PPTP

Document revision 1.4 (Tue Aug 09 12:01:21 GMT 2005)
This document applies to V2.9

Table of Contents

Table of Contents
General Information
   Summary
   Quick Setup Guide
   Specifications
   Related Documents
   Description
   Additional Documents
PPTP Client Setup
   Property Description
   Example
Monitoring PPTP Client
   Property Description
   Example
PPTP Server Setup
   Description
   Property Description
   Example
PPTP Users
   Description
PPTP Server User Interfaces
   Description
   Property Description
   Example
PPTP Application Examples
   Router-to-Router Secure Tunnel Example
   Connecting a Remote Client via PPTP Tunnel
   PPTP Setup for Windows
   Sample instructions for PPTP (VPN) installation and client setup - Windows 98SE
Troubleshooting
   Description

General Information

Summary

PPTP (Point to Point Tunnel Protocol) supports encrypted tunnels over IP. The MikroTik RouterOS implementation includes support for PPTP client and server.

General applications of PPTP tunnels:
• For secure router-to-router tunnels over the Internet
• To link (bridge) local Intranets or LANs (when EoIP is also used)
• For mobile or remote clients to remotely access an Intranet/LAN of a company (see PPTP setup for Windows for more information)

Each PPTP connection is composed of a server and a client. The MikroTik RouterOS may function as a server or client - or, for various configurations, it may be the server for some connections and client for other connections. For example, the client created below could connect to a Windows 2000 server, another MikroTik Router, or another router which supports a PPTP server.

**Quick Setup Guide**

To make a PPTP tunnel between 2 MikroTik routers with IP addresses 10.5.8.104 (PPTP server) and 10.1.0.172 (PPTP client), follow the next steps.

• Setup on PPTP server:
  1. Add a user:

```
[admin@PPTP-Server] ppp secret> add name=jack password=pass \ ...
local-address=10.0.0.1 remote-address=10.0.0.2
```
  2. Enable the PPTP server:

```
[admin@PPTP-Server] interface pptp-server server> set enabled=yes
```

• Setup on PPTP client:
  1. Add the PPTP client:

```
[admin@PPTP-Client] interface pptp-client> add user=jack password=pass \ ...
connect-to=10.5.8.104 disabled=no
```

**Specifications**

Packages required: **ppp**
License required: **level1 (limited to 1 tunnel), level3 (limited to 200 tunnels), level5**
Home menu level: /interface pptp-server, /interface pptp-client
Standards and Technologies: **PPTP (RFC 2637)**
Hardware usage: **Not significant**

**Related Documents**

• [Software Package Management](#)
• [IP Addresses and ARP](#)
• [PPP User AAA](#)
• [EoIP](#)

**Description**
PPTP is a secure tunnel for transporting IP traffic using PPP. PPTP encapsulates PPP in virtual lines that run over IP. PPTP incorporates PPP and MPPE (Microsoft Point to Point Encryption) to make encrypted links. The purpose of this protocol is to make well-managed secure connections between routers as well as between routers and PPTP clients (clients are available for and/or included in almost all OSs including Windows).

PPTP includes PPP authentication and accounting for each PPTP connection. Full authentication and accounting of each connection may be done through a RADIUS client or locally.

MPPE 40bit RC4 and MPPE 128bit RC4 encryption are supported.

PPTP traffic uses TCP port 1723 and IP protocol GRE (Generic Routing Encapsulation, IP protocol ID 47), as assigned by the Internet Assigned Numbers Authority (IANA). PPTP can be used with most firewalls and routers by enabling traffic destined for TCP port 1723 and protocol 47 traffic to be routed through the firewall or router.

PPTP connections may be limited or impossible to setup though a masqueraded/NAT IP connection. Please see the Microsoft and RFC links at the end of this section for more information.

