

# EoIP Tunnel Interface

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This document applies to MikroTik RouterOS V2.8

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## General Information

### Summary

Ethernet over IP (EoIP) Tunneling is a MikroTik RouterOS protocol that creates an Ethernet tunnel between two routers on top of an IP connection. The EoIP interface appears as an Ethernet interface. When the bridging function of the router is enabled, all Ethernet traffic (all Ethernet protocols) will be bridged just as if there were a physical Ethernet interface and cable between the two routers (with bridging enabled). This protocol makes multiple network schemes possible.

Network setups with EoIP interfaces:

- Possibility to bridge LANs over the Internet
- Possibility to bridge LANs over encrypted tunnels
- Possibility to bridge LANs over 802.11b 'ad-hoc' wireless networks

### Quick Setup Guide

To make an EoIP tunnel between 2 routers which have IP addresses **10.5.8.1** and **10.1.0.1**:

1. On router with IP address **10.5.8.1**, add an EoIP interface and set its MAC address:

```
/interface eoip add remote-address=10.1.0.1 tunnel-id=1 mac-address=00-00-5E-80-00-01 \  
\... disabled=no
```

2. On router with IP address **10.1.0.1**, add an EoIP interface and set its MAC address::

```
/interface eoip add remote-address=10.5.8.1 tunnel-id=1 mac-address=00-00-5E-80-00-02 \  
\... disabled=no
```

Now you can add IP addresses to the created EoIP interfaces from the same subnet.

## Specifications

Packages required: *system*

License required: *level1 (limited to 1 tunnel), level3*

Home menu level: */interface eoip*

Standards and Technologies: [GRE \(RFC1701\)](#)

Hardware usage: *Not significant*

## Related Documents

- [Package Management](#)
- [IP Addresses and ARP](#)
- [Bridge Interfaces](#)
- [PPTP Interface](#)

## Description

An EoIP interface should be configured on two routers that have the possibility for an IP level connection. The EoIP tunnel may run over an IPIP tunnel, a PPTP 128bit encrypted tunnel, a PPPoE connection, or any connection that transports IP.

Specific Properties:

- Each EoIP tunnel interface can connect with one remote router which has a corresponding interface configured with the same 'Tunnel ID'.
- The EoIP interface appears as an Ethernet interface under the interface list.
- This interface supports all features of an Ethernet interface. IP addresses and other tunnels may be run over the interface.
- The EoIP protocol encapsulates Ethernet frames in GRE (IP protocol number 47) packets (just like PPTP) and sends them to the remote side of the EoIP tunnel.
- Maximal count of EoIP tunnels is 65536.

## EoIP Setup

Home menu level: */interface eoip*

## Property Description

**name** (*name*; default: **eoip-tunnelN**) - interface name for reference

**mtu** (*integer*; default: **1500**) - Maximum Transmission Unit. The default value provides maximal compatibility

**arp** (*disabled* | *enabled* | *proxy-arp* | *reply-only*; default: **enabled**) - Address Resolution Protocol

**tunnel-id** (*integer*) - a unique tunnel identifier

**remote-address** - the IP address of the other side of the EoIP tunnel - must be a MikroTik router

**mac-address** (*MAC address*) - MAC address of the EoIP interface. You can freely use MAC addresses that are in the range from 00-00-5E-80-00-00 to 00-00-5E-FF-FF-FF

## Notes

**tunnel-id** is method of identifying tunnel. There should not be tunnels with the same **tunnel-id** on the same router. **tunnel-id** on both participant routers must be equal.

**mtu** should be set to 1500 to eliminate packet refragmentation inside the tunnel (that allows transparent bridging of Ethernet-like networks, so that it would be possible to transport full-sized Ethernet frame over the tunnel).

For **EoIP** interfaces you can use MAC addresses that are in the range from **00-00-5E-80-00-00** to **00-00-5E-FF-FF-FF**.

