

Configuring PPPoE

PPPoE (Point-to-Point Protocol over Ethernet) is a network protocol for encapsulating PPP frames in Ethernet frames. Just as ppp, it allows organizing subscriber network access by using authorization, encryption, compression etc.

For providing access via PPPoE it is required a PPPoE server and a subscriber's unit (client) supporting PPPoE. In this manual, as a PPPoE server it is used a freeware packet rp-pppoe working in kernel mode on Gentoo Linux (rp-pppoe project web-page: http://www.roaringpenguin.com/penguin/open_source_rp-pppoe.php). As a client it is used a Microsoft Windows 2003 based PC and rasp-pppoe packet (raspppoe packet project web-page: <http://www.raspppoe.com/>).

Authorization of subscribers is carried out via RADIUS protocol by using a joint repository of subscriber information in the NetUP UTM 5 billing system.

PPPoE server configuration

For setting up a server it is necessary to install pppd packets supporting RADIUS protocol and rp-pppoe. In order to install pppd, add a string `net-dialup/ppp radius` in the file `/etc/portage/package.use`. After that perform installation by using the command: `emerge ppp`

After installation it is necessary to edit configuration files. In particular, in the file `/etc/ppp/radius/radiusclient.conf` it is important to define the variables `authserver` and `acctserver` correctly. In these fields it should be indicated a domain name or IP-address of the RADIUS server (`utm5_radius` process). Example:

```
authserver localhost: 1812
acctserver localhost:1813
```

For correct authorization and accounting via RADIUS protocol it is necessary to define a secret word in the file `/etc/ppp/radius/servers`.

Example:

```
localhost    secret
```

After that install the package `rp-pppoe` by using the command:

```
emerge rp-pppoe
```

For correct work of `rp-pppoe` in the kernel mode put the following string in the file `/etc/ppp/pppoe.conf`:

```
LINUX_PLUGIN=rp-pppoe.so
```

Additionally, in the file `/etc/ppp/pppoe-server-options` it is necessary to set the following:

```
require-chap
require-mschap-v2
proxyarp
nologfd
plugin radius.so
```

According to these settings secure authorization protocols CHAP and MSCHAPv2 are allowed. It is also defined that the `radius.so` plug-in should be loaded for working with RADIUS protocol.

Before starting the server, load the Linux kernel module by using the command:

```
modprobe pppoe
```

In order to load the module automatically on start-up of the operating system it is necessary to add the string `pppoe` in the file `/etc/modules.autoload.d/kernel-2.6`. If an error of the module absence in the system appears then it is necessary to set the following option for compilation of the Linux kernel:

```
<M> PPP over Ethernet
```

After the module has been loaded, it is possible to start the server by using the command:

```
pppoe-server -k
```

The PPPoE server configuration is now complete.

PPPoE client configuration

For setting up a subscriber's PC it is necessary to download and unpack the `raspppoe` package from the web-site of the developer. As a result you should have the `RASPPPOE_099` folder. For installation it is necessary to enter "Control panel"->"Network Connections" and in properties of any connection select "Install ..." -> "Protocol" -> "Have Disk ..." -> "Browse ...". Set a path to the `RASPPPOE_099` folder and select the file `RASPPPOE.INF`. Press "OK" when the system offers installing "PPP over Ethernet Protocol".

After the protocol installation has been finished, it is possible to start `RASPPPOE.EXE` from the `RASPPPOE_099` folder. In the menu select «Ethernet adapter connected to the local network» and press "Query Available Services". After a short search, found PPPoE servers are shown (figure 1).

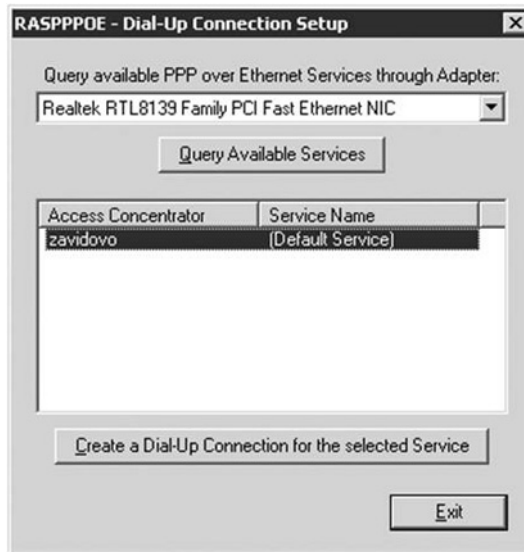


Figure 1. Search of available PPPoE servers in a local network.