Additional Documents

- [http://support.microsoft.com/support/kb/articles/q162847.asp](http://support.microsoft.com/support/kb/articles/q162847.asp)

PPTP Client Setup

Home menu level: /interface pptp-client

Property Description

add-default-route (yes | no; default: no) - whether to use the server which this client is connected to as its default router (gateway)

allow (multiple choice: mschap2, mschap1, chap, pap; default: mschap2, mschap1, chap, pap) - the protocol to allow the client to use for authentication

connect-to (IP address) - The IP address of the PPTP server to connect to

mru (integer; default: 1460) - Maximum Receive Unit. The optimal value is the MRU of the interface the tunnel is working over decreased by 40 (so, for 1500-byte ethernet link, set the MRU to 1460 to avoid fragmentation of packets)

mtu (integer; default: 1460) - Maximum Transmission Unit. The optimal value is the MTU of the interface the tunnel is working over decreased by 40 (so, for 1500-byte ethernet link, set the MTU to 1460 to avoid fragmentation of packets)

name (name; default: pptp-outN) - interface name for reference

password (text; default: "") - user password to use when logging to the remote server

profile (name; default: default) - profile to use when connecting to the remote server
**user** *(text)* - user name to use when logging on to the remote server

**Example**

To set up PPTP client named **test2** using username **john** with password **john** to connect to the **10.1.1.12** PPTP server and use it as the default gateway:

```
[admin@MikroTik] interface pptp-client> add name=test2 connect-to=10.1.1.12 \
\... user=john add-default-route=yes password=john
[admin@MikroTik] interface pptp-client> print
Flags: X - disabled, R - running
  0 X name="test2" mtu=1460 mru=1460 connect-to=10.1.1.12 user="john"
    password="john" profile=default add-default-route=yes
[admin@MikroTik] interface pptp-client> enable 0
```

**Monitoring PPTP Client**

Command name: `/interface pptp-client monitor`

**Property Description**

- **encoding** *(text)* - encryption and encoding (if asymmetric, separated with '/') being used in this connection
- **status** *(text)* - status of the client
  - **Dialing** - attempting to make a connection
  - **Verifying password...** - connection has been established to the server, password verification in progress
  - **Connected** - self-explanatory
  - **Terminated** - interface is not enabled or the other side will not establish a connection uptime (time) - connection time displayed in days, hours, minutes and seconds
- **uptime** *(time)* - connection time displayed in days, hours, minutes and seconds

**Example**

Example of an established connection:

```
[admin@MikroTik] interface pptp-client> monitor test2
  uptime: 4h35s
  encoding: MPPE 128 bit, stateless
  status: Connected
[admin@MikroTik] interface pptp-client>
```

**PPTP Server Setup**

Home menu level: `/interface pptp-server server`

**Description**

The PPTP server creates a dynamic interface for each connected PPTP client. The PPTP connection count from clients depends on the license level you have. Level1 license allows 1 PPTP client, Level3 or Level4...
licenses up to 200 clients, and Level5 or Level6 licenses do not have PPTP client limitations.

To create PPTP users, you should consult the PPP secret and PPP Profile manuals. It is also possible to use the MikroTik router as a RADIUS client to register the PPTP users, see the manual how to do it.

**Property Description**

**authentication** *(multiple choice: pap | chap | mschap1 | mschap2; default: mschap2)* - authentication algorithm

**default-profile** - default profile to use

**enabled** *(yes | no; default: no)* - defines whether PPTP server is enabled or not

**keepalive-timeout** *(time; default: 30)* - defines the time period (in seconds) after which the router is starting to send keepalive packets every second. If no traffic and no keepalive responses has came for that period of time (i.e. 2 * keepalive-timeout), not responding client is proclaimed disconnected

**mru** *(integer; default: 1460)* - Maximum Receive Unit. The optimal value is the MRU of the interface the tunnel is working over decreased by 40 (so, for 1500-byte ethernet link, set the MRU to 1460 to avoid fragmentation of packets)

**mtu** *(integer; default: 1460)* - Maximum Transmission Unit. The optimal value is the MTU of the interface the tunnel is working over decreased by 40 (so, for 1500-byte ethernet link, set the MTU to 1460 to avoid fragmentation of packets)

**Example**

To enable PPTP server:

```
[admin@MikroTik] interface pptp-server server> set enabled=yes
[admin@MikroTik] interface pptp-server server> print
   enabled: yes
   mtu: 1460
   mru: 1460
   authentication: mschap2,mschap1
   keepalive-timeout: 30
   default-profile: default
[admin@MikroTik] interface pptp-server server>
```

**PPTP Users**

**Description**

The PPTP users are authenticated through a RADIUS server (if configured), and if RADIUS fails, then the local PPP user database is used. See the respective manual sections for more information:

- **RADIUS client**
- **PPP User AAA**

**PPTP Server User Interfaces**

Home menu level: `/interface pptp-server`
Description

There are two types of items in PPTP server configuration - static users and dynamic connections. A dynamic connection can be established if the user database or the default-profile has its local-address and remote-address set correctly. When static users are added, the default profile may be left with its default values and only PPP user (in /ppp secret) should be configured. Note that in both cases PPP users must be configured properly.

