresses:

CAPsMAN Names:

CAPsMAN Certificate Common Names:

Bridge: none

☐ Static Virtual

Requested Certificate: CAP-000C4200635C

Locked CAPsMAN Common Name:

OK Cancel Apply

CAP Configuration

```
/interface wireless cap set enabled=yes interfaces=wlan1
```

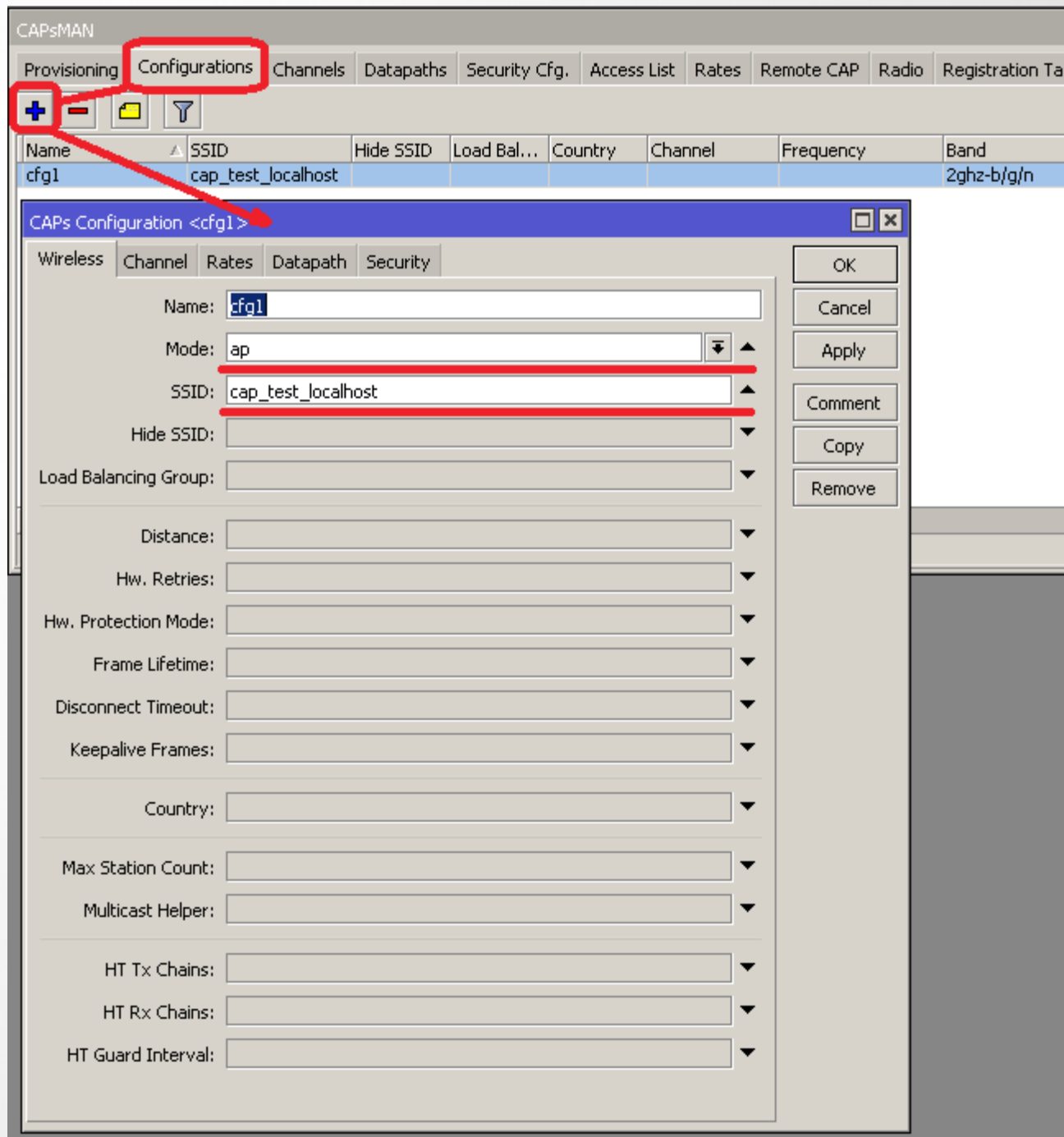
Oter parameters depending on
configuration

```
caps-man-addresses  
discovery-interfaces  
Bridge
```

Default CAP configuration loaded by
holding reset button for 10 seconds

CAPsMAN

- CAP and CAPsMAN can be on the same router, set to 'loopback' or 127.0.0.1
- To provision configuration CAPsMAN needs:
 - To get connection from CAP and discover its interfaces
 - To have configuration parameters
 - To have provisioning criteria



CAPsMAN

Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Ta

+ - [Icon] [Icon]

Name	SSID	Hide SSID	Load Bal...	Country	Channel	Frequency	Band
cfg1	cap_test_localhost						2ghz-b/g/n

