



# LTE On MikroTik

MUM Portugal  
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# Fábio Santos

- RouterOS desde 2014
- Networks desde 2014
- Officelan 2015
- MTCNA 2015
- MTCWE / Trainer 2019 (TR0652)
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# História

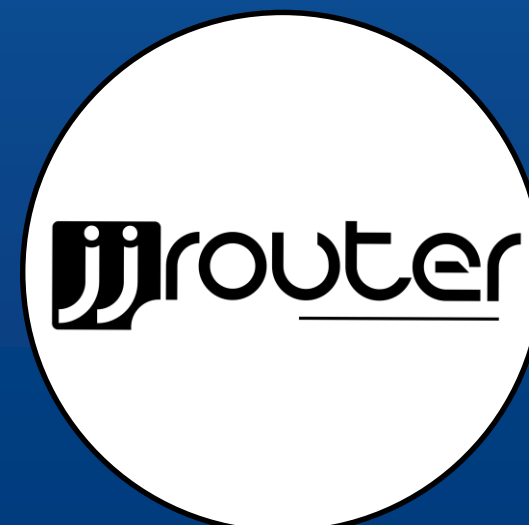
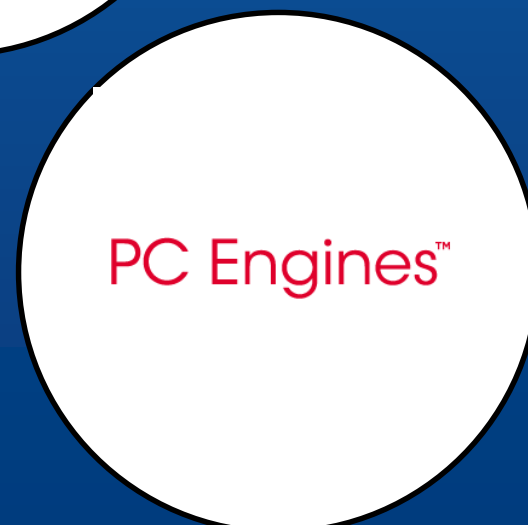
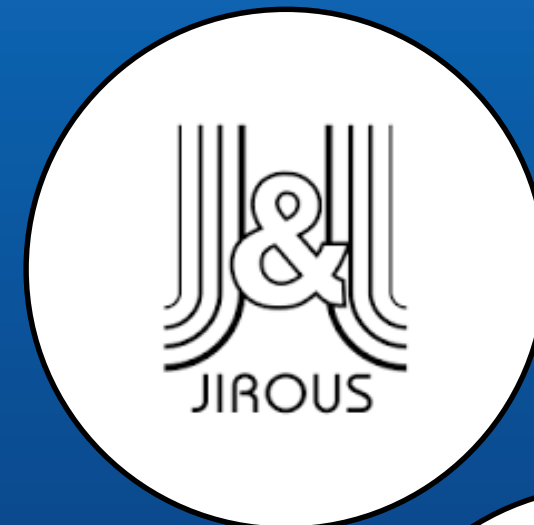
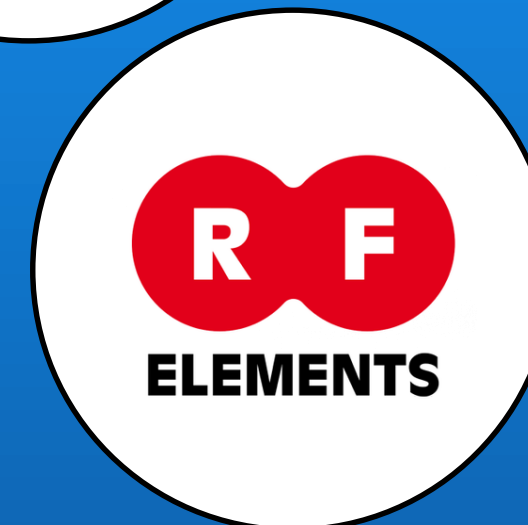


# O que fazemos

- Venda e instalação de produtos e soluções de redes
- Desenho e produção de equipamentos (JJRouter)
- Projetos de redes (arquitetura, implementação e gestão)
- Formação MikroTik, Ubiquiti, Wireless e Network
- Coberturas Wifi alta densidade em eventos temporários

