

DHCP

- Per interface DHCP server
- DHCP client and relay
- Static and dynamic DHCP leases
- RADIUS support
- Custom DHCP options
- DHCPv6 Prefix Delegation (DHCPv6-PD)
- DHCPv6 Client

Hotspot

- Plug-n-Play access to the Network
- Authentication of local Network Clients
- Users Accounting
- RADIUS support for Authentication and Accounting

QoS

- Hierarchical Token Bucket (HTB) QoS system with CIR, MIR, burst and priority support
- Simple and fast solution for basic QoS implementation - Simple queues
- Dynamic client rate equalization (PCQ)

Proxy

- HTTP caching proxy server
- Transparent HTTP proxy
- SOCKS protocol support
- DNS static entries
- Support for caching on a separate drive
- Parent proxy support
- Access control list
- Caching list

Tools

- Ping, traceroute
- Bandwidth test, ping flood
- Packet sniffer, torch
- Telnet, ssh
- E-mail and SMS send tools
- Automated script execution tools
- CALEA
- File Fetch tool
- Advanced traffic generator
- WoL (Wake on LAN) sending

Other features

- Samba support
- OpenFlow support
- Bridging – spanning tree protocol (STP, RSTP), bridge firewall and MAC natting.
- Dynamic DNS update tool
- NTP client/server and synchronization with GPS system
- VRRP v2 and v3 support
- SNMP
- M3P - MikroTik Packet packer protocol for wireless links and ethernet
- MNDP - MikroTik neighbor discovery protocol, supports CDP (Cisco discovery protocol)
- RADIUS authentication and accounting
- TFTP server
- Synchronous interface support (Farsync cards only) (Removed in v5.x)
- Asynchronous – serial PPP dial-in/dial-out, dial on demand
- ISDN – dial-in/dial-out, 128K bundle support, Cisco HDLC, x75i, x75ui, x75bui line protocols, dial on demand

Kernel version

- RouterOS version 6.x uses 3.3.5
- RouterOS version 7.x uses 5.6.3

Supported Encryptions

RouterOS 7 is used for the management of network (telecommunication) devices.

- RouterOS 7 includes encryption features (components), intended for data (information) security, passed through telecommunication channels and device control channels.
- All encryption features (components) are an integral part of RouterOS 7 and can not be changed by the end-users.
- RouterOS 7 is intended for installation by end-users without significant support from the vendor.
- RouterOS 7 uses the following security protocols:

Supported security protocol	Encryption algorithm	Maximum key length
IPSec	DES	56 bit
	3DES	168 bit
	AES	128, 192, 256 bit
	Blowfish	448 bit
	Twofish	256 bit
	Camelia	128, 192, 256 bit
PPTP (with MPPE)	RC4	128 bit
L2TP (with MPPE)	RC4	128 bit
SNMP	DES	56 bit
	AES	128 bit
SSH	Blowfish	128 bit
	3DES	192 bit
	AES	128, 192, 256 bit
SSTP	AES	256 bit
	RC4	128 bit
Used in WinBox connection (nameless)	AES	128 bit
WEP	RC4	104 bit
WPA-TKIP	RC4	128 bit
WPA2-TKIP	RC4	128 bit
WPA-AES	AES	128 bit
WPA2-AES	AES	128, 256 bit
WPA3	AES	128, 256 bit
HTTPS	NULL, RC4, DES, DES40, 3DES, AES	128, 192, 256 bit

Feature support based on architecture

All devices support the same features, with a few exceptions, clarified in the below table:

Architecture	Not supported	Exclusively supported
ARM (ARM32)		Zerotier, Container (only ARM32 / ARMv5 containers), BTH
ARM64		Zerotier, Container, BTH
MIPSBE	Zerotier, Dude server	
MMIPS	Zerotier	
SMIPS	Zerotier, DOT1X, BGP, MPLS, PIMSM, Dude server, User manager	
TILE	Zerotier	BTH
PPC	Zerotier, Dude server	
X86 PC	Zerotier, Cloud	Container
CHR VM		

Apart from features, there are also a few differences in hardware capabilities, based on the specific model of device. For these differences, please see the below articles:

- Wifi - new driver implementation for 802.11ax devices and supported older devices <https://help.mikrotik.com/docs/display/ROS/Wifi>
- L3 Hardware offloading <https://help.mikrotik.com/docs/display/ROS/L3+Hardware+Offloading#L3HardwareOffloading-L3HWDeviceSupport>
- PTP <https://help.mikrotik.com/docs/display/ROS/Precision+Time+Protocol>
- Switch chip features <https://help.mikrotik.com/docs/display/ROS/Switch+Chip+Features>

First Time Configuration

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Connecting to the Router

There are two types of routers:

- Routers with default configuration.
- Routers without default configuration. In cases where no specific configuration is present, the IP address 192.168.88.1/24 is assigned to ether1, combo1, sfp1, or MGMT/BOOT.

