

Re: PPPoE

Source: <http://unix.derkeiler.com/Mailing-Lists/FreeBSD/net/2004-06/0155.html>

From: Yohan (yohanphilip_at_yahoo.com)

Date: 06/21/04

Date: Mon, 21 Jun 2004 06:04:32 -0700 (PDT)

To: Gleb Smirnoff <glebius@cell.sick.ru>, freebsd-net@freebsd.org

Gleb,

I sort of anticipated you would require the tcpdump output. Its attached below. The Windows driver README is the furthest below. The windows connection works flawlessly but i wouldnt want to use windows unless its the last resort. The instructions by the isp for linux are as follows ...

FOR LINUX

For redhat 7.2 or higher

Installing using RPM

Copy RPM `rp-pppoe-3.5-1.i386.rpm` in the root directory.

Execute the command

```
rpm -Uvh rp-pppoe-3.5-1.i386.rpm
```

To configure

```
/usr/sbin/adsl-setup
```

To connect

```
/usr/sbin/adsl-start
```

To stop/disconnect

```
/usr/sbin/adsl-stop
```

To install GUI based PPPoE

```
rpm -Uvh rp-pppoe-3.5-1.i386.rpm
```

```
rp-pppoe-gui-3.5-1.i386.rpm
```

To connect GUI based PPPoE

```
/usr/bin/tkpppoe
```

Re: PPPoE

Thanks and Regards

Yohann

Output of tcpdump -e -i rl1

```
17:47:58.383405 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.22 tell 172.16.40.17
17:48:04.718691 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:04.732330 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:04.732347 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:06.724827 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:09.603009 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.23 tell 172.16.40.17
17:48:09.875429 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:09.889090 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:09.889105 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:11.884908 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:15.035656 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:15.049217 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:15.049232 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:17.044982 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:20.195576 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:20.209343 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
```

Re: PPPoE

UTF8]
17:48:20.209357 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:20.822597 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.23 tell 172.16.40.17
17:48:22.205063 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:25.355677 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:25.369222 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:25.369237 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:27.365137 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:30.515748 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:30.529471 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:30.529486 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:32.042197 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.23 tell 172.16.40.17
17:48:32.525219 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:35.675836 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:35.689479 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:48:35.689494 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:37.685297 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:48:40.847982 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:40.861730 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]

freebsd-net: Re: PPPoE

[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq UTF8]
17:48:40.861764 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:42.855374 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:43.261813 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.24 tell 172.16.40.17
17:48:46.006119 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:46.019730 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq UTF8]
17:48:46.019745 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:48.015450 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:51.166074 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:51.179734 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq UTF8]
17:48:51.179750 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:53.175528 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:54.481397 0:4:e6:2:44:12 Broadcast arp 64: arp
who-has 172.16.40.24 tell 172.16.40.17
17:48:56.326122 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:48:56.339611 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:
PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq UTF8]
17:48:56.339626 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:48:58.335606 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name "BANYAN"]
17:49:01.486231 0:8:a1:5f:b5:4b Broadcast 8863 60:
PPPoE PADI [Host-Uniq UTF8]
17:49:01.499862 0:4:e6:4:41:1 0:8:a1:5f:b5:4b 8863 76:

Re: PPPoE

PPPoE PADO [AC-Name "BANYAN"] [AC-Cookie UTF8]
[Service-Name] [Relay-Session-ID UTF8] [Host-Uniq
UTF8]
17:49:01.499878 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]
17:49:03.495683 0:8:a1:5f:b5:4b 0:4:e6:4:41:1 8863 60:
PPPoE PADR [Host-Uniq UTF8] [AC-Cookie UTF8] [AC-Name
"BANYAN"]

RASPPPOE
PPP over Ethernet Protocol
for Windows 2000/XP/.NET

(If you are using Windows 95/98/98SE/ME, please click
here)

(If you are using Windows NT 4.0, please click here)

written by Robert Schlabbach

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Version 0.98, October 3rd, 2002

Contents

1. Introduction
2. Installing the PPP over Ethernet Protocol
3. Creating PPP over Ethernet Dial-Up Connections
4. Removing the PPP over Ethernet Protocol
5. Advanced Protocol Features
6. Troubleshooting
7. Known Issues
8. Revision History

1. Introduction

Welcome to RASPPPOE, a PPP over Ethernet (short: PPPoE) implementation for Windows 95, 98, 98SE, ME, NT 4.0, 2000, XP and .NET. PPPoE as a method for establishing PPP connections through Ethernet adapters is described in RFC 2516 and is used by your broadband service provider to allow authentication and maintain the familiar "dial-up experience" when connecting to the Internet through a broadband modem. Although there are other PPPoE implementations for Windows, this one still has its unmatched strong points:

- * Seamless integration into the operating system.

This protocol makes Ethernet network adapters appear as "modems", allowing PPPoE to be easily used within the standard Dial-Up Networking framework.