Property Description

client-address (IP address) - shows (cannot be set here) the IP address of the connected client
encoding (text) - encryption and encoding (if asymmetric, separated with '/') being used in this connection
mtu (integer) - (cannot be set here) client's MTU
name (name) - interface name
uptime (time) - shows how long the client is connected
user (name) - the name of the user that is configured statically or added dynamically

Example

To add a static entry for ex1 user:

```
[admin@MikroTik] interface pptp-server> add user=ex1
[admin@MikroTik] interface pptp-server> print
Flags: X - disabled, D - dynamic, R - running
#   NAME   USER  MTU  CLIENT-ADDRESS  UPTIME  ENC...
0   DR <pptp-ex> ex   1460 10.0.0.202  6m32s  none
1   pptp-in1 ex1                  
```

In this example an already connected user ex is shown besides the one we just added.

PPTP Application Examples

Router-to-Router Secure Tunnel Example

The following is an example of connecting two Intranets using an encrypted PPTP tunnel over the Internet.
There are two routers in this example:

- **[HomeOffice]**
  - Interface LocalHomeOffice 10.150.2.254/24
  - Interface ToInternet 192.168.80.1/24

- **[RemoteOffice]**
  - Interface ToInternet 192.168.81.1/24
  - Interface LocalRemoteOffice 10.150.1.254/24

Each router is connected to a different ISP. One router can access another router through the Internet.

On the *Preforma* PPTP server a user must be set up for the client:

```bash
[admin@HomeOffice] ppp secret> add name=ex service=pptp password=lkjrh
local-address=10.0.103.1 remote-address=10.0.103.2
[admin@HomeOffice] ppp secret> print detail
Flags: X - disabled
  0 name="ex" service="pptp" caller-id="" password="lkjrht" profile=default
    local-address=10.0.103.1 remote-address=10.0.103.2 routes=""
[admin@HomeOffice] ppp secret>
```

Then the user should be added in the PPTP server list:

```bash
[admin@HomeOffice] interface pptp-server> add user=ex
[admin@HomeOffice] interface pptp-server> print
Flags: X - disabled, D - dynamic, R - running
# NAME USER MTU CLIENT-ADDRESS UPTIME ENC...
0 pptp-in1 ex
```
And finally, the server must be enabled:

```
[admin@HomeOffice] interface pptp-server server> set enabled=yes
[admin@HomeOffice] interface pptp-server server> print
    enabled: yes
    mtu: 1460
    mru: 1460
    authentication: mschap2
    default-profile: default
```

Add a PPTP client to the RemoteOffice router:

```
[admin@RemoteOffice] interface pptp-client> add connect-to=192.168.80.1 user=ex ... password=lkjrht disabled=no
[admin@RemoteOffice] interface pptp-client> print
    Flags: X - disabled, R - running
    0 R name="pptp-out1" mtu=1460 mru=1460 connect-to=192.168.80.1 user="ex" password="lkjrht" profile=default add-default-route=no
```

Thus, a PPTP tunnel is created between the routers. This tunnel is like an Ethernet point-to-point connection between the routers with IP addresses 10.0.103.1 and 10.0.103.2 at each router. It enables 'direct' communication between the routers over third party networks.

![Network Setup with PPTP](image)

To route the local Intranets over the PPTP tunnel you need to add these routes:

```
[admin@HomeOffice] > ip route add dst-address 10.150.1.0/24 gateway 10.0.103.2
```
On the PPTP server it can alternatively be done using `routes` parameter of the user configuration:

```
[admin@HomeOffice] ppp secret> print detail
Flags: X - disabled
  0 name="ex" service=pptp caller-id="" password="lkjrht" profile=default
      local-address=10.0.103.1 remote-address=10.0.103.2 routes=""

[admin@HomeOffice] ppp secret> set 0 routes="10.150.1.0/24 10.0.103.2 1"
[admin@HomeOffice] ppp secret> print detail
Flags: X - disabled
  0 name="ex" service=pptp caller-id="" password="lkjrht" profile=default
      local-address=10.0.103.1 remote-address=10.0.103.2
      routes="10.150.1.0/24 10.0.103.2 1"
```