For additional details regarding the current default configuration, please refer to the Quick Guide document provided with your device. This document outlines which ports to initially utilize for connection and instructions on device setup.

This document describes the step-by-step process for configuring the device from scratch. Therefore, we recommend clearing all defaults when initiating the setup.

When connecting the first time to the router with the default username **admin** and **no password** (or, for some models, check user and wireless passwords on the sticker). Upon the initial boot, a notification will appear, offering you the choice to either remove the default configuration (even if the default config has only an IP address), leading to a reboot with no configuration applied, or to "Show Script" and retain the current default configuration, applying it accordingly. Since this article assumes that there is no configuration on the router, you should remove it by pressing "r" on the keyboard when prompted or click on the "Remove Configuration" button in WinBox.

Router without Default Configuration

If the router doesn't have a default configuration, there are multiple options to consider. However, in this case, we'll opt for a method that best fits our requirements.

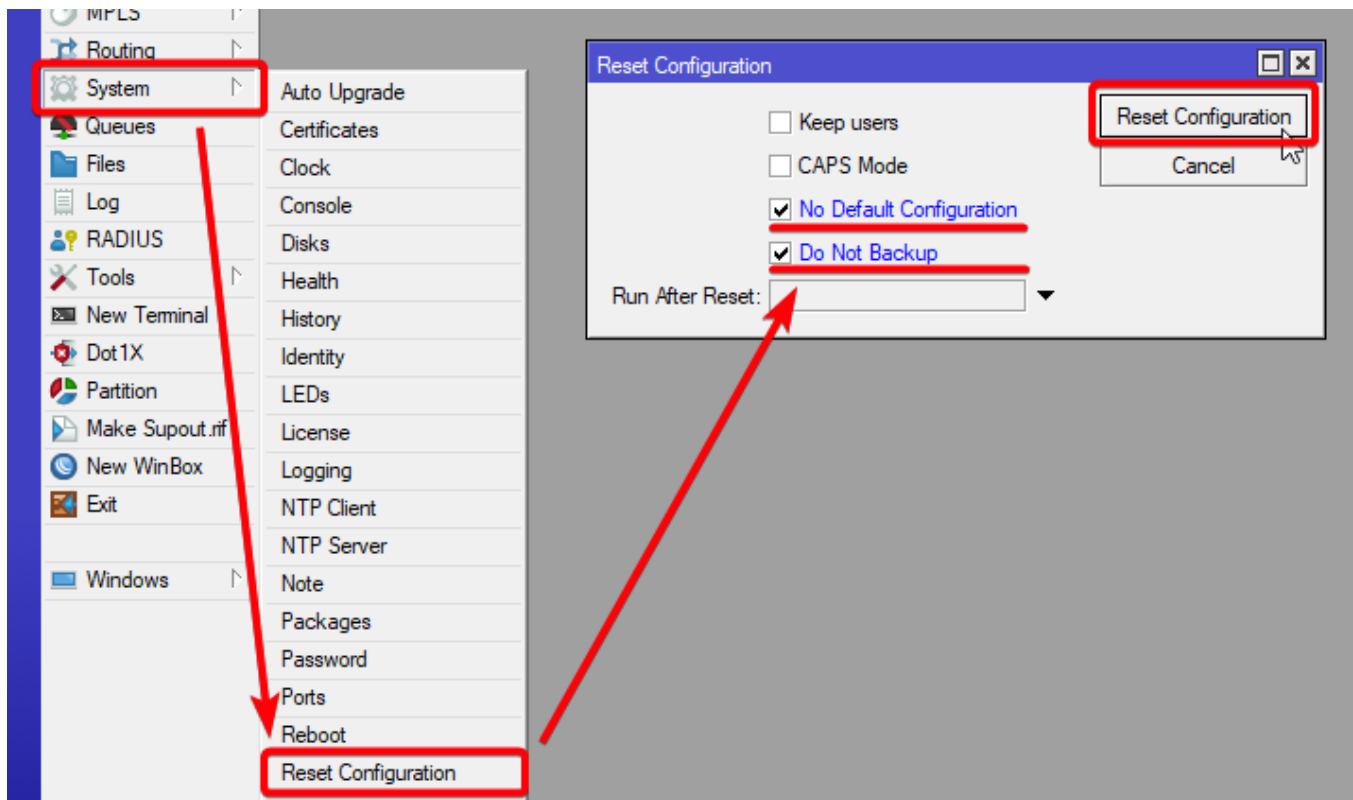
Connect the ISP cable to the router's ether1 port and connect your PC to any port **except** ether1. Then, launch WinBox and search for your router using the neighbor discovery feature. See detailed example in [Winbox article](#).