- * Compatibility: This protocol supports Internet Connection Sharing (including on-demand dialing), power management (Standby and Hibernate) as well as

multiprocessor systems.

- * Completeness: This protocol can not only act as a PPPoE Host (client), but also as an Access Concentrator (server), fully implementing RFC 2516.

- * Compactness: The complete protocol is less than 250 KB. Yet no concessions were made in the implementation.

To install this protocol, please follow the installation instructions carefully. If you have problems using it, see Troubleshooting for help. If you are successfully using this protocol, you can check if you find any of the advanced features useful. You may also want to know about the known issues. Users upgrading from a previous version of this protocol should check the Revision History to find out what changed.

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Banyan Networks, India

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2. Installing the PPP over Ethernet Protocol

To install RASPPPOE, simply open the media on which you received this software in Explorer and double-click the file PPPOE098.EXE (or PPPOE098_IA64.EXE if you are using an Intel Itanium 64-bit system) to run the automated installer, which guides you through the installation process to your first broadband connection. Only if the automated installer should fail to work properly on your machine, you need to do a manual installation. To install the protocol manually, follow these steps:

- * **WARNING:** You are about to install a driver. Since any driver installation poses a non-zero risk of crashing your operating system, you are advised to save your work and close all running applications before proceeding.

- * Since you are about to install a driver, you will need administrative privileges to perform the

installation. If you are logged on to a user account, log off and log on to an account with administrative privileges before proceeding.

* If there is already a different PPPoE implementation installed on your machine, it might get confused by the PPPoE traffic generated by this protocol. This protocol was written to peacefully coexist with other PPPoE implementations on the same machine, but other programmers may not have been as thoughtful. Thus, it is recommended (but not required!) that you uninstall any other PPPoE implementations and reboot your machine before proceeding.

* If you already have a previous version of this PPP over Ethernet Protocol installed, you must first remove the old version. See Removing the PPP over Ethernet Protocol for details.

* Create a temporary folder on your hard disk and copy the file PPPOE098.EXE (or PPPOE098_IA64.EXE if you are using an Intel Itanium 64-bit system) to it.

* Click the Start button on the taskbar and select Run... to bring up the Run dialog box.

* Click the Browse... button, browse to the temporary folder you create, select PPPOE098.EXE (or PPPOE098_IA64.EXE if you are using an Intel Itanium 64-bit system) and click Open.

* Back at the Run dialog box, edit the name of the program to run and append a space character followed by /X to the name.

* Click OK. This will extract the installation files to your temporary folder. You should check in Explorer if the following required files (among others, which are not used on Windows 2000/XP/.NET) were correctly extracted: NETPPPOE.INF, RASPPPOE.INF, RASPPPOE.DLL, RASPPPOE.EXE and RMSPPPOE.SYS. NOTE: Explorer may be configured to hide DLL and SYS files, so it may not display these files.

* If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

* If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

* Go to the menu and select View then Details to get a detailed view of the network connections on your machine.

* You should find one or more Local Area Connection objects. Locate the one for the network adapter connected to your broadband modem (you should be able to tell by the name in the Device Name column), right-click it and select Properties.

* In the properties dialog box, click the Install... button.

* In the Select Network Component Type window, select Protocol and click the Add... button. (Note: It could take a few seconds for the following window to come up.)

* In the Select Network Protocol window, click the Have Disk... button.

* In the Install From Disk window, either type the name of your temporary installation directory or click the Browse... button to navigate to it (it does not matter which of the INF files you select, Windows will automatically pick the right one later). Then click the OK button. A new window opens, offering the PPP over Ethernet Protocol for installation. Click OK to start installing the protocol.

* During installation, a window titled Digital Signature Not Found (Windows 2000) or Hardware Installation (Windows XP/.NET) may come up several times (typically four times per installed network adapter), warning you that the driver has no digital signature or Windows Logo. Make sure you click "Yes" (Windows 2000) or "Continue Anyway" (Windows XP/.NET) every time you are prompted to allow successful installation of the protocol.

* Back at the Local Area Connection Properties window, click Close to close the window. Note: If you have a network adapter dedicated to your broadband modem, it is recommended that you first clear the checkboxes for all other components listed and leave

only PPP over Ethernet Protocol checked.

* If you have more than one network adapter in your system, you may want to disable the PPP over Ethernet Protocol for all adapters but the one your broadband modem is actually connected to. To do this, bring up the properties of each network adapter you want to disable the protocol for and clear the checkbox next to PPP over Ethernet Protocol in the listed components. BEWARE: If you accidentally disable the protocol for the network adapter you want to connect through, simply re-checking the checkbox, even if you do so immediately, may not be enough to make the protocol functional on that network adapter again. See Known Issues for a more detailed explanation and possible workarounds.