Test the PPTP tunnel connection:

```
[admin@RemoteOffice]> /ping 10.0.103.1
10.0.103.1 pong: ttl=255 time=3 ms
10.0.103.1 pong: ttl=255 time=3 ms
10.0.103.1 pong: ttl=255 time=3 ms
ping interrupted
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 3/3.0/3 ms
```

Test the connection through the PPTP tunnel to the LocalHomeOffice interface:

```
[admin@RemoteOffice]> /ping 10.150.2.254
10.150.2.254 pong: ttl=255 time=3 ms
10.150.2.254 pong: ttl=255 time=3 ms
10.150.2.254 pong: ttl=255 time=3 ms
ping interrupted
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 3/3.0/3 ms
```

To bridge a LAN over this secure tunnel, please see the example in the 'EoIP' section of the manual. To set the maximum speed for traffic over this tunnel, please consult the 'Queues' section.

**Connecting a Remote Client via PPTP Tunnel**

The following example shows how to connect a computer to a remote office network over PPTP encrypted tunnel giving that computer an IP address from the same network as the remote office has (without need of bridging over EoIP tunnels)

Please, consult the respective manual on how to set up a PPTP client with the software You are using.
The router in this example:

- [RemoteOffice]
  Interface ToInternet 192.168.81.1/24
  Interface Office 10.150.1.254/24

The client computer can access the router through the Internet.

On the PPTP server a user must be set up for the client:

```
[admin@RemoteOffice] ppp secret> add name-ex service=pptp password=lkjrh
[admin@RemoteOffice] ppp secret> print detail
Flags: X - disabled
  0   name="ex" service=pptp caller-id="" password="lkjrht" profile=default
      local-address=10.150.1.254 remote-address=10.150.1.2 routes=""
```

Then the user should be added in the PPTP server list:

```
[admin@RemoteOffice] interface pptp-server> add name-FromLaptop user-ex
[admin@RemoteOffice] interface pptp-server> print
Flags: X - disabled, D - dynamic, R - running
  #   NAME USER  MTU  CLIENT-ADDRESS  UPTIME ENC...
  0   FromLaptop  ex
```

And the server must be enabled:
Finally, the proxy APR must be enabled on the 'Office' interface:

[admin@RemoteOffice] interface ethernet> set Office arp=proxy-arp
[admin@RemoteOffice] interface ethernet> print
Flags: X - disabled, R - running
#  NAME          MTU MAC-ADDRESS ARP
 0  R ToInternet  1500 00:30:4F:0B:7B:C1 enabled
 1  R Office      1500 00:30:4F:06:62:12 proxy-arp

PPTP Setup for Windows

Microsoft provides PPTP client support for Windows NT, 2000, ME, 98SE, and 98. Windows 98SE, 2000, and ME include support in the Windows setup or automatically install PPTP. For 95, NT, and 98, installation requires a download from Microsoft. Many ISPs have made help pages to assist clients with Windows PPTP installation.


Sample instructions for PPTP (VPN) installation and client setup - Windows 98SE

If the VPN (PPTP) support is installed, select 'Dial-up Networking' and 'Create a new connection'. The option to create a 'VPN' should be selected. If there is no 'VPN' options, then follow the installation instructions below. When asked for the 'Host name or IP address of the VPN server', type the IP address of the router. Double-click on the 'new' icon and type the correct user name and password (must also be in the user database on the router or RADIUS server used for authentication).

The setup of the connections takes nine seconds after selection the 'connect' button. It is suggested that the connection properties be edited so that 'NetBEUI', 'IPX/SPX compatible', and 'Log on to network' are unselected. The setup time for the connection will then be two seconds after the 'connect' button is selected.

To install the 'Virtual Private Networking' support for Windows 98SE, go to the 'Setting' menu from the main 'Start' menu. Select 'Control Panel', select 'Add/Remove Program', select the 'Windows setup' tab, select the 'Communications' software for installation and 'Details'. Go to the bottom of the list of software and select 'Virtual Private Networking' to be installed.

Troubleshooting

Description

-  I use firewall and I cannot establish PPTP connection

Troubleshooting
Make sure the TCP connections to port 1723 can pass through both directions between your sites. Also, IP protocol 47 should be passed through