If the router appears in the list, select its MAC address and click **Connect**.

The easiest method to ensure a completely clean router is to run the CLI command

```
/system reset-configuration no-defaults=yes skip-backup=yes
```

Or from WinBox:



Configuring IP Access

As MAC connection can sometimes be unreliable, our first step is to configure the router to enable IP connectivity:

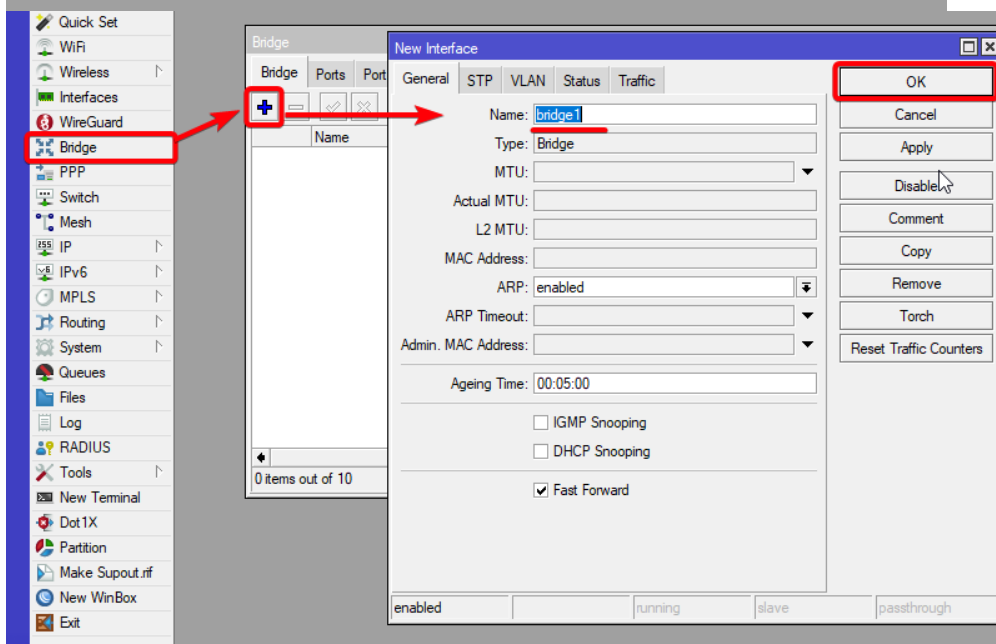
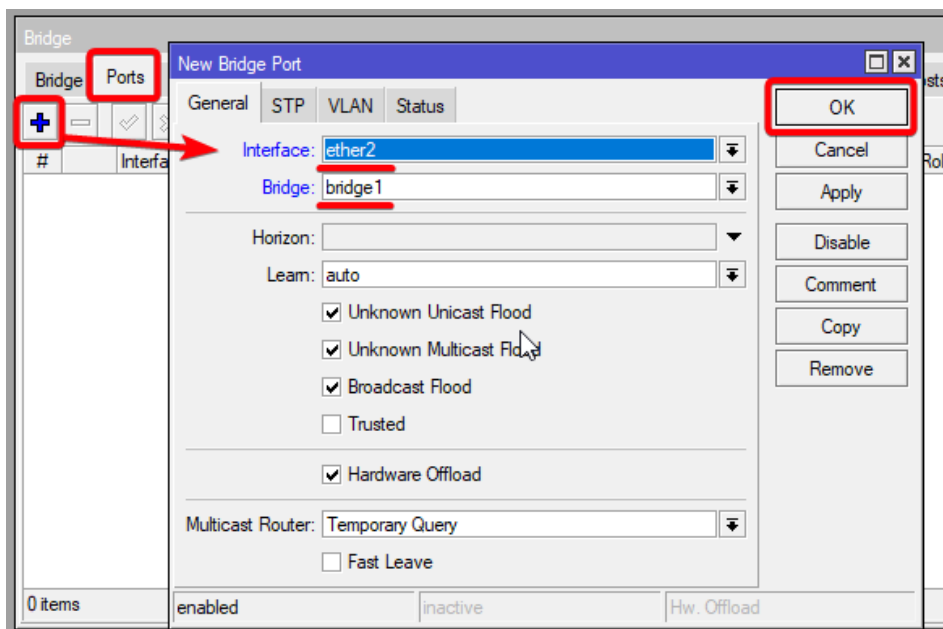
- Create a bridge interface and assign bridge ports;
- Assign an IP address to the bridge interface;
- Configure a DHCP server.