CAPs Configuration <cfg1>

Wireless **Channel** Rates Datapath Security

Channel: [Dropdown]

Frequency: [Dropdown]

Control Channel Width: [Dropdown]

Band: 2ghz-b/g/n [Dropdown]

Extension Channel: [Dropdown]

Tx Power: [Dropdown]

Save Selected: [Dropdown]

Reselect Interval: [Dropdown]

Skip DFS Channels: [Dropdown]

OK Cancel Apply Comment Copy Remove

CAPsMAN

Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Ta

+ - [Icon] [Icon]

Name	SSID	Hide SSID	Load Bal...	Country	Channel	Frequency	Band
cfg1	cap_test_localhost						2ghz-b/g/n

CAPs Configuration <cfg1>

Wireless Channel Rates **Datapath** Security

Datapath: [Text Box] ▼

MTU: [Text Box] ▼

L2 MTU: [Text Box] ▼

ARP: [Text Box] ▼

Bridge: [Text Box] ▼

Bridge Cost: [Text Box] ▼

Bridge Horizon: [Text Box] ▼

Local Forwarding: ☒ ▲

Client To Client Forwarding: [Text Box] ▼

VLAN Mode: [Text Box] ▼

VLAN ID: [Text Box] ▼

OK

Cancel

Apply

Comment

Copy

Remove

CAPsMAN

Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio Registration Ta

+ - [Icon] [Icon]

Name	SSID	Hide SSID	Load Bal...	Country	Channel	Frequency	Band
cfg1	cap_test_localhost						2ghz-b/g/n

CAPs Configuration <cfg1>

Wireless Channel Rates Datapath **Security**

Security: [Dropdown]

Authentication Type: ☒ WPA PSK ☒ WPA2 PSK ☐ WPA EAP ☐ WPA2 EAP

Encryption: ☒ aes ccm ☐ tkip

Group Encryption: [Dropdown]

Group Key Update: [Dropdown]

Passphrase: [Text Field]

EAP Methods: [Dropdown]

EAP Radius Accounting: [Dropdown]

TLS Mode: [Dropdown]

TLS Certificate: [Dropdown]

OK Cancel Apply Comment Copy Remove

CAPsMAN

CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio

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#	Radio MAC	Identity Reg...	Common Na...	Action	Master Configura...	Slave Configuration
0	00:00:00:00:00:00			create d...	cfg1	

CAPs Provisioning <00:00:00:00:00:00>

Radio MAC: 00:00:00:00:00:00 OK

Hw. Supported Modes: gn Cancel

b Apply

Identity Regexp: Disable

Common Name Regexp: Comment

IP Address Ranges: Copy

Action: create dynamic enabled Remove

Master Configuration: cfg1

Slave Configuration:

Name Format: cap

Name Prefix:

enabled

CAPsMAN

CAP Interface Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates Remote CAP Radio

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#	Radio MAC	Identity Reg...	Common Na...	Action	Master Configura...	Slave Configuration
0	00:00:00:00:00:00			create d...	cfg1	