Select a PPPoE server and press “Create a Dial-Up Connection for the selected Service”. As a result, in the Windows OS it should appear “Connection to zavidovo”. For establishing the connection go to “Control panel”->”Network Connections” and click twice on the connection icon. Enter your login and password and press “Dial” (figure 2).



Figure 2. Establishing PPPoE connection with a server.

Debugging and Testing

PPPoE server messages are recorded in the file `/var/log/messages`. Below there is a part of the file in case of successful subscriber authorization:

```
Oct 7 22:27:29 zavidovo pppoe-server[18595]: Session 10 created for
client 00:80:48:30:4b:f8 (10.67.15.10) on eth0 using Service-Name ''
Oct 7 22:27:29 zavidovo pppd[18595]: Plugin /etc/ppp/plugins/rp-pppoe.
so loaded.
Oct 7 22:27:29 zavidovo pppd[18595]: RP-PPPoE plugin version 3.3 com-
piled against pppd 2.4.3
Oct 7 22:27:29 zavidovo pppd[18595]: Plugin radius.so loaded.
Oct 7 22:27:29 zavidovo pppd[18595]: RADIUS plugin initialized.
Oct 7 22:27:29 zavidovo pppd[18595]: pppd 2.4.3 started by root, uid 0
Oct 7 22:27:29 zavidovo pppd[18595]: using channel 66
Oct 7 22:27:29 zavidovo pppd[18595]: Using interface ppp0
Oct 7 22:27:29 zavidovo pppd[18595]: Connect: ppp0 <--> eth0
Oct 7 22:27:29 zavidovo pppd[18595]: sent [LCP ConfReq id=0x1 <mru
1492> <auth chap MD5> <magic 0xcfd25f4e>]
Oct 7 22:27:29 zavidovo pppd[18595]: rcvd [LCP ConfReq id=0x0 <mru
1492> <magic 0x19595f15> <callback CBCP> <mrru 1614> <endpoint [local:3
3.4d.35.0e.08.2d.4f.5d.9b.16.34.42.43.fb.be.74.00.00.00]>]
Oct 7 22:27:29 zavidovo pppd[18595]: sent [LCP ConfRej id=0x0 <call-
back CBCP> <mrru 1614>]
Oct 7 22:27:29 zavidovo pppd[18595]: rcvd [LCP ConfReq id=0x1 <mru
1492> <magic 0x19595f15> <endpoint [local:33.4d.35.0e.08.2d.4f.5d.9b.16
.34.42.43.fb.be.74.00.00.00]>]
Oct 7 22:27:29 zavidovo pppd[18595]: sent [LCP ConfAck id=0x1 <mru
1492> <magic 0x19595f15> <endpoint [local:33.4d.35.0e.08.2d.4f.5d.9b.16
.34.42.43.fb.be.74.00.00.00]>]
Oct 7 22:27:32 zavidovo pppd[18595]: sent [LCP ConfReq id=0x1 <mru
1492> <auth chap MD5> <magic 0xcfd25f4e>]
Oct 7 22:27:32 zavidovo pppd[18595]: rcvd [LCP ConfAck id=0x1 <mru
1492> <auth chap MD5> <magic 0xcfd25f4e>]
Oct 7 22:27:32 zavidovo pppd[18595]: sent [CHAP Challenge id=0x47 <139
c175d3a37a56422dd83540583188f38a8c8>, name = "net11"]
Oct 7 22:27:32 zavidovo pppd[18595]: rcvd [LCP Ident id=0x2
magic=0x19595f15 "MSRASV5.20"]
Oct 7 22:27:32 zavidovo pppd[18595]: rcvd [LCP Ident id=0x3
magic=0x19595f15 "MSRAS-0-MONDIALE"]
Oct 7 22:27:32 zavidovo pppd[18595]: rcvd [CHAP Response id=0x47 <ca38
1f6597d1c7208c0285121ded1e2b>, name = "pppoe"]
```

```
Oct  7 22:27:32 zavidovo pppd[18595]: sent [CHAP Success id=0x47 "" ]
Oct  7 22:27:32 zavidovo pppd[18595]: peer from calling number
00:80:48:30:4B:F8 authorized
Oct  7 22:27:32 zavidovo pppd[18595]: sent [IPCP ConfReq id=0x1 <addr
10.0.0.1>]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [CCP ConfReq id=0x4 <mpe -H
-M -S -L -D +C>]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [CCP ConfReq id=0x1]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [CCP ConfRej id=0x4 <mpe -H
-M -S -L -D +C>]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [IPCP ConfReq id=0x5
<compress VJ 0f 01> <addr 0.0.0.0> <ms-dns1 0.0.0.0> <ms-wins
0.0.0.0> <ms-dns3 0.0.0.0> <ms-wins 0.0.0.0>]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [IPCP ConfRej id=0x5 <com-
press VJ 0f 01> <ms-dns1 0.0.0.0> <ms-wins 0.0.0.0> <ms-dns3 0.0.0.0>
<ms-wins 0.0.0.0>]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [IPCP ConfAck id=0x1 <addr
10.0.0.1>]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [CCP ConfAck id=0x1]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [CCP TermReq id=0x6 19 59 5f
15 00 3c cd 74 00 00 02 dc]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [CCP TermAck id=0x6]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [IPCP ConfReq id=0x7 <addr
0.0.0.0>]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [IPCP ConfNak id=0x7 <addr
172.16.0.102>]
Oct  7 22:27:32 zavidovo pppd[18595]: rcvd [IPCP ConfReq id=0x8 <addr
172.16.0.102>]
Oct  7 22:27:32 zavidovo pppd[18595]: sent [IPCP ConfAck id=0x8 <addr
172.16.0.102>]
Oct  7 22:27:32 zavidovo pppd[18595]: Cannot determine ethernet address
for proxy ARP
Oct  7 22:27:32 zavidovo pppd[18595]: local IP address 10.0.0.1
Oct  7 22:27:32 zavidovo pppd[18595]: remote IP address 172.16.0.102
Oct  7 22:27:32 zavidovo pppd[18595]: Script /etc/ppp/ip-up started
(pid 18608)
Oct  7 22:27:32 zavidovo pppd[18595]: Script /etc/ppp/ip-up finished
(pid 18608), status = 0x1
```