Setting up the bridge and assigning an IP address are straightforward processes:

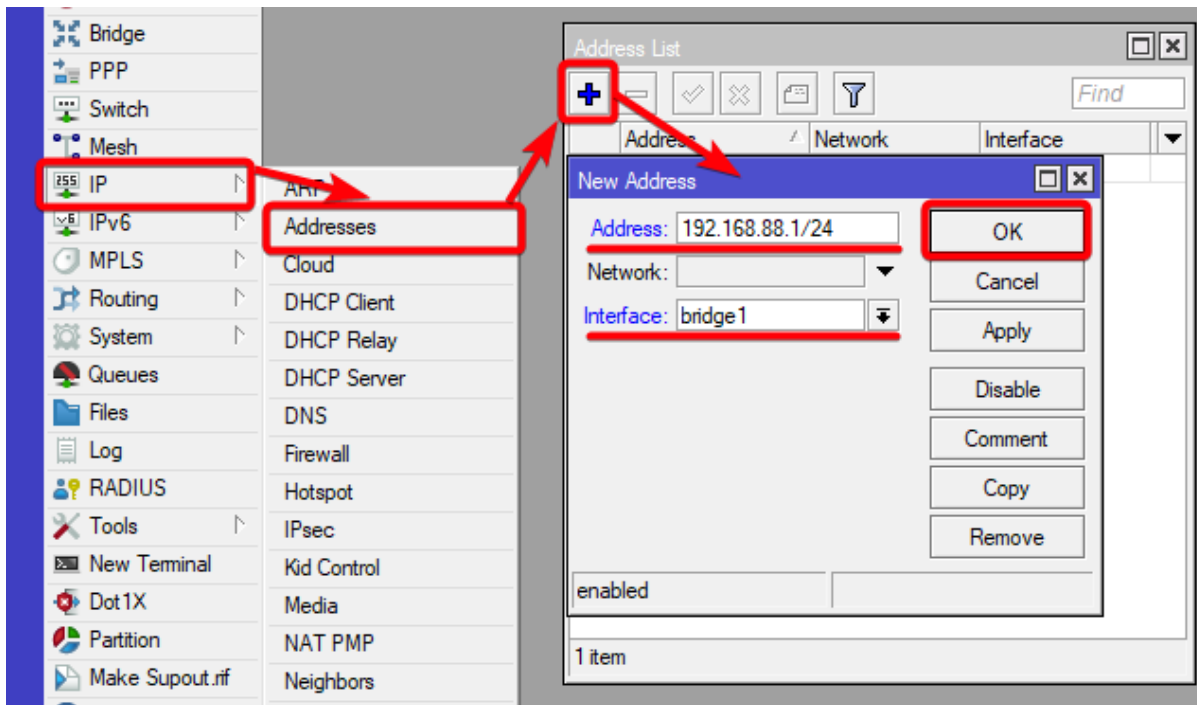
```
/interface bridge add name=bridge1
/interface bridge port add interface=ether2 bridge=bridge1
/ip address add address=192.168.88.1/24 interface=bridge1
```

If you prefer WinBox/WebFig as configuration tools:

- Open **Bridge** window, **Bridge** tab should be selected;
- Click on the **+** button to open a new dialog box. You can either enter a custom bridge name or retain the default **bridge1**, then click **OK** to proceed;
- Switch to the **Ports** tab and click on the **+** button to open another dialog box;
- Select interface **ether2** and bridge **bridge1** from drop-down lists and click on the **OK** button to apply settings;
- You may close the bridge dialog.



- Access the **IP** menu and navigate to the **Addresses** dialog;
- Select the **+** button to open a new dialog box;
- Enter IP address **192.168.88.1/24** select interface **bridge1** from the drop-down list;
- Click **OK** to confirm the settings.