* The protocol is now fully functional, but you still need to create a dial-up connection to use it. See the next section for details.

3. Creating PPP over Ethernet Dial-Up Connections

If you installed the protocol with the automated installer, it already created a dial-up connection for you. If you installed the protocol manually, you can create a PPP over Ethernet dial-up connection with the Dial-Up Connection Setup application provided with the protocol, which creates dial-up connections with all the correct settings at the click of a button.

* Click the Start button on the taskbar and select Run... to bring up the Run dialog box.

* Type RASPPPOE in the edit field and click the OK button to run the Dial-Up Connection Setup application.

* If the application quits with an error message, follow the advice it gives.

* A dialog box comes up with a combo box labeled Query available PPP over Ethernet Services through Adapter: at the top. Select the network adapter your broadband modem is connected to from the list. If the protocol is only operating on one network adapter, the box will be grayed out as there is no choice to make.

* Generally, it is recommended that you create a connection for an adapter, not for a specific service, so that it continues to work even if your service

provider changes the server or service name. To do this, simply click the Create a Dial-Up Connection for the selected Adapter button now. Shortly afterwards, a shortcut to the new dial-up connection named Connection through Adapter Name should show up on your desktop.

* If you want to create a connection for a specific service, click the Query Available Services button. The application will send out a query for offered services and display the result in the list view below. If an error message is displayed, see Troubleshooting for help. Otherwise, select the desired service and the button below will change to Create a Dial-Up Connection for the selected Service. Click the button to create a connection for this service. Shortly afterwards, a shortcut to the new dial-up connection named Connection to Service Name at Access Concentrator or Connection to Access Concentrator (if the connection is for the default service) should show up on your desktop.

* After you have created the connection(s) you need, click the Exit button to quit the application.

* Double-click the desktop icon for the dial-up connection you created.

* In the Connect Connection Name window, enter your user name and password if your service provider requires authentication.

* Click on the Dial button. If all goes well, you should be connected to the Internet almost instantly. If not, see Troubleshooting.

4. Removing the PPP over Ethernet Protocol

If the protocol was installed with the automated installer, it was added to the list of installed programs and can be conveniently removed through Control Panel: Click on the Start button, select Settings then Control Panel to open the Control Panel window. In that window, double-click Add/Remove Programs. In the upcoming dialog, locate the entry PPP over Ethernet Protocol 0.98, select it and click Change/Remove. The automated installer will guide you through the removal process.

If the protocol was installed manually or you cannot find the protocol in the list of installed programs,

you need to remove the protocol manually. To do this, follow these steps:

* **WARNING:** You are about to remove a driver. Since any driver removal poses a non-zero risk of crashing your operating system, you are advised to save your work and close all running applications before proceeding.

* Since you are about to remove a driver, you will need administrative privileges to perform the removal. If you are logged on to a user account, log off and log on to an account with administrative privileges before proceeding.

* If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

* If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

* First, you may want to remove all dial-up connections you created for connecting through this protocol. To do so, right-click each of the dial-up connections you created for this protocol and select Delete. If you had created any shortcuts to these dial-up connections on your desktop, right-click them and select Delete as well.

* If you are running Windows 2000, you must first unbind the protocol from all network adapters to ensure that it is unloaded from memory. This step is not necessary if you are running Windows XP/.NET. **BEWARE:** Do NOT do this if you currently have a RASPPPOE version prior to 0.95 installed as these versions may CRASH the operating system when unbinding the protocol from the last network adapter. In that case, skip the next step and reboot after uninstalling the protocol to remove it from memory.

* To unbind the protocol from all network adapters, right click each Local Area Connection, select Properties and clear the checkbox next to PPP over Ethernet Protocol and close the properties dialog with the OK button. After clearing the last checkbox, the protocol is unloaded from memory

- * Right-click any Local Area Connection and select Properties.

- * In the list of components, select PPP over Ethernet Protocol and click Uninstall.

- * A dialog box comes up asking you to confirm the removal. Make sure that you are really about to uninstall the PPP over Ethernet Protocol and click Yes.

- * Back at the Local Area Connection Properties window, click Close to close the window.

Note: The protocol is not completely removed from your machine at this point due to shortcomings of Windows, which prohibit a complete removal. The pieces that are left behind are not harmful in any way, but if you want to get rid of every little bit of this protocol, here is what's left behind:

- * If you are running Windows 2000, the protocol's Notify Object, named RASPPPOE.DLL, is left behind in your \WINNT\SYSTEM32 directory. You can safely delete it at this point. Automatic deletion fails due to a bug in Windows 2000 (see Known Issues). In Windows XP/.NET, this file is automatically deleted.