# Parcerias

## Distribuidores



## VAR





Links



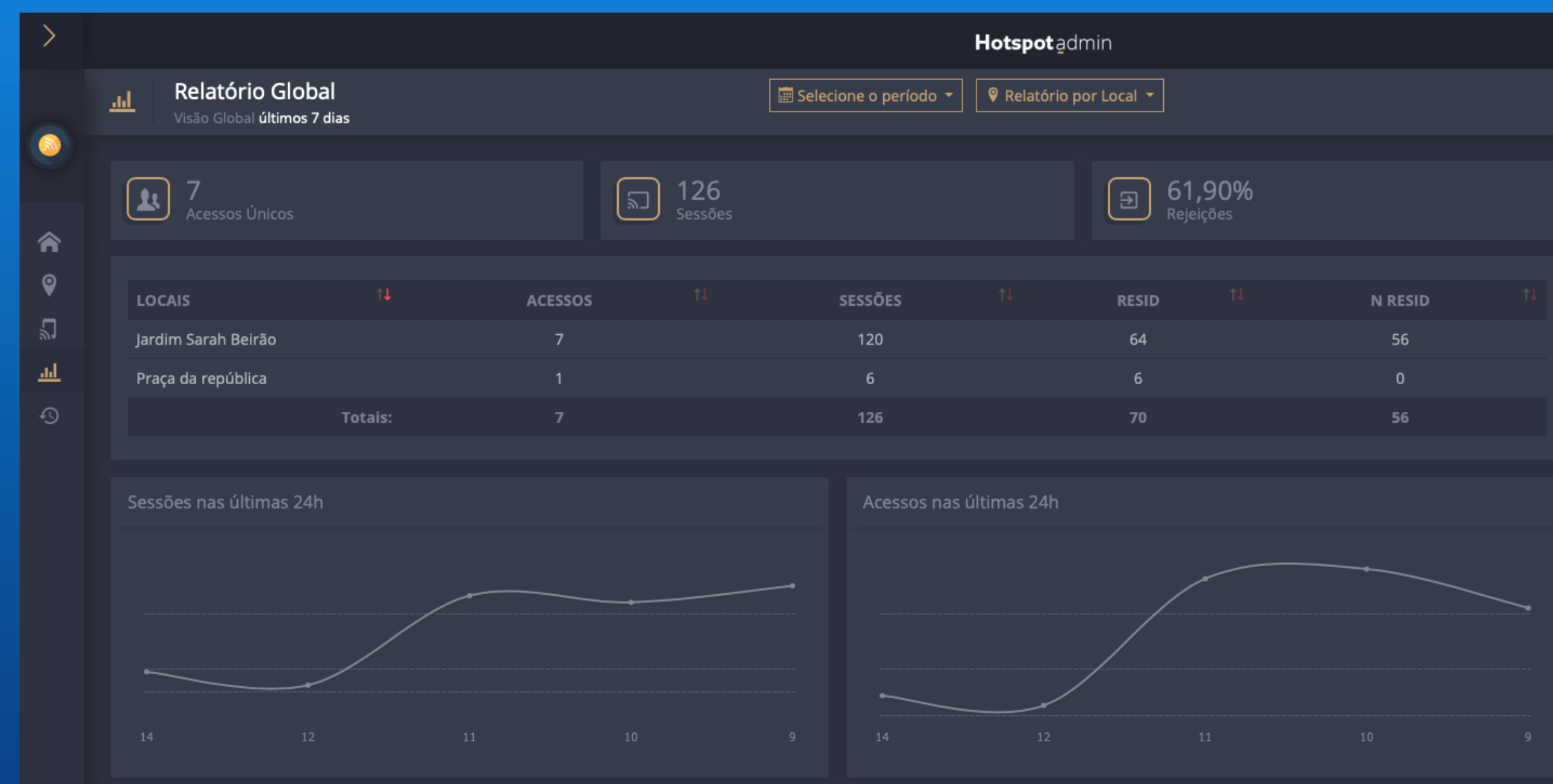
Modem 4G



Antenas Sectoriais



Router 4G