## Example

To add and enable an EoIP tunnel named **to\_mt2** to the **10.5.8.1** router, specifying **tunnel-id** of **1**:

```
[admin@MikroTik] interface eoip> add name=to_mt2 remote-address=10.5.8.1 \  
\... tunnel-id 1  
[admin@MikroTik] interface eoip> print  
Flags: X - disabled, R - running  
  0 X  name="to_mt2" mtu=1500 arp=enabled remote-address=10.5.8.1 tunnel-id=1  
  
[admin@MikroTik] interface eoip> enable 0  
[admin@MikroTik] interface eoip> print  
Flags: X - disabled, R - running  
  0 R  name="to_mt2" mtu=1500 arp=enabled remote-address=10.5.8.1 tunnel-id=1  
  
[admin@MikroTik] interface eoip>
```

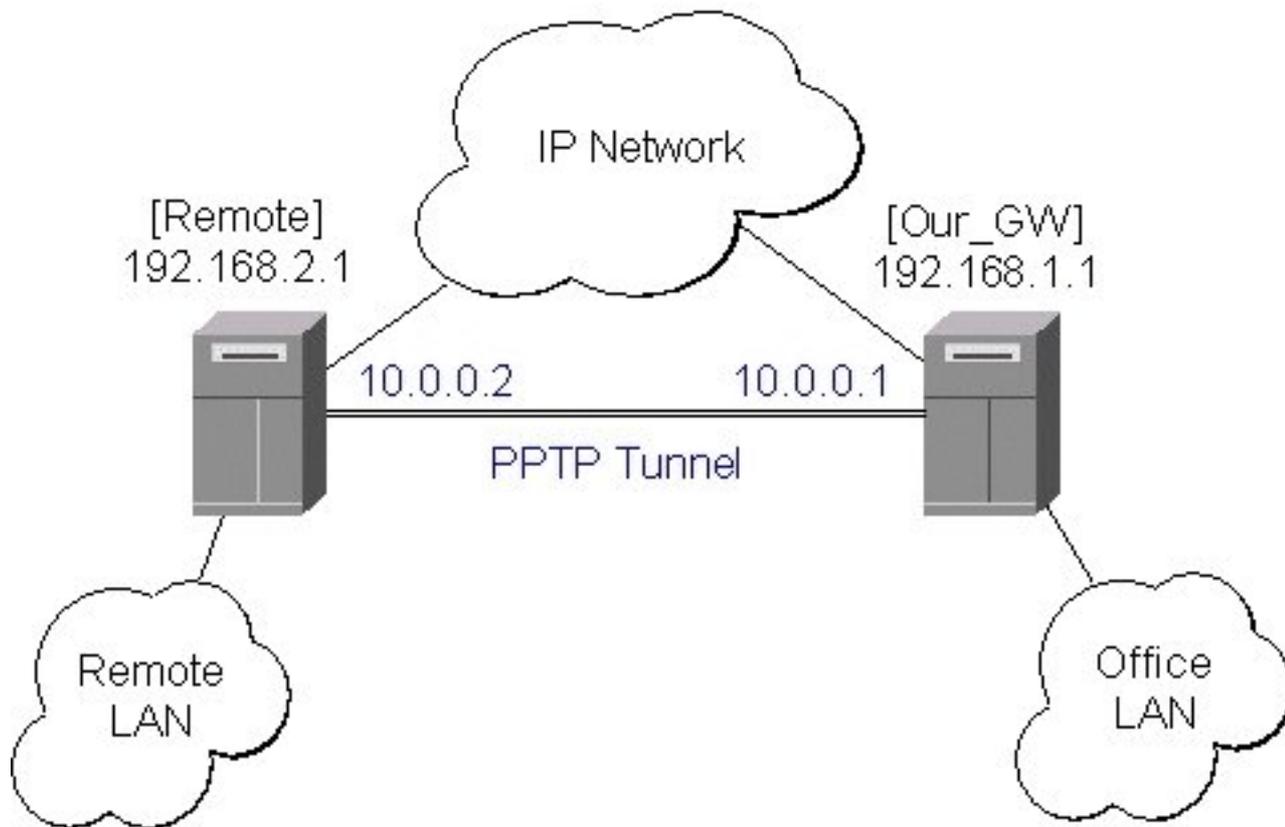
## EoIP Application Example

### Description

Let us assume we want to bridge two networks: 'Office LAN' and 'Remote LAN'. The networks are connected to an IP network through the routers [Our\_GW] and [Remote]. The IP network can be a private intranet or the Internet. Both routers can communicate with each other through the IP network.