- * In your \WINNT\INF directory, the protocol's INF file and its precompiled version is left behind, named oem#.inf and oem#.PNF, respectively. "#" stands for a number that varies with the number of third party drivers you installed on your machine. This means that you will have to identify the INF by loading each of your oem#.inf files into a text editor, e.g. NOTEPAD. The PPP over Ethernet Protocol INF identifies itself as such right in the second line of the file. Once you have identified the INF, delete it and the corresponding PNF file as well. This is not a bug, but Microsoft's design. These files cannot be removed automatically due to the varying name.

- * Even if the protocol has been completely removed from hard disk and memory, the dial-up devices that were exposed by it will be shown in the properties of any dial-up connection until you reboot. This is a bug in Windows (see Known Issues).

5. Advanced Protocol Features

This section covers the advanced features of the protocol. Average users should be perfectly happy with the default settings, although specifying the link speed to display may be of interest. Users having problems with VPN software might try if overriding the MTU reported by the protocol helps. Users with flat rate Internet access may be interested in making the connection "always on". If you are interested in using the protocol's server capability, please see Enabling the protocol to act as a PPPoE Access Concentrator.

To bring up the protocol settings for an adapter:

- * If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

- * If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

- * Locate the Local Area Connection (Note well: not your dial-up connection entry!) of the adapter the protocol settings of which you wish to modify, right-click it and select Properties.

- * In the list of components used by this connection, select PPP over Ethernet Protocol (BEWARE: You must not click on the checkbox, as this will disable the protocol for this adapter! Make sure you click on the protocol name) then click the Properties button to bring up the protocol's settings for this adapter.

- * Changes to the protocol settings take effect when you close the PPP over Ethernet Protocol Properties window with the OK button unless noted otherwise.

The General tab offers the following settings:

5.1 Limit TCP MSS Maximum Segment Size (MSS) Option

When using Internet Connection Sharing, the client machines are completely unaware of the packet size restrictions imposed by the nature of PPP over Ethernet (in contrast to e.g. modem or ISDN connections, which allow passing arbitrarily sized packets). Typically, a client assumes that packets of up to 1500 bytes can be passed and thus indicates a Maximum Segment Size of 1460 bytes (1500 bytes minus

40 bytes for the TCP and IP headers) when opening a TCP session, resulting in either side of the connection sending packets up to 1500 bytes in size, too large to pass through a PPP over Ethernet connection, which can only pass packets up to 1492 bytes in size. These oversized packets are then often silently dropped at either side of the PPP over Ethernet connection, leading to delays or hangs when accessing the Internet from a client.

To work around this problem, this option makes the protocol scan all network packets it sends and receives for the TCP Maximum Segment Size (MSS) option and, if a value greater than either the default (1492) or the overridden MTU minus 40 for the IP and TCP headers (i.e. 1452 in case of the default MTU) is found, change it to this value, recalculate the TCP checksum and pass the modified packet. This option is enabled by default. If you are not using Internet Connection Sharing, you can disable this option to save a little (very little) CPU power, although leaving it enabled has no negative side effects.

5.2 Override Maximum Transfer Unit

By default, the protocol will report an MTU of 1492 bytes, the maximum possible for PPP over Ethernet. However, you can use this option to override the MTU initially reported by the protocol. Making the protocol initially report a lower MTU was found to help with certain VPN software packages which "blindly" add their own overhead without paying any respect to the MTU reported by the driver, making the network packets too large to pass through a PPP over Ethernet connection. Check the Override Maximum Transfer Unit checkbox and type the MTU the protocol should report in the Maximum Transfer Unit (MTU) edit box. The valid range is 576 through 1492 bytes. Reducing the MTU by 32 bytes to 1460 should generally suffice to make misbehaved VPN software work. Note: Regardless of this setting, the protocol will always send and receive packets of up to 1492 bytes. Only the MTU initially reported by the protocol (the MaxFrameSize value in response to the OID_WAN_GET_INFO request) and, if enabled, the TCP MSS option limit are affected by this setting.

For any changes to this setting to take effect, you need to disable and re-enable the Local Area Connection for the corresponding network adapter once, or reboot.

NOTE: This option will only "stick" if you enter an MTU other than 1492. If you only check the checkbox, but leave the MTU at 1492, the protocol will recognize the default value and clear the checkbox the next time you open the properties dialog, because the MTU was not actually overridden.

5.3 Number of lines (WAN endpoints)

The protocol is capable of running several simultaneous PPP over Ethernet sessions through one adapter. This feature will probably be very rarely – if ever – needed. To allow this, you can configure the number of WAN endpoints (dial-up devices) the protocol exposes for a network adapter. The default is 1, and up to 10 WAN endpoints can be configured. This setting requires a reboot to take effect.

The Advanced tab offers the following settings:

5.4 Specify Link Speed

By default, the protocol will report the speed of the network adapter you are connecting through as the speed of a dial-up connection you make through it, as it cannot find out the actual speed of your broadband modem. However, you can specify the connection speed the protocol should report for connections through a specific adapter. To do this, check the Specify Link Speed checkbox and type the link speed the protocol should report in the Link Speed (kbps) edit box, in kilobits per second. If you want to revert to displaying the adapter's link speed, clear the Specify Link Speed checkbox. Note: This setting has absolutely no effect on the network traffic through this adapter; it is purely a cosmetic setting. This setting takes effect the next time you establish a PPP over Ethernet connection.