Next, proceed with setting up a DHCP server. To simplify and expedite this process, we'll execute the **setup** command.

```
[admin@MikroTik] > ip dhcp-server/ setup [enter]
Select interface to run DHCP server on

dhcp server interface: bridge1 [enter]
Select network for DHCP addresses

dhcp address space: 192.168.88.0/24 [enter]
Select gateway for given network

gateway for dhcp network: 192.168.88.1 [enter]
Select pool of ip addresses given out by DHCP server

addresses to give out: 192.168.88.2-192.168.88.254 [enter]
Select DNS servers

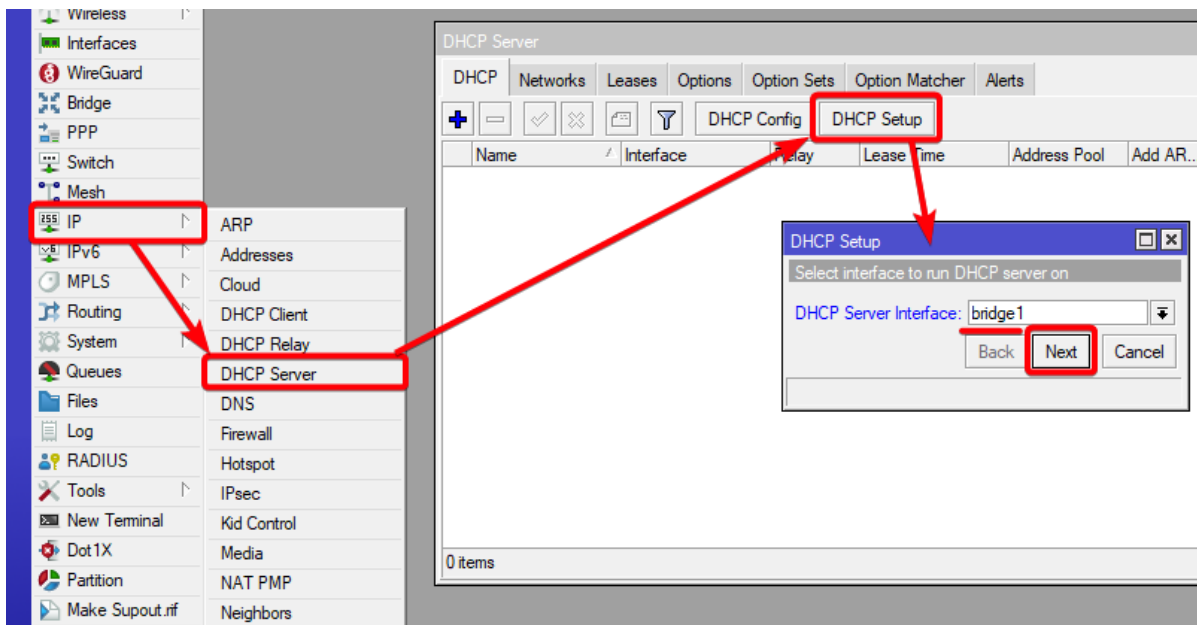
dns servers: 192.168.88.1 [enter]
Select lease time

lease time: 1800 [enter]
```

Notice that most of the configuration options are automatically determined and you just simply need to hit the enter key.

The setup tool is also accessible in WinBox/WebFig:

- Navigate to **IP -> DHCP Server** window, ensuring the **DHCP** tab is selected;
- Click on the **DHCP Setup** button to open a new dialog;
- Select the **bridge1** as the **DHCP Server Interface** and click **Next**;
- Follow the wizard to complete the setup.



Following these steps, the connected PC should now obtain a dynamic IP address. You can then close Winbox and reconnect to the router using the IP address (192.168.88.1).

Configuring Internet Connection

To enable internet access for the router, you'll need to configure one of the following common types of internet connections:

- Dynamic public IP address.
- Static public IP address.
- PPPoE connection.

Dynamic Public IP

Dynamic address configuration is the easiest option. Simply set up a DHCP client on the public interface. The DHCP client will obtain information from your Internet Service Provider (ISP), such as an IP address, DNS servers, NTP servers, and default route, making the setup process straightforward for you.

```
/ip dhcp-client add disabled=no interface=ether1
```

After adding the client you should see the assigned address and status should be bound

```
[admin@MikroTik] > ip dhcp-client print
Columns: INTERFACE, USE-PEER-DNS, ADD-DEFAULT-ROUTE, STATUS, ADDRESS
# INTERFACE USE-PEER-DNS ADD-DEFAULT-ROUTE STATUS ADDRESS
0 ether1 yes yes bound 1.2.3.100/24
```

Static Public IP

When configuring a static address, your ISP provides specific parameters, such as:

- IP: 1.2.3.100/24
- Gateway: 1.2.3.1
- DNS: 8.8.8.8

These are three basic parameters that you need to get the internet connection working.