CAPs Provisioning <00:00:00:00:00:00>

Radio MAC: 00:00:00:00:00:00 OK

Hw. Supported Modes: gn Cancel

b Apply

Identity Regexp: Disable

Common Name Regexp: Comment

IP Address Ranges: Copy

Action: create dynamic enabled Remove

Master Configuration: cfg1

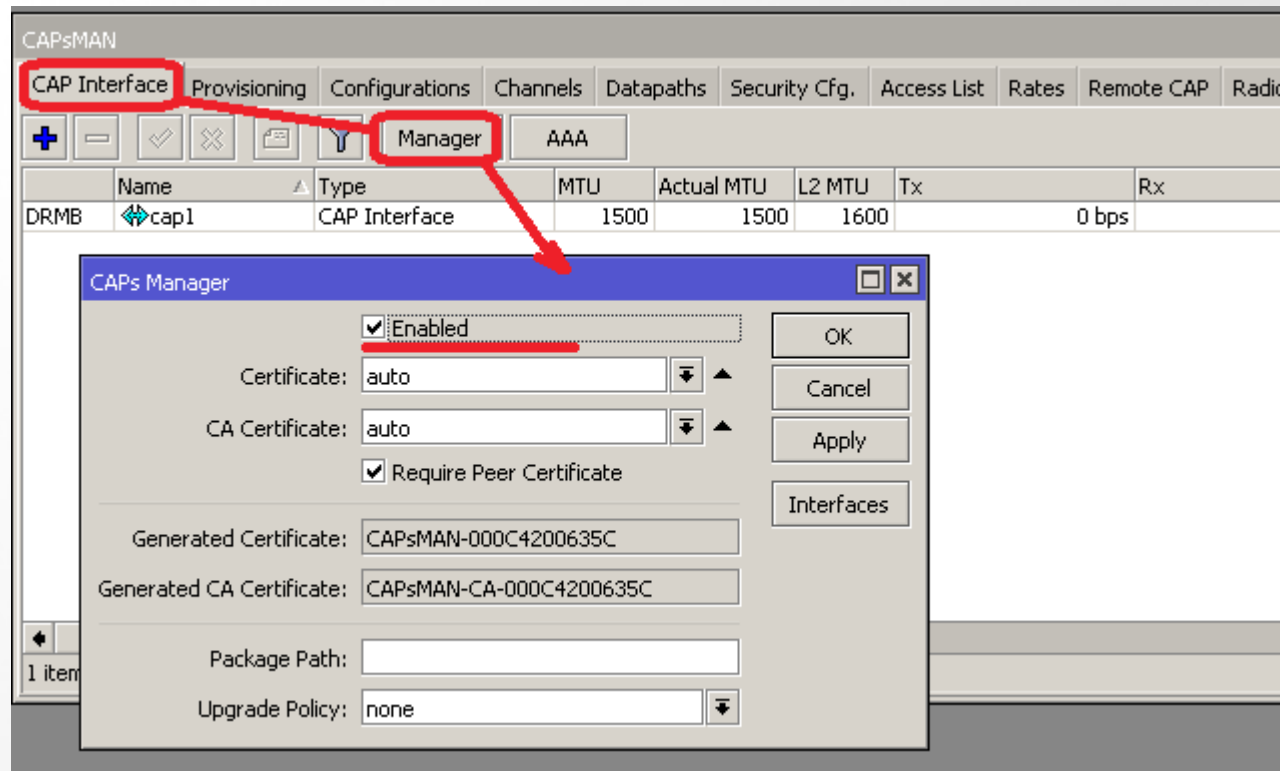
Slave Configuration:

Name Format: cap

Name Prefix:

enabled

CAPsMAN



CAPsMAN

CAPsMAN

Provisioning Configurations Channels Datapaths Security Cfg. Access List Rates **Remote CAP** Radio Registration Ta

Provision Upgrade Set Identity

Address	Name	Board	Serial	Version	Identity	Base MAC	State
192.168.39.2	CAPsMAN-C...	RB751U-2HnD	2B3001DD3BEB	6.39rc80	Rb751-cap-test	00:0C:42:00:63:5C	Run

1 item (1)

CAPs Remote AP <CAPsMAN-CA-000C4200635C>

Address: 192.168.39.2

Port: 44461

Name: CAPsMAN-CA-000C4200635C

Board: RB751U-2HnD

Serial: 2B3001DD3BEB

Version: 6.39rc80

Identity: Rb751-cap-test

Base MAC: 00:0C:42:00:63:5C

State: Run

Radios: 1

OK

Remove

Provision

Upgrade

Set Identity

CAPsMAN

The screenshot displays the CAPsMAN web interface. At the top, a navigation bar includes tabs for Provisioning, Configurations, Channels, Datapaths, Security Cfg., Access List, Rates, Remote CAP, Radio, and Registration Table. The Registration Table tab is selected and highlighted with a red box. Below the navigation bar, there is a CAPs Scanner button and a table listing registered clients. The first row of the table is highlighted in blue and also enclosed in a red box. This row contains the following data: Interface: cap1, SSID: cap_test_localhost, MAC Address: 40:B8:37:D2:B6:42, Tx Rate: 104Mbps..., Rx Rate: 78Mbps..., Tx Signal: 0, Rx Signal: -44, Uptime: 00:02:2..., and Tx/Rx Packets: 423/498. Below the table, a modal window titled 'CAPs AP Client <40:B8:37:D2:B6:42>' is open, showing detailed configuration and statistics for the selected client. The modal window has a red arrow pointing to its title bar. The fields in the modal window are as follows:

Field	Value
Interface	cap1
SSID	cap_test_localhost
MAC Address	40:B8:37:D2:B6:42
Tx Rate	104Mbps-20MHz/25
Rx Rate	78Mbps-20MHz/25
Tx Rate Set	CCK:1-11 OFDM:6-54 BW:1x HT:0-15
Tx Signal	0
Rx Signal	-44
Uptime	00:02:26.39
Tx/Rx Packets	423/498
Tx/Rx Bytes	196.1 KiB/81.1 KiB

Buttons on the right side of the modal window include OK, Remove, and Copy to Access List.

CAPsMAN

- Possibility to provision different configurations on the same device (2GHz and 5GHz)
 - Create two configurations
 - Create two provisioning criteria (bgn, an or ac)
- Common config parameters can be set in templates (channel, datapath, security)

CAPsMAN Limitations

- 32 Radios per CAP
- 32 Virtual interfaces per master radio interface
- But unlimited CAPs (access points) supported by CAPsMAN
- CAPsMAN v1 not compatible with v2
- No Nstreme, NV2 support

Thank you!