As a result of successful authorization utm5_radius gives out IP-address 172.16.0.102 for a subscriber. RADIUS server functioning is recorded to the file /netup/utm5/log/radius_main.log. Below there is an extract from the file in case of successful authorization of a subscriber:

```
?Debug : Oct 07 22:27:32 AuthServer: User <pppoe> connecting
?Debug : Oct 07 22:27:32 AuthServer: Session for sessionid <pppoe> not
found in <127.0.0.1> cache
?Debug : Oct 07 22:27:32 RADIUS DBA: Info for login <pppoe> found. type
<1>
?Debug : Oct 07 22:27:32 AuthServer: Auth scheme: CHAP
?Debug : Oct 07 22:27:32 AuthServer: CHAP: Challenge size: 19
?Debug : Oct 07 22:27:32 AuthServer: CHAP: Authorized user <pppoe>
?Debug : Oct 07 22:27:32 AuthServer: IP claimed: 0xac100066
(<172.16.0.102>)
?Debug : Oct 07 22:27:32 AuthServer: Calling fill radius attributes for
service. Attr storage size <0>
?Debug : Oct 07 22:27:32 AuthServer: Calling fill radius attributes for
slink. Attr storage size <0>
?Debug : Oct 07 22:27:32 AuthServer: Calling fill radius attributes for
NAS. Attr storage size <0>
  Notice: Oct 07 22:27:32 AuthServer: Login OK <pppoe> from NAS
<127.0.0.1> CLID <>
  Notice: Oct 07 22:27:32 AuthServer: Login OK <pppoe> from NAS
<127.0.0.1> CLID <>
?Debug : Oct 07 22:27:32 AuthServer: Setting interim update interval
from config
```

On successful authorization, on the server it is created a dedicated interface for the current subscriber:

```
ppp0 Link encap:Point-to-Point Protocol
  inet addr:10.0.0.1 P-t-P:172.16.0.102 Mask:255.255.255.255
  UP POINTOPOINT RUNNING NOARP MULTICAST MTU:1492 Metric:1
  RX packets:9 errors:0 dropped:0 overruns:0 frame:0
  TX packets:9 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:3
  RX bytes:133 (133.0 b) TX bytes:115 (115.0 b)
```