# Projetos



## Survey para levantamento das necessidades



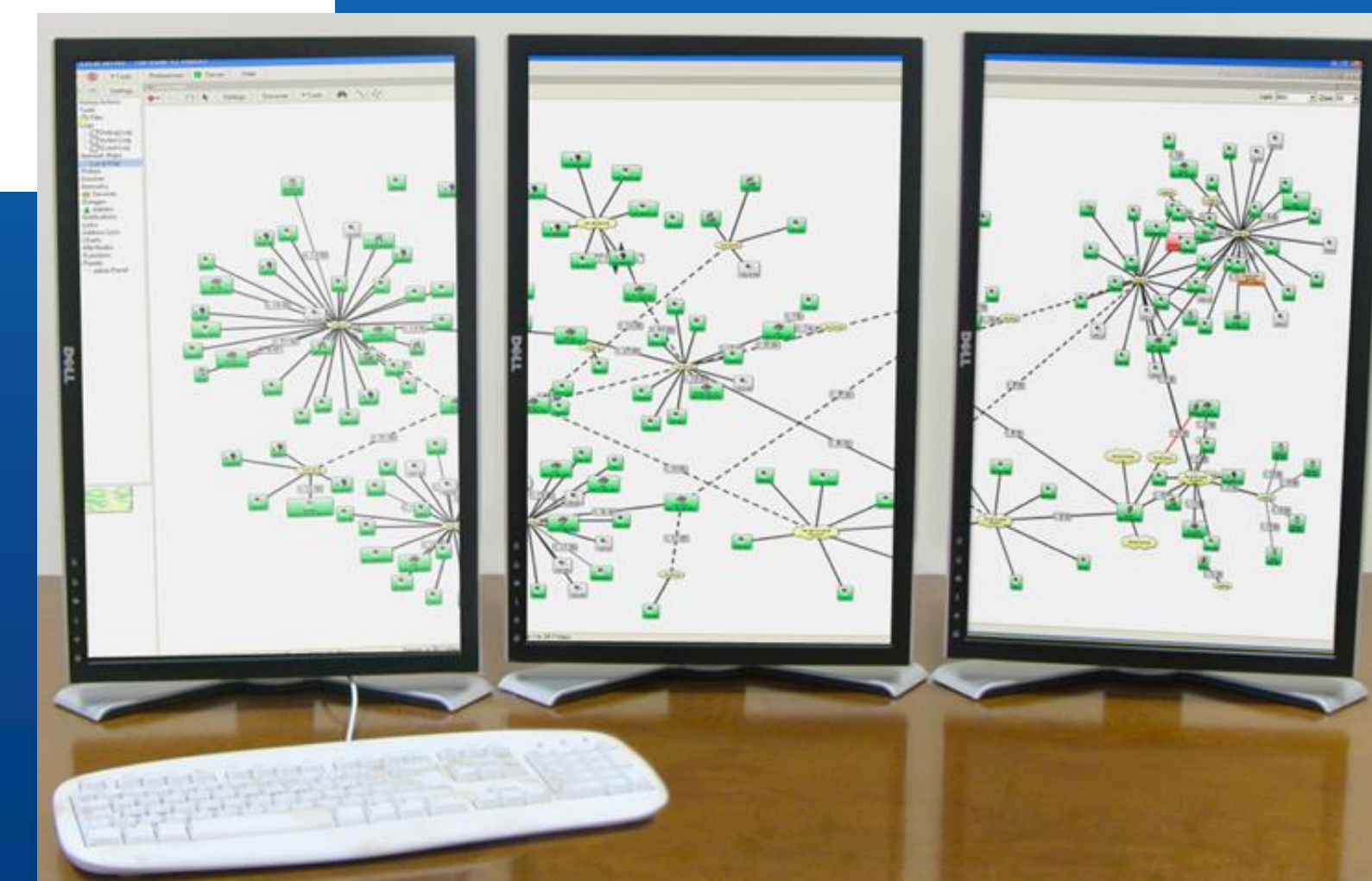
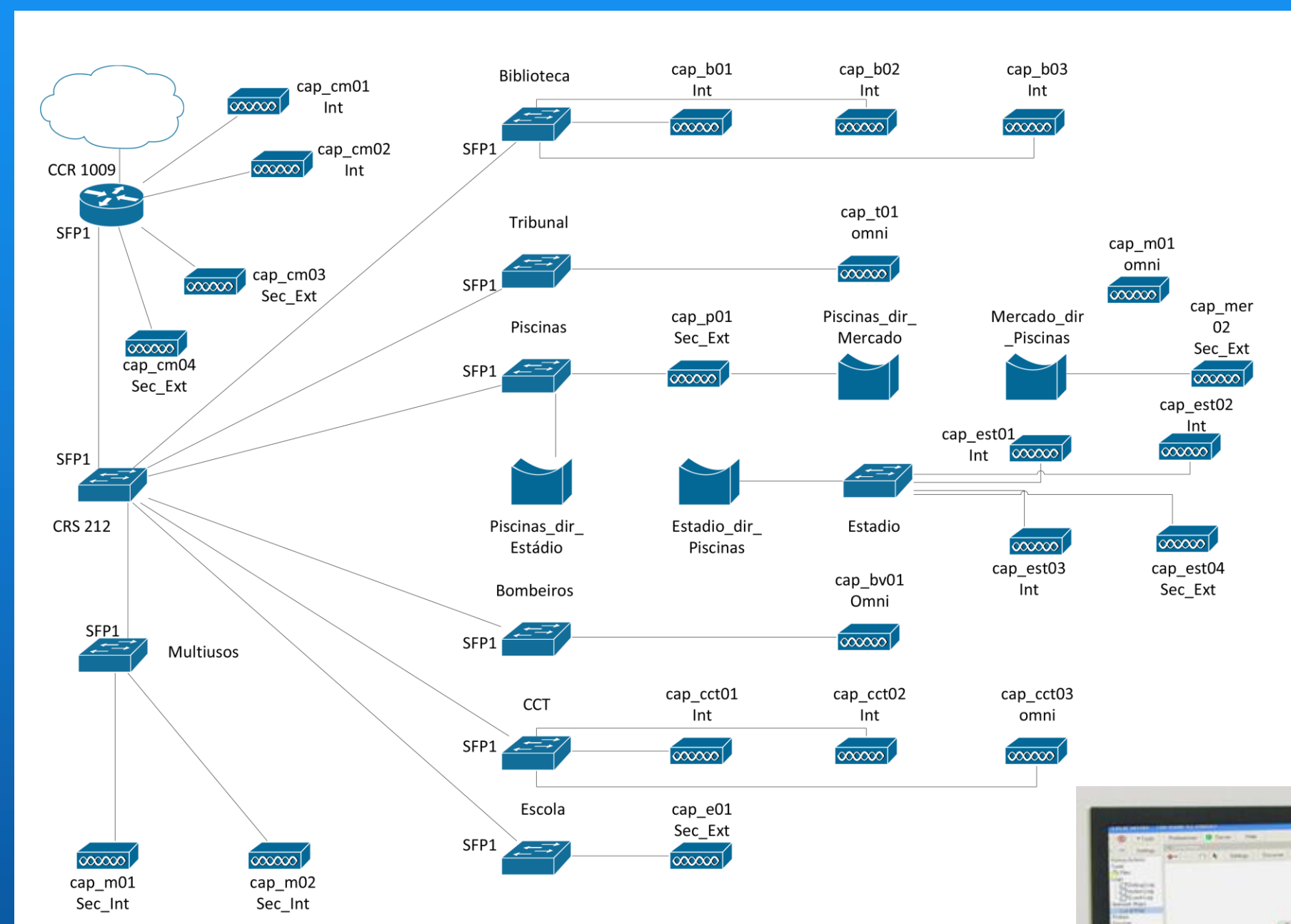
# Desenho arquitetura de rede