5.5 Event Logging options

The protocol can inform you about informational events, warnings and errors during operation by logging events to the System event log. By default, the protocol logs all types of events, which should result in no log entries during flawless operation. If you find the event log flooded with repeated entries despite flawless operation, you can disable logging that type of event by clearing the corresponding checkbox. Clearing all checkboxes prevents the protocol from logging any events.

- * Log Informational Events will log any vendor-specific information received.
- * Log Warnings will log non-fatal warnings that do not necessarily prevent successful operation.
- * Log Errors will log fatal errors that prevent correct function of the protocol.

You use Event Viewer to view any events logged by this protocol:

- * Right-click the My Computer icon on your desktop and select Manage to bring up the Computer Management window.
- * In the tree on the left-hand side, expand the Event Viewer branch, select the System sub branch and press F5 to refresh the view on the right-hand side. Look for log entries from source RMSPPPOE there.
- * To get a detailed description of a logged event, double click the event in the view on the right-hand side.

NOTE: If you are using another PPP over Ethernet software on the same machine, you will find the event log flooded with Warnings from source RMSPPPOE that it received a PPPoE packet for an unknown session. To fix this, either use solely this protocol on the machine, or disable the Log Warnings option as described above.

Beyond these settings, the protocol offers the following possibilities:

5.6 Making a dial-up connection "always on"

Users who enjoy flat rate Internet access may find it desirable to turn their connection into an "always on" connection that is established once when the machine boots (before any user logs in) and kept until the machine is shut down. To make your dial-up connection "always on", follow these steps:

- * If your service provider requires authentication, make sure you have saved the password by checking the Save Password checkbox in the Connect Connection Name window and connecting at least once.
- * If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.
- * If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the

Network Connections control panel icon to bring up the Network Connections window.

- * Locate the Dial-Up connection you created for PPP over Ethernet, right-click it and select Properties.

- * Select the Options tab and clear all checkboxes under Dialing options.

- * Under Redialing options, set Idle time before hanging up: to never and check the Redial if line is dropped checkbox.

- * Click OK to save the changes.

- * Now click the Start button, select Settings then Control Panel to open the Control Panel window.

- * In the Control Panel window, double-click Scheduled Tasks.

- * In the Scheduled Tasks window, double-click Add Scheduled Task.

- * On the welcome screen of the Scheduled Task Wizard, click Next.

- * At the program selection step, click Browse... and browse to your WINNT\System32 directory (Windows 2000) or to your Windows\System32 directory (Windows XP/.NET).

- * Type RASPHONE.EXE (note the spelling!) in the File name: edit box or locate it in the directory and select it and click Open.

- * Make up a name for this task and under Perform this task: select When my computer starts. Click Next.

- * Enter your password. Note: The task must be run under the same account which the dial-up entry was created under.

- * At the final step, make sure that Open advanced properties for this task when I click finish is checked and click Finish.

- * In the advanced properties, edit the Run: edit box and append the command-line parameters " -d "Connection Name"".

- * Go to the Settings tab and clear all checkboxes on that page.

- * Click OK to close the task's properties.

- * Finally, you need to make a little registry change to prevent Windows from disconnecting when a user logs on and off again:

Run REGEDIT and navigate to:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon

Then right-click the right-hand pane, select New -> String Value, name the value KeepRasConnections and set it to 1.

* Reboot. Windows will establish the connection automatically and keep it until you shut the machine down.

* NOTE: The connection will not be properly terminated when shutting the machine down or rebooting. This can cause problems with service providers who take very long to detect such a dropped connection and limit the number of concurrent connections. See Known Issues for further details.

5.7 Addressing a specific Service and/or Access Concentrator

In most cases, there is no need to address a specific Service or Access Concentrator. But should you have a need to do so, you can use the phone number field of your dial-up connection to specify a Service, Access Concentrator or both. The following phone number formats are possible:

1. Blank or "0": The protocol will connect to the default Service of the first Access Concentrator that replies to the connection request.
2. "Service-Name": The protocol will connect to the first Access Concentrator that replies offering the requested Service.
3. "Access-Concentrator\": The protocol will connect to the default Service of the named Access Concentrator.
4. "Access-Concentrator\Service-Name": The protocol will connect to the requested Service of the named Access Concentrator.

The RASPPPOE application uses format A for the phone number if you create a connection for an adapter and format C or D if you create a connection for a specific service.