To configure this in RouterOS, we'll manually add an IP address, add a default route with a provided gateway, and set up a DNS server

```
/ip address add address=1.2.3.100/24 interface=ether1
/ip route add gateway=1.2.3.1
/ip dns set servers=8.8.8.8
```

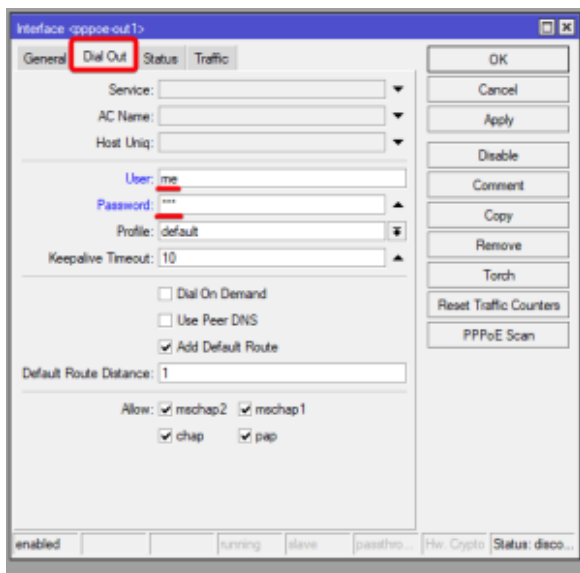
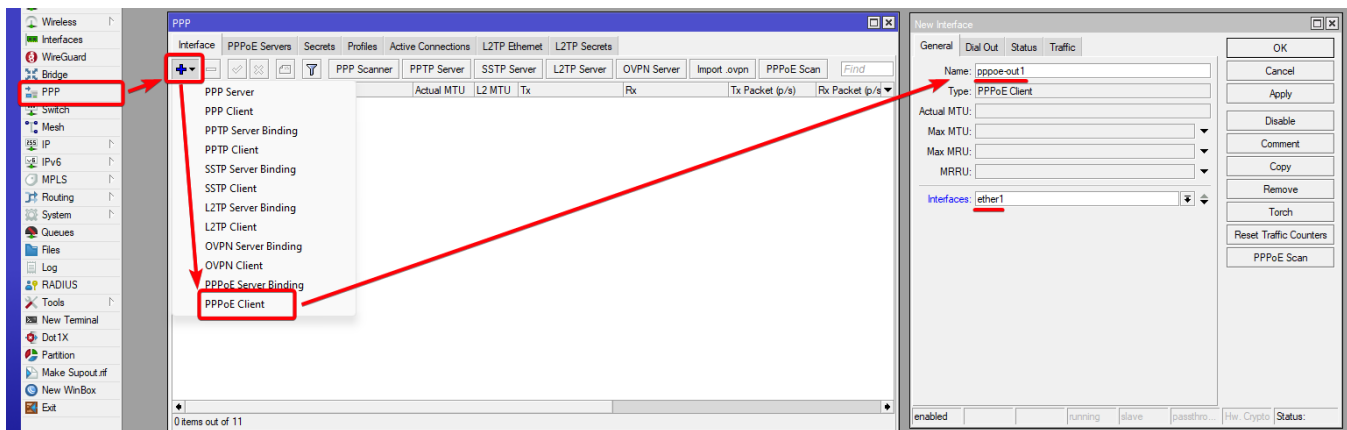
PPPoE Connection

PPPoE connection also gives you a dynamic IP address and can configure dynamically DNS and default gateway. Typically service provider (ISP) gives you a username and password for the connection

```
/interface pppoe-client
add disabled=no interface=ether1 user=me password=123 \
add-default-route=yes use-peer-dns=yes
```

Winbox/WebFig actions:

- In the **PPP** window, select the **Interfaces** tab and click the "+" button;
- Choose **PPPoE Client** from the dropdown list;
- Set the name and select **ether1** as the interface;
- Go to the **Dial Out** tab, configure the username, password, and other parameters;
- Click **OK** to save the settings.



Further in configuration, the **WAN** interface is now the **pppoe-out1** interface, not **ether1**.