## Instalação e configuração da infraestrutura



## Suporte, monitorização e manutenção técnica





# Implementações

visit Portugal



WIFI4EU

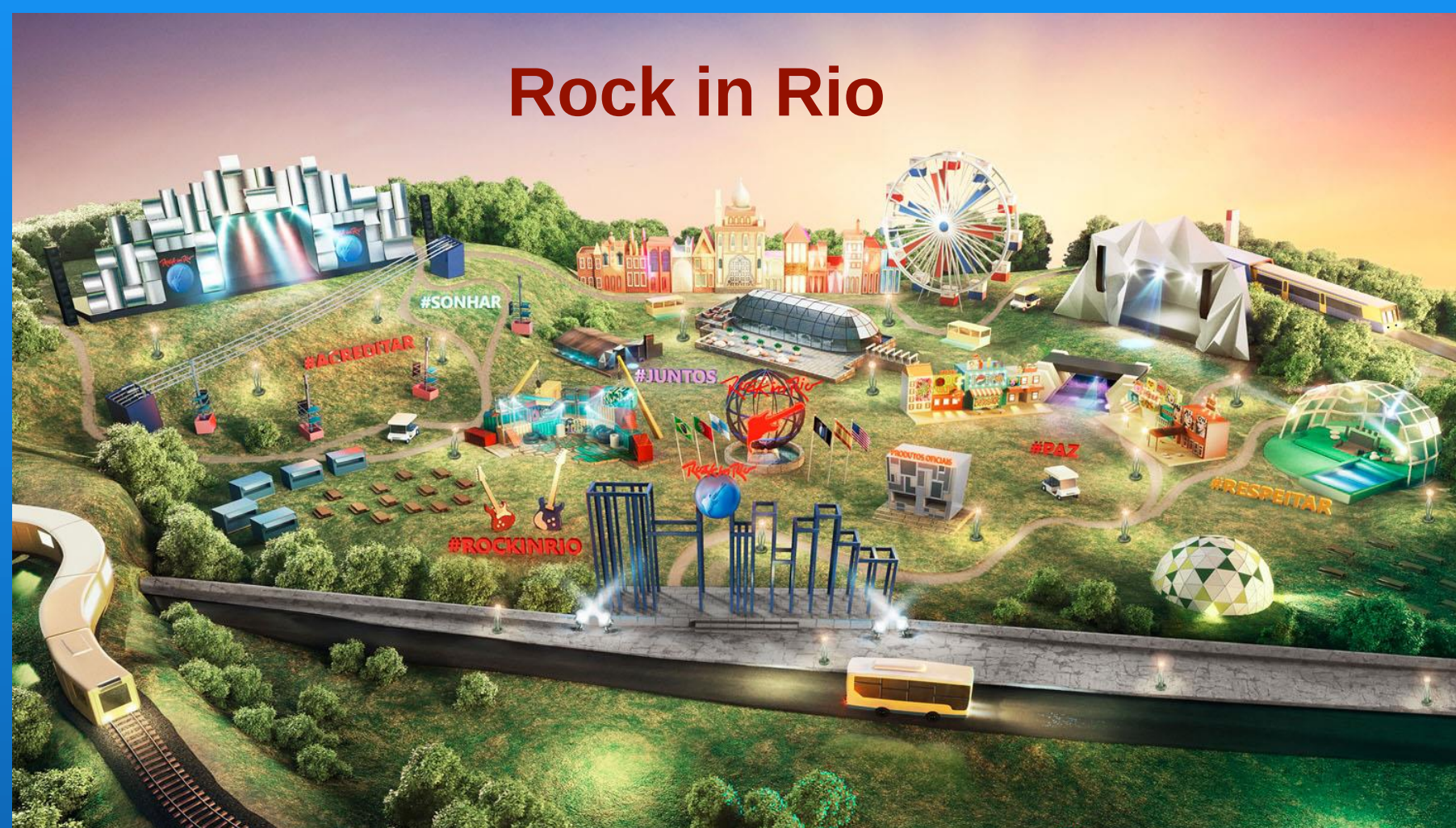


Smart City Solutions

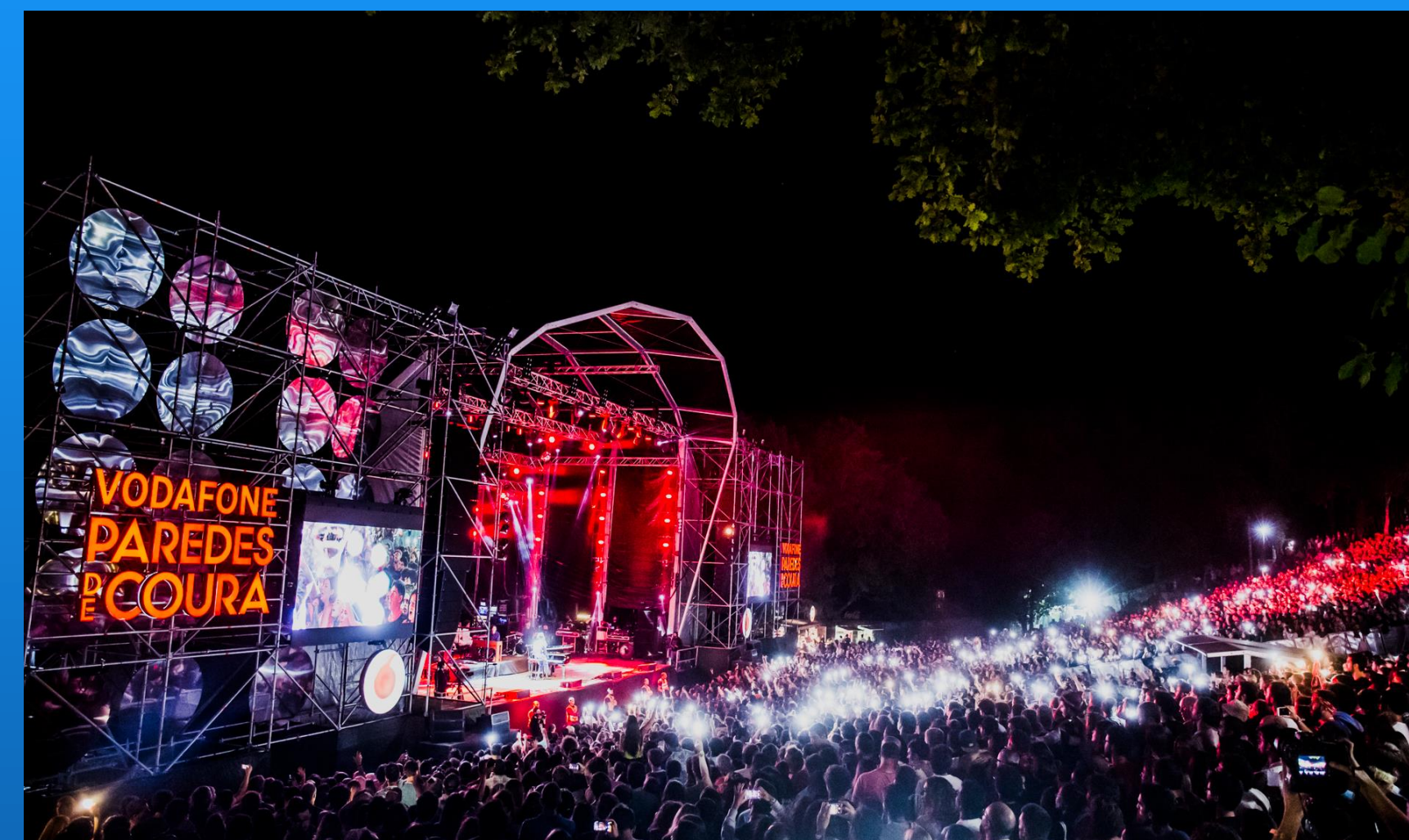




# Eventos Temporários



Cobertura Wifi indoor/outdoor  
de alta densidade



Transporte IP para múltiplos  
sites áudio/vídeo



E MUITOS MAIS...



# LTE no MikroTik

# LTE

- PEN Lte / Modem USB
- Routerboard's com Modem's incorporados.



# Casos Práticos

- Hotspot para veículos (p.e. LtAP mini)
- Ligação à Internet em sítios remotos (p.e. LHG LTE)
- Backup da ligação à Internet principal
- Gestão outbound



# Quick Set - LTE

- Configuração rápida
- Serve para a maior parte dos casos
- LTE AP – Router LTE com Wi-fi
- LTE – Router LTE sem Wi-fi

# LTE – AP Quick set

admin@74:4D:28:14:80:8A (MikroTik) - WinBox v6.45.6 on LtAP mini (mipsbe)

Session Settings Dashboard

Safe Mode Session: 74:4D:28:14:80:8A

**Quick Set** **LTE AP** Quick Set

**Wireless**

Network Name: MikroTik-14808C

Frequency: auto MHz

Band: 2GHz-B/G/N

Country: no\_country\_set

MAC Address: 74:4D:28:14:80:8C

☐ Use Access List (ACL)

WiFi Password: 12345678 ☐ Hide **WPS Accept**

**Guest Wireless Network**

Guest Network:

**Wireless Clients**

| MAC Address | In ACL | Last IP | Uptime | Signal Strength |
