Modem−Dialup−NT HOW−TO

Table of Contents

Modem−Dialup−NT HOW−TO

Al Dev (Alavoor Vasudevan) alavoor[AT]yahoo.com

v1.4, 12 Feb 2002

This document will help you to setup the Modem to do Dial−up Networking with remote server like Windows NT RAS or Linux RAS (Remote Access Server). You can use the Modem to do Dial−Up Networking on Linux very similar to that of MS Windows dialup networking.

---

1. Introduction

(The latest version of this document is at http://www.milkywaygalaxy.freeservers.com. You may want to check there for changes).

Most of the companies in USA and Europe provide "Remote Access Servers" (RAS), so that their employees can dial−in from remote locations either from home or from field. RAS servers are generally Linux RAS servers or MS Windows NT RAS servers.

Nowadays, Virtual Private Network (VPN) is becoming quite popular because it supports broadband and may eventually replace dial−up networking which is very slow running at 56KB/sec. See the VPN HOWTO and VPN−Masquerade howto and java based MindTerm−SSH−HOWTO.

Configuring a dial−up connection on Linux is about as simple as it is in Windows. We will use PPP.

Definition: ***PPP ('Point to Point Protocol') is a protocol, that makes it possible to make IP−Links (Internet Protocol) between two computers with a modem.***

The operating system Linux has this protocol in the kernel (If you compiled it into the kernel). For a ppp−link you need to start a daemon called pppd.

With PPP you can make a link between two hosts which understand the protocol. A link between a Linux host, acting as client and a Windows NT server, acting as server, is called a (Microsoft term) **'Remote Access Service'** (RAS) link.

First, see if your modem is supported by linux. Internal Modems (WinModems) do not work with linux. Some WinModems require special tweaking to make it work in linux.

1.1 Preparations

Check if you have all the needed hardware, software and data and hand:

- A modem supported by Linux. Some modems, like most internal PCI modems or some external USB modems are so−called WinModems. Which means that they rely on Windows−only software to work. Read Winmodems are not modems for more information and a compability list and check out Linmodems.org for (a few) drivers.
- The modem's init−string. GNU/Linux does not have an equivalent to the Windows hardware information file (.inf) mechanism. You may have to find out the init−string for your modem yourself. It should(TM) be listed in your hardware's documentation or in the modem's INF file, but there are also online sources like this list of modem init−strings . If you have no clue at all, use ATZ, that works with many modems.
- Provider data. You'll need your login name, password and the telephone number. DNS addresses would be fine, too, but are optional for recent versions of pppd.
- Check if your modem is connected correctly to the system or properly recognized by it. With an external modem, that's pretty easy. As 'root' do **echo >/dev/ttyS0** and watch the modem LEDs. You should see them flicker for a moment. If not, try **echo >/dev/ttyS1** in case your modem is connected to the second serial port. With an internal modem, use HardDrake to check if the system sees the modem. Or use this command to query the PCI list directly: **cat /proc/pci**. If it's an ISA bus modem, check '/etc/isapnp.conf' if it is listed there. If you don't have that file, you'll have to generate it. Read isapnpfaq.txt in the isapnptools doc directory or **man isapnp** or **man isapnp.conf**.

2. Quick Steps to Dialup Networking

These quick steps will enable you to setup dial−up networking on Linux in just five minutes.

You need the following packages:

- wvdial*.rpm
- ppp*.rpm

You can check with **rpm −qa | grep −i wvdial** for the installed packages on redhat linux. Use equivalent package commands in case of other distributions like Debian or Slackware.

The steps below are for MS Windows NT RAS server. The NT RAS requires **noauth** in wvdial file. The Linux RAS may need different settings. In the sample example given below, you should replace username **john** with the user ID given to you to login into remote RAS server.

1. Edit the file /etc/wvdial.conf and insert lines like

   ```
   [Dialer myconnection]
   Username = john
   Password = passwordofjohn
   Phone = 982 1956
   Area Code = 713
   Inherits = Dialer Defaults
   Stupid mode = 1
   ```

   Change john with whatever.
2. Edit /etc/ppp/pap−secrets and insert lines like

   ```
   # Secrets for authentication using PAP
   # client        server  secret                  IP addresses
   john            ppp0    passwordofjohn
   john            *       passwordofjohn
   ```

   Change john with whatever.
3. Edit /etc/ppp/chap−secrets and insert lines like

   ```
   # Secrets for authentication using CHAP
   # client        server  secret                  IP addresses
   john            ppp0    passwordofjohn
   john            *       passwordofjohn
   ```

   Change john with whatever.
4. Edit /etc/ppp/options and insert lines like

   ```
   lock
   defaultroute
   ```

```
noipdefault
idle 1200
usepeerdns
proxyarp
```

5. Create a new file /etc/ppp/ip−up and insert lines like

```
#!/bin/bash

# This file /etc/ppp/ip-up should not be modified -- make local changes to
# /etc/ppp/ip-up.local instead

LOGDEVICE=$6
REALDEVICE=$1

export PATH=/sbin:/usr/sbin:/bin:/usr/bin

[ -f /etc/sysconfig/network-scripts/ifcfg-${LOGDEVICE} ] && /etc/sysconfig/network-scripts/ifup-post ifcfg-${LOGDEVICE}

[ -x /etc/ppp/ip-up.local ] && /etc/ppp/ip-up.local "$@"

exit 0
```

6. Create a new file /etc/ppp/ip−up.local and insert lines like

```
#!/bin/sh

echo "  "
echo "Before doing route add......"
echo "Output from netstat -nr is : "
netstat -nr
echo "  "

echo " Doing route add now....  "
# You should change the lines below and add the networks where
# your remote machines are ...
route add -net 156.15.24.0 netmask 255.255.255.0 dev ppp0
route add -net 172.28.36.0 netmask 255.255.255.0 dev ppp0
route add -net 172.28.39.0 netmask 255.255.255.0 dev ppp0
route add -net 172.28.26.0 netmask 255.255.255.0 dev ppp0

echo "After doing route add......"
echo "Output from netstat -nr is : "
netstat -nr

echo "  "
```

When **wvdial** is started it automatically starts the **pppd** which automatically calls this script to add route to your remote networks via the PPP link. See 'man pppd'. In the example above I have to connect to remote networks 156.15.24, 172.28.36, 172.28.39 via the PPP link. You should replace these with your settings. You can also manually add or delete the route after starting the PPP.

```
bash$ su - root
```

```
bash# route add -net 172.28.26.0 netmask 255.255.255.0 dev ppp0
bash# route del -net 172.23.2.0 netmask 255.255.255.0 dev ppp0
```

7. Create a new file /etc/ppp/ip−down and insert lines like

```