### Example

Our goal is to create a secure channel between the routers and bridge both networks through it. The network setup diagram is as follows:



To make a secure Ethernet bridge between two routers you should:

1. Create a PPTP tunnel between them. Our\_GW will be the pptp server:

```
[admin@Our_GW] interface pptp-server> /ppp secret add name=joe service=pptp \
\... password=top_s3 local-address=10.0.0.1 remote-address=10.0.0.2
[admin@Our_GW] interface pptp-server> add name=from_remote user=joe
[admin@Our_GW] interface pptp-server> server set enable=yes
[admin@Our_GW] interface pptp-server> print
Flags: X - disabled, D - dynamic, R - running
#    NAME           USER           MTU    CLIENT-ADDRESS  UPTIME    ENC...
```

The Remote router will be the pptp client:

```
[admin@Remote] interface pptp-client> add name=pptp user=joe \
\... connect-to=192.168.1.1 password=top_s3 mtu=1500 mru=1500
[admin@Remote] interface pptp-client> enable pptp
[admin@Remote] interface pptp-client> print
Flags: X - disabled, R - running
0 R name="pptp" mtu=1500 mru=1500 connect-to=192.168.1.1 user="joe"
password="top_s2" profile=default add-default-route=no
```

```
[admin@Remote] interface pptp-client> monitor pptp
status: "connected"
uptime: 39m46s
encoding: "none"
```

```
[admin@Remote] interface pptp-client>
```

See the PPTP Interface Manual for more details on setting up encrypted channels.

2. Configure the EoIP tunnel by adding the eoip tunnel interfaces at both routers. Use the ip addresses of the pptp tunnel interfaces when specifying the argument values for the EoIP

## tunnel:

```
[admin@Our_GW] interface eoip> add name="eoip-remote" tunnel-id=0 \  
\... remote-address=10.0.0.2  
[admin@Our_GW] interface eoip> enable eoip-remote  
[admin@Our_GW] interface eoip> print  
Flags: X - disabled, R - running  
0 name=eoip-remote mtu=1500 arp=enabled remote-address=10.0.0.2 tunnel-id=0  
[admin@Our_GW] interface eoip>  
  
[admin@Remote] interface eoip> add name="eoip" tunnel-id=0 \  
\... remote-address=10.0.0.1  
[admin@Remote] interface eoip> enable eoip-main  
[admin@Remote] interface eoip> print  
Flags: X - disabled, R - running  
0 name=eoip mtu=1500 arp=enabled remote-address=10.0.0.1 tunnel-id=0  
  
[Remote] interface eoip>
```

### 3. Enable bridging between the EoIP and Ethernet interfaces on both routers.

#### On the Our\_GW:

```
[admin@Our_GW] interface bridge> add forward-protocols=ip,arp,other \  
\... disabled=no  
[admin@Our_GW] interface bridge> print  
Flags: X - disabled, R - running  
0 R name="bridgel" mtu=1500 arp=enabled mac-address=00:00:00:00:00:00  
forward-protocols=ip,arp,other priority=1  
  
[admin@Our_GW] interface bridge> port print  
Flags: X - disabled  
# INTERFACE BRIDGE  
0 eoip-remote none  
1 office-eth none  
2 isp none  
  
[admin@Our_GW] interface bridge> port set "0,1" bridge=bridgel
```

#### And the same for the Remote:

```
[admin@Remote] interface bridge> add forward-protocols=ip,arp,other \  
\... disabled=no  
[admin@Remote] interface bridge> print  
Flags: X - disabled, R - running  
0 R name="bridgel" mtu=1500 arp=enabled mac-address=00:00:00:00:00:00  
forward-protocols=ip,arp,other priority=1  
  
[admin@Remote] interface bridge> port print  
Flags: X - disabled  
# INTERFACE BRIDGE  
0 ether none  
1 adsl none  
2 eoip-main none  
  
[admin@Remote] interface bridge> port set "0,2" bridge=bridgel
```

### 4. Addresses from the same network can be used both in the Office LAN and in the Remote LAN.

## Troubleshooting

### Description

- **The routers can ping each other but EoIP tunnel does not seem to work!**  
Check the MAC addresses of the EoIP interfaces - they should not be the same!