|-------------|--------|---------|--------|-----------------|
|-------------|--------|---------|--------|-----------------|

☒ Signal Strength:

**LTE**

PIN: 1234

APN: internet.vodafone.pt

**Status**

Current Operator:

EARFCN:

**Internet**

IP Address: 0.0.0.0

☒ Firewall Router

**Local Network**

IP Address: 192.168.88.1

Netmask: 255.255.255.0 (/24)

☒ DHCP Server

DHCP Server Range: 192.168.88.10-192.168.88.254

☒ NAT

☐ UPnP

**System**

Router Identity: LTE-AP

**Check For Updates** **Reset Configuration**

Password:

Confirm Password:

**Copy To ACL** **Remove From ACL**

active

# LTE Quick set

LTE

Quick Set

- LTE -

Band: ☐ 1 ☒ 3 ☒ 7 ☒ 20 ☐ 8 ☐ 2 ☐ 38 ☐ 40

PIN:

APN:

- Status -

Current Operator:

EARFCN:

SINR:

- Internet -

IP Address:

☒ Firewall Router

- Local Network -

IP Address:

Netmask:

☒ DHCP Server

DHCP Server Range:

☒ NAT

☐ UPnP

- VPN -

☐ VPN Access

VPN Address:

- System -

Router Identity:

Password:

Confirm Password:

OK

Cancel

Apply



# Interface LTE

Quick Set

CAPsMAN

**Interfaces**

Wireless

Bridge

Interface List

Interface

Interface List

Ethernet

EoIP Tunnel

IP Tunnel

GRE Tunnel

VLAN

VRRP

Bonding

**LTE**

✓

✗

📁

🔍

**LTE APNs**

LTE Scanner

|   | Name | Type | MTU  | Actual MTU | L2 MTU | Tx    | Rx |
|---|------|------|------|------------|--------|-------|----|
| R | lte1 | LTE  | 1480 | 1480       |        | 0 bps |    |