5.8 Enabling the protocol to act as a PPPoE Access Concentrator

The protocol is able to act as a PPPoE Access Concentrator (server). This feature can be used for testing purposes, but also offers a future potential for advanced provider services like instant messaging or instant e-mail even for users who are offline at the time a message is received. The server capability

is fully integrated with the operating system's Incoming connections component. No PPPoE-specific configuration is needed. The protocol uses the current Computer Name as the Access Concentrator Name and offers any Service Name requested by a client. Note that the protocol will not offer any services until you explicitly enable its dial-up devices to accept incoming connections. To do this, follow these steps:

- * If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

- * If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

- * Double-click Make New Connection and click Next.

- * Select Accept incoming connections and click Next.

- * The list of Connection devices should contain the names of the network adapters in your system. Check all network adapters through which you want to accept incoming connections and click Next.

- * Choose whether you want to allow virtual private connections and click Next.

- * Select the user accounts which should be allowed to connect to your machine and click Next.

- * Select the networking components you want to enable for the incoming connections. Note that PPP over Ethernet Protocol will also be shown in this list, but its checkbox will be grayed out.

- * If you enable the Internet Protocol (TCP/IP) for incoming connections, you may also want to click on the Properties button to define the IP addresses to use for the incoming connections.

- * Click Next and then click Finish to finish the wizard and enable the server. The Network and Dial-up Connections window will now contain an additional item named Incoming Connections.

- * If you want to disable the server only for a specific network adapter, right-click the Incoming Connections item, select Properties, clear the checkbox next to the name of that network adapter and click OK to stop the protocol from offering services on that network adapter.

- * If you want to disable accepting any connection on your machine (not only through this protocol, but through all dial-up devices installed on

your machine), right-click the Incoming Connections item, select Delete and confirm to stop the protocol from offering any services.

For further help on using Incoming Connections, please refer to the operating system's documentation on this topic.

6. Troubleshooting

This section helps you with possible problems you might encounter during the installation and use of the protocol.

6.1 Right after installation of the protocol, the Local Area Connection properties window lists no components

This happens when the protocol could not be properly installed and appears to be a bug in Windows. Clicking the OK button at this point gives an error message that no components are installed. Click the Cancel button to close the properties dialog and then re-open it again to get the list of components back. Select PPP over Ethernet Protocol in the list, click the Uninstall button and confirm to remove the bad installation. Before you make another installation attempt, make sure that Windows is not set to block the installation of unsigned drivers:

- * Right-click the My Computer icon on your desktop and select Properties.
- * Select the Hardware tab and click the Driver Signing... button.
- * Make sure that File signature verification is not set to Block – Prevent installation of unsigned files.
- * Change the setting if required and click OK to put the change into effect.

If File Signature verification is set to Warn – Display a message before installing an unsigned file, make sure you click "Yes" (Windows 2000) or "Continue Anyway" (Windows XP/.NET) every time in the warning dialog box that comes up during the protocol installation. Clicking any other button even just once will prevent proper installation and result in the same problem.

If you still cannot install the protocol properly, do the following: Locate the file SETUPAPI.LOG in your

Windows directory and delete it. Make another installation attempt (which will probably fail as well). Then check your Windows directory again for the file SETUPAPI.LOG and load it into a text editor, e.g. NOTEPAD. The contents of this file should give you some hints about the cause of the installation failure.

6.2 RASPPPOE application does not list the desired adapter

First, be aware that you can use this protocol only on Ethernet adapters. As PPP over Ethernet only works over Ethernet, the protocol will only bind itself to Ethernet adapters (NdisMedium802_3). Adapters that do not support this medium type (e.g. internal or USB broadband modems that do not expose a standard Ethernet interface through their driver) are not supported by this protocol.

You should make sure that the Local Area Connection for the adapter in question is enabled:

- * If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

- * If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

- * Go to the menu and select View then Details to get a detailed view of the network connections on your machine.

- * You should find one or more Local Area Connection objects. Locate the one for the network adapter in question, and check the Status column.

- * If the Status is disabled, right-click the Local Area Connection and select Enable.

- * If enabling fails, check in Device Manager for possible problems with this adapter.

- * If you successfully enabled the adapter, re-run the RASPPPOE application and check whether the adapter is listed now.

If the adapter still does not show up, make sure that the protocol is enabled for the adapter in question:

- * Right-click the Local Area Connection of the adapter in question and select Properties.

- * In the properties dialog box, check the list of installed components. Make sure that the checkbox next to PPP over Ethernet Protocol is checked.

- * If the checkbox is clear, check it. You may be prompted about the digital signature again. Make sure you click "Yes" (Windows 2000) or "Continue Anyway" (Windows XP/.NET) every time you are prompted.

- * If the Local Area Connection properties dialog box lists no components now, see above.

- * Click OK to close the Local Area Connection properties dialog box.

- * Right-click the Local Area Connection in the Network Connections window and select Disable.

- * Right-click the Local Area Connection again and select Enable.

- * Re-run the RASPPPOE application and check if the adapter is listed now.

If the adapter still does not show up, try the following:

- * Right-click the Local Area Connection in the Network Connections window and select Disable.

- * Right-click the Local Area Connection again and select Enable.

- * The RASPPPOE application should list the desired adapter now.

6.3 RASPPPOE application reports "RASPPPOE – No Service Offers Received" when querying available services

This error message means that the protocol did not receive any response from your service provider. You should check the following things in order:

1. Check if your broadband modem has successfully established a link with its counterpart. Most DSL modems have a Sync LED on them which indicates this status. If your modem has such an LED and it indicates that the link is down, contact your service provider for assistance.

2. Check in Device Manager if the network adapter your broadband modem is connected to is enabled and working properly.

3. Check if your network adapter is correctly configured: Bring up Device Manager, select the network adapter your broadband modem is connected to and click Properties. In the Properties window, select the Advanced tab, look through the options and make sure that the correct Line Speed and duplex mode is

selected (most DSL modems only support 10Mbps half duplex mode). If your network adapter has several connectors at the back, make sure the correct connector is selected, which is most likely Twisted Pair (TP).

4. Check that the cable connecting your broadband modem to your network adapter is properly attached and of the correct type. Note that broadband modems typically have a "crossed" connector on them, so you will need a straight cable to connect it directly to a network adapter, while you need to use a crossed cable or use an uplink port to connect it to a hub or switch.

5. Check with your service provider whether they currently have a service outage.

6.4 Connection attempt fails with "Error 797: The connection failed because the modem (or other connecting device) was not found."

This can be the result of unbinding the protocol from an adapter and then re-binding it, which may not have taken effect (see Known Issues). Follow these steps to put the change into effect:

- * If you are running Windows 2000, right-click the My Network Places icon on your desktop and select Properties to bring up the Network and Dial-up Connections window.

- * If you are running Windows XP/.NET, click the Start button, select Control Panel, then click Network and Internet Connections and then click the Network Connections control panel icon to bring up the Network Connections window.

- * Go to the menu and select View then Details to get a detailed view of the network connections on your machine.

- * You should find one or more Local Area Connection objects. Locate the one for the network adapter in question, right-click it and select Disable.

- * Right-click the Local Area Connection again and select Enable.

- * Make another connection attempt and see if it works.

If that did not help, the dial-up connection you created may be configured to connect through a "ghost" dial-up device that no longer exists. Do the following to remedy this:

- * Right-click the dial-up connection that failed to connect and select Properties.

- * In the Connect using: list view, take a close look at the name of the dial-up device that is checked. A "ghost" dial-up device has the name format ISDN channel – Adapter Name (xx), while a correct entry is of the format ISDN channel – Adapter Name, i.e. the extra (xx) identifies a "ghost" device.

- * If the checked device is indeed a "ghost" device, clear it, look through the list for the correct dial-up device and check that one instead.

- * Make another connection attempt.

6.5 Connection attempt fails with "Error 678: There was no answer."

First, you should check whether you can get any reply from your service provider with the Dial-Up Connection Setup application provided with the protocol:

- * Click the Start button on the taskbar and select Run... to bring up the Run dialog box.

- * Type RASPPPOE in the edit field and click the OK button to run the Dial-Up Connection Setup application.

- * If the application quits with an error message, follow the advice it gives.

- * A dialog box comes up with a combo box labeled Query available PPP over Ethernet Services through Adapter: at the top. Select the network adapter your broadband modem is connected to from the list. If the protocol is only operating on one network adapter, the box will be grayed out as there is no choice to make.

- * Click the Query Available Services button. If an error message is displayed, continue here for further help.

- * If the list view shows one or more offered services and you had tried to connect to a specific Service and/or Access Concentrator, make sure the one you had tried to connect to is listed. If you find your service provider has changed the Service Name and/or the Access Concentrator name, simply create a new connection with the new name(s) or edit the Phone number field in your existing dial-up connection accordingly.

- * Click the Exit button to quit the application.

If you do not want to connect to a specific Service and/or Access Concentrator, make sure the Phone number field of your dial-up connection is really completely blank.

6.6 Connection attempt fails with "Error 651: The Modem (or other connecting device) has reported an error."

If you have not rebooted since the installation of the protocol and the machine was in Standby mode since, this is a known issue. Simply click the Redial button. The second connection attempt will proceed without this error. You'll get it once each time after waking the machine from Standby until you reboot the machine. Then the protocol will work flawlessly even right after waking the machine.

6.7 Connection is successfully established, but some (or all) Internet websites do not load properly

This is usually a sign of an MTU problem. You should determine the Path MTU to the problem site(s) (Note: The method described here does not work with all servers. If you get no reply at all from a server or a number below 548, you cannot determine the Path MTU to this server):

Connect, open a Command Prompt and run

```
ping -f -l xxxx Address
```

Where Address is the name or IP address of the server you have problems accessing. For xxxx, start with 1464 and lower the number until you get a reply. Then add 28 to the highest number at which you get a reply. The result is the Path MTU.

Example: You start getting replies at ping -f -l 1372 Address. The Path MTU is $1372 + 28 = 1400$ bytes in this case.

Normally, the Path MTU to all servers should be 1492. However, some service providers appear to have a configuration problem which reduces the Path MTU. If you determine a Path MTU lower than 1492 to several (or all) servers on the Internet, you should enable the MTU override option and set it to the Path MTU you determined. After that setting has taken effect, all sites with a Path MTU greater than or equal to the value you set should load properly.

6.8 Cannot get the Routing and Remote Access Service (RRAS) to work with the PPPoE connection

A common cause of this is that RRAS was incorrectly set up to use a network adapter for Internet access, which bypasses the PPP over Ethernet Protocol. When setting up RRAS with the configuration wizard, you are first presented with a list of network adapters in your system. Do not select any of these entries. Instead, look for an option to create an on-demand dial connection below and select that. A few steps later, an on-demand dial wizard should come up, which offers a list of dial-up devices, in which you should find an ISDN channel with the name of your network card. Select this device to make RRAS work with your PPPoE connection.

If the list of dial-up devices does not contain the mentioned device, you may first have to enable it for use with RRAS. Look through the RRAS Management Console for a list of ports. This list should contain the mentioned dial-up device. You can right-click the device in this list and find an option to enable it for use with RRAS.

6.9 The "Override Maximum Transfer Unit" option does not remain checked

This option will only "stick" if you enter an MTU other than 1492. If you only check the checkbox, but leave the MTU at 1492, the protocol will recognize the default value and clear the checkbox the next time you open the properties dialog, because the MTU was not actually overridden.

6.10 The System Event Log contains "Received a PPPoE Session packet for an unknown session" warnings

This warning merely means that the protocol received a PPPoE packet it could not attribute to any of its connections and is usually not a sign of any malfunction. One possible cause of this is your service provider sending one more packets after the connection has been terminated. This can also be caused by using another PPPoE implementation on the same machine. In that case, the System Event Log may end up being flooded with these warnings. You can prevent this by disabling the Log Warnings checkbox in the protocol's Event Logging options.

7. Known Issues

This section documents known issues with the protocol.

7.1 Binding/unbinding the protocol to/from a network adapter takes effect immediately and cannot be canceled

When you bring up the Properties of a Local Area Connection and toggle the checkbox next to PPP over Ethernet Protocol, the binding change takes effect immediately, i.e. it is not deferred until you click OK or Cancel, and you cannot cancel the change. This is merely annoying when accidentally checking the checkbox, as you can clear it again with no harm done. However, if you accidentally clear the checkbox, simply re-checking the checkbox may not be sufficient to make the protocol work on that adapter again, due to this known issue.

Background: This protocol is implemented as an NDIS intermediate driver with a different upper edge (ndiswan) than lower edge (ndis4, ndis5). As such, it does not qualify as a filter driver and thus requires its own Notify Object (implemented in RASPPPOE.DLL) to install and remove miniport instances for the bound adapters and to communicate the names of the installed device instances to the protocol portion of the driver via the registry. When the user brings up the connection properties dialog box, the only way for the Notify Object to tell whether the user clicked OK or Cancel is that its ApplyRegistryChanges() and ApplyPnpChanges() member functions are only called in the former case, but not in the latter. So the right thing to do would be install and remove the miniport instance(s) in one of these functions – but that does not work, because a reentrancy check in the Windows network configuration library blocks all calls to INetCfgClassSetup::Install() and INetCfgClassSetup::DeInstall() at that point for fear the developer might have overlooked the possibility that these calls could lead to another invocation of the Notify Object's member functions that requested the installation or removal, which could lead to endless installation loops if the writer of the Notify Object was not smart enough to set a flag to prevent this. This makes it impossible to install and remove miniport instances from these Notify Object member functions. To work around this problem, the PPP over Ethernet Protocol does all installation and removal in the Notify Object's NotifyBindingPath() member function, which is unfortunately called immediately when the user toggles the checkbox. Thus, the change

takes effect immediately and cannot be canceled.

7.2 After initial installation, binding the protocol to a network adapter may not take effect

If you unbound the protocol from a network adapter by clearing the checkbox next to the PPP over Ethernet Protocol in the Properties of a Local Area Connection, binding the protocol to the network adapter by checking the checkbox again may not take effect, although you get no notification of this. If you unbound the protocol from all network adapters, the first binding you re-enable will take effect, but subsequent ones will not. There are three possible solutions in this situation:

1. Locate the Local Area Connection of the adapter in question, right-click it and select Disable. Then, right-click it again and select Enable. This will make the protocol work again. Note, though, that this temporarily disrupts