# LTE APN

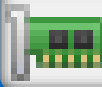
LTE APN <default> □ ✕

|                         |                                                       |                                                                                    |
|-------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------|
| Name:                   | <input type="text" value="default"/>                  | <div>OK</div> <div>Cancel</div> <div>Apply</div> <div>Copy</div> <div>Remove</div> |
| APN:                    | <input type="text" value="internet.vodafone.pt"/>     |                                                                                    |
| IP Type:                | <input type="text" value="IPv4"/> ▾                   |                                                                                    |
|                         | <input checked="" type="checkbox"/> Use Peer DNS      |                                                                                    |
|                         | <input checked="" type="checkbox"/> Add Default Route |                                                                                    |
| Default Route Distance: | <input type="text" value="1"/>                        |                                                                                    |
| IPv6 Interface:         | <input type="text" value="none"/> ▾                   |                                                                                    |
| <hr/>                   |                                                       |                                                                                    |
| Authentication:         | <input type="text" value="none"/> ▾                   |                                                                                    |
| <hr/>                   |                                                       |                                                                                    |
| Passthrough Interface:  | <input type="text" value="none"/> ▾                   |                                                                                    |

# Interface LTE

 Quick Set

 CAPsMAN

 Interfaces

 Wireless

 Bridge

Interface List

Interface

Interface List

Ethernet

EoIP Tunnel

IP Tunnel

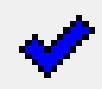
GRE Tunnel

VLAN

VRRP

Bonding

LTE









LTE APNs

LTE Scanner

|   | Name                                                                                     | Type | MTU  | Actual MTU | L2 MTU | Tx    | Rx |
|---|------------------------------------------------------------------------------------------|------|------|------------|--------|-------|----|
| R |  lte1 | LTE  | 1480 | 1480       |        | 0 bps |    |



# LTE Status

Interface <lte1>

General

Cellular

Status

Traffic

Current Operator:

LAC:

Current Cell ID:

eNB ID:

Sector ID:

PHY Cell ID:

Access Technology:

IMEI:

IMSI:

UICC:

EARFCN:

Session Uptime:

RSRP:

RSRQ:

SINR:

OK

Cancel

Apply

Disable

Comment

Torch

Scan...

enabled

running

slave

# LTE Passthrough

# LTE Passthrough

LTE APN <vodafone>

Name:

APN:

IP Type:  ▾

☒ Use Peer DNS

☒ Add Default Route

Default Route Distance:

IPv6 Interface:  ▾

Authentication:  ▾

Passthrough Interface:  ▾

Passthr. MAC Address:

Passthr. Subnet Selection:  ▾

OK

Cancel

Apply

Copy

Remove



# LTE Passthrough

```
/interface lte apn
```

```
add      apn=internet.vodafone.pt    default-route-distance=1  
name=vodafone passthrough-interface=ether1 passthrough-  
mac=auto
```

```
/interface lte
```

```
set [ find ] apn-profiles=vodafone mtu=1500 name=wwan
```



# LTE Passthrough com Vlan's

Interface List

Interface

Interface List

Ethernet

EoIP Tunnel

IP Tunnel

GRE Tunnel

VLAN

VRRP

Bonding

LTE

+

−

✓

✗

📄

📶

Detect Internet

|   | Name                                                                                          | Type                     | Actual MTU | L2 MTU | Tx        | Rx       |
|---|-----------------------------------------------------------------------------------------------|--------------------------|------------|--------|-----------|----------|
| R |  ether1    | Ethernet                 | 1500       | 1598   | 42.4 kbps | 4.0 kbps |
| R |  eth1.q306 | VLAN                     | 1500       | 1594   | 0 bps     | 0 bps    |
| R |  eth1.q69  | VLAN                     | 1500       | 1594   | 0 bps     | 0 bps    |
| X |  wlan1     | Wireless (Atheros AR9... | 1500       | 1600   | 0 bps     | 0 bps    |
|   |  wwan      | LTE                      | 1500       |        | 0 bps     | 0 bps    |

5 items

# LTE Passthrough com Vlan's

LTE APN <vodafone>

Name:

APN:

IP Type:  ▼

☒ Use Peer DNS

☒ Add Default Route

Default Route Distance:

IPv6 Interface:  ▼

Authentication:  ▼

Passthrough Interface:  ▼

Passthr. MAC Address:

Passthr. Subnet Selection:  ▼

OK

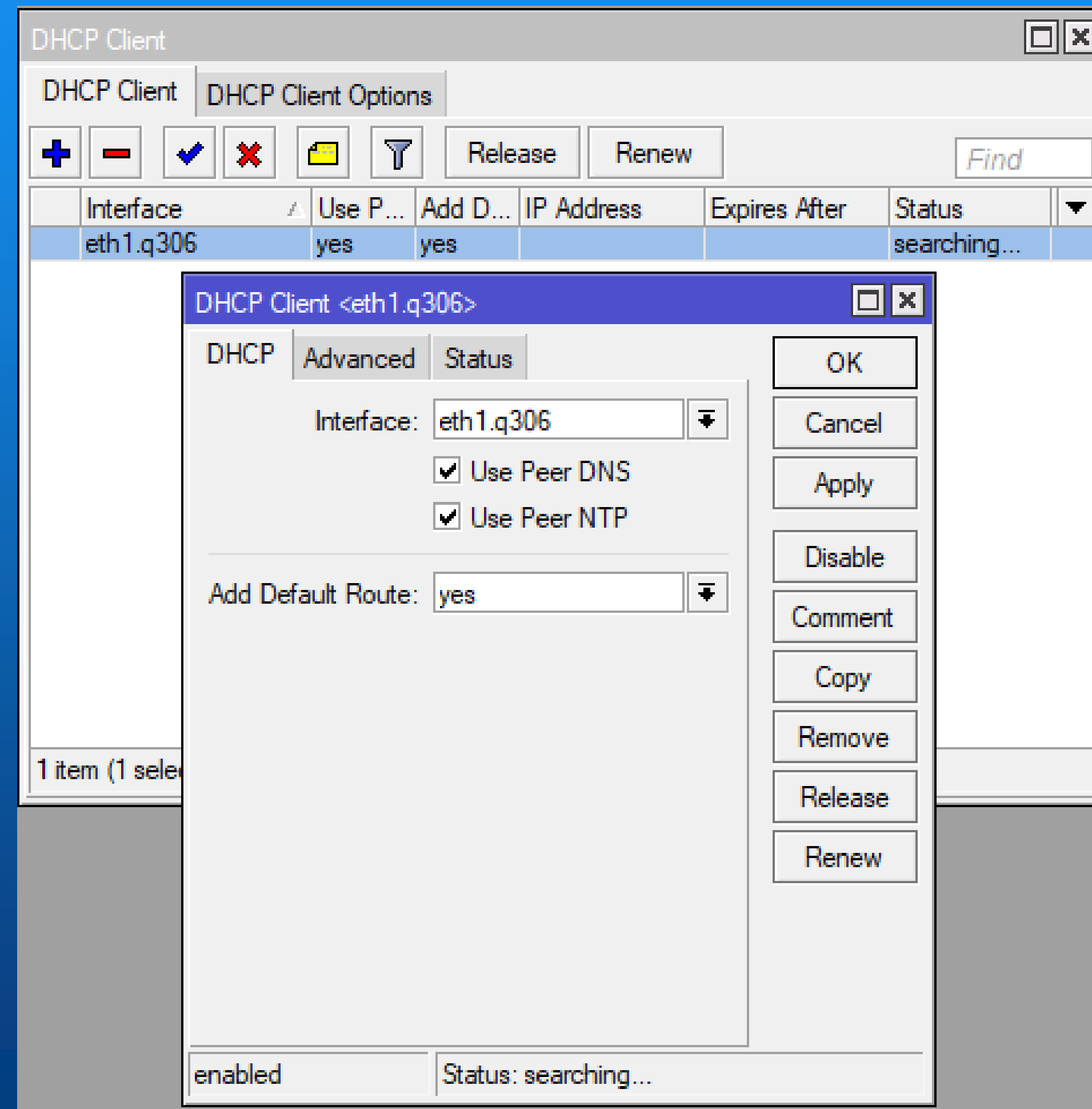
Cancel

Apply

Copy

Remove

# LTE Passthrough com vlan's





# LTE Passthrough

## **/interface vlan**

add interface=ether1 name=eth1.q306 vlan-id=306

add interface=ether1 name=eth1.q69 vlan-id=69

## **/interface lte apn**

add apn=internet.vodafone.pt default-route-distance=1

name=vodafone passthrough-interface=eth1.q69

passthrough-mac=auto

## **/ip dhcp-client**

add dhcp-options=hostname,clientid disabled=no

interface=eth1.q306



# LTE Passthrough com Multiplos APN's

Interface List

Interface

Interface List

Ethernet

EoIP Tunnel

IP Tunnel

GRE Tunnel

VLAN

VRRP

Bonding

LTE

+

▼

—

✓

✗

📄

🔍

Detect Internet

|             | Name                                                                                          | Type                     | Actual MTU | L2 MTU | Tx        | Rx |
|-------------|-----------------------------------------------------------------------------------------------|--------------------------|------------|--------|-----------|----|
| ::: defconf |                                                                                               |                          |            |        |           |    |
| R           |  bridge    | Bridge                   | 1500       | 1598   | 56.3 kbps |    |
| RS          |  ether1    | Ethernet                 | 1500       | 1598   | 56.6 kbps |    |
| R           |  eth1.q101 | VLAN                     | 1500       | 1594   | 0 bps     |    |
| R           |  eth1.q102 | VLAN                     | 1500       | 1594   | 0 bps     |    |
| S           |  wlan1     | Wireless (Atheros AR9... | 1500       | 1600   | 0 bps     |    |
|             |  wwan      | LTE                      | 1480       |        | 0 bps     |    |

# LTE Passthrough com Multiplos APN's

LTE APN <netfixa>

Name:

APN:

IP Type:

☒ Use Peer DNS

☒ Add Default Route

Default Route Distance:

IPv6 Interface:

Authentication:

Passthrough Interface:

Passthr. MAC Address:

OK Cancel Apply Copy Remove

LTE APN <vozfixa>

Name:

APN:

IP Type:

☒ Use Peer DNS

☒ Add Default Route

Default Route Distance:

IPv6 Interface:

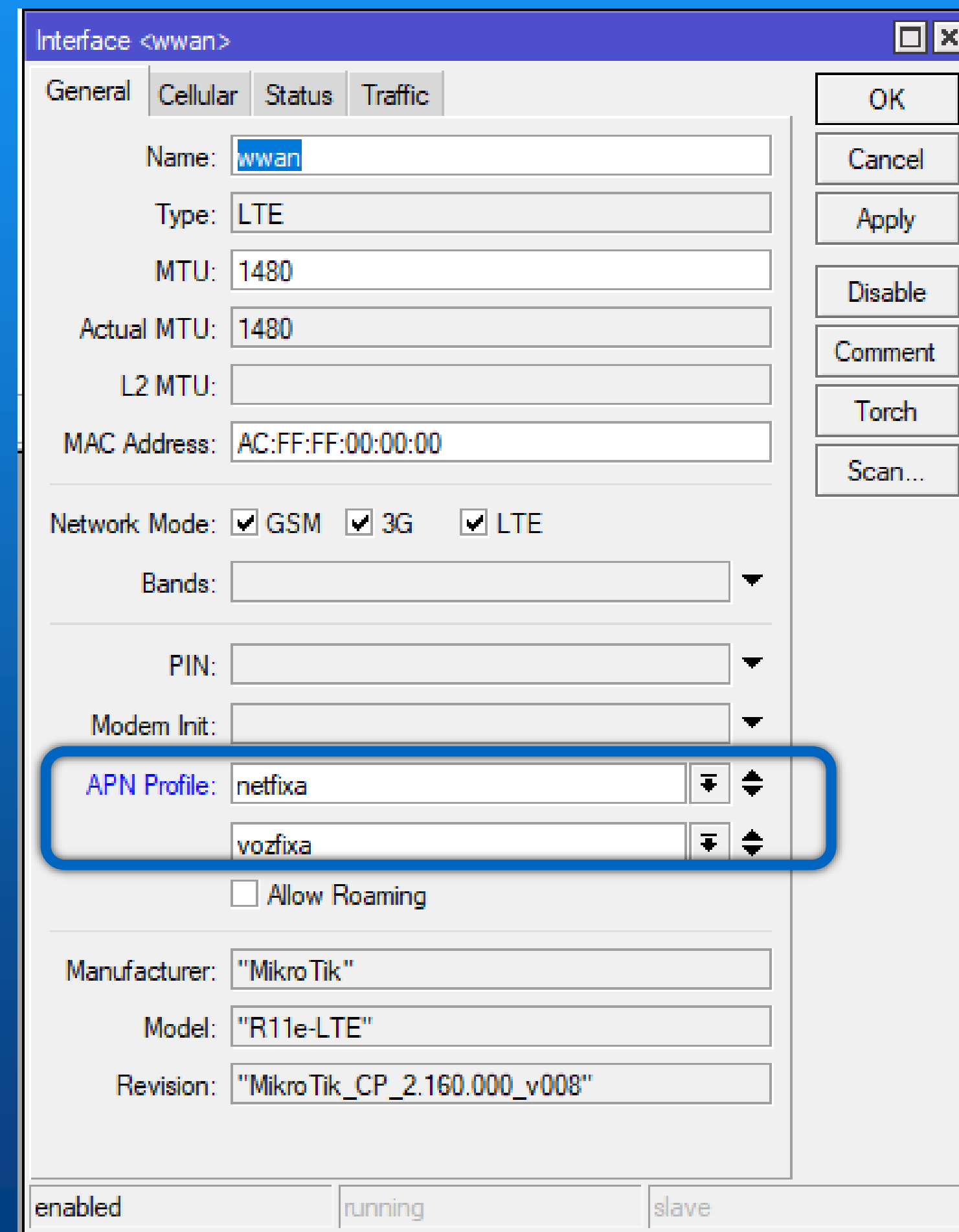
Authentication:

Passthrough Interface:

Passthr. MAC Address:

OK Cancel Apply Copy Remove

# LTE Passthrough com Multiplos APN's

A screenshot of a software configuration window titled "Interface <wwan>". The window has four tabs: "General", "Cellular", "Status", and "Traffic", with "General" currently selected. The "General" tab contains several fields: "Name" (set to "wwan"), "Type" (set to "LTE"), "MTU" (set to "1480"), "Actual MTU" (set to "1480"), "L2 MTU" (empty), and "MAC Address" (set to "AC:FF:FF:00:00:00"). Below these are "Network Mode" (with checkboxes for GSM, 3G, and LTE, all checked), "Bands" (empty dropdown), "PIN" (empty dropdown), and "Modem Init" (empty dropdown). A blue rectangular box highlights the "APN Profile" section, which contains two entries: "netfixa" and "vozfixa", each with up and down arrow icons to its right. Below this is an "Allow Roaming" checkbox (unchecked). At the bottom are fields for "Manufacturer" ("MikroTik"), "Model" ("R11e-LTE"), and "Revision" ("MikroTik\_CP\_2.160.000\_v008"). On the right side of the window are buttons for "OK", "Cancel", "Apply", "Disable", "Comment", "Torch", and "Scan...". At the very bottom, there are three status indicators: "enabled", "running", and "slave".



# LTE Passthrough com Múltiplos APN's

```
/interface lte
```

```
set [ find ] apn-profiles=netfixa,vozfixa mac-  
address=AC:FF:FF:00:00:00 name=wwan
```

```
/interface lte apn
```

```
add apn=internetfixa.vodafone.pt default-route-distance=1  
name=netfixa passthrough-interface=eth1.q101 passthrough-  
mac=auto
```

```
add apn=vozfixa.vodafone.pt default-route-distance=1 name=vozfixa  
passthrough-interface=eth1.q102 passthrough-mac=auto
```

# Logging

The screenshot shows the MikroTik WinBox interface. In the left sidebar, the 'System' menu is highlighted. In the right sidebar, the 'Logging' option is selected. The 'Logging' window is open, showing a table of log rules. A 'New Log Rule' dialog box is also open, showing fields for Topics, Prefix, and Action.

**Logging Window:**

- Rules tab is active.
- Buttons: +, -, ✓, ✗, Filter, Find.
- Table with 4 columns: Topics, Prefix, Action, and a dropdown arrow.
- Table content:

| Topics     | Prefix | Action |  |
|------------|--------|--------|--|
| * critical |        | echo   |  |
| * error    |        | memory |  |
| * info     |        | memory |  |
| * warning  |        | memory |  |

**New Log Rule Dialog:**

- Topics: ☐ lte
- Prefix:
- Action:
- Buttons: OK, Cancel, Apply, Disable, Copy, Remove.

4 items enabled



# Contactos

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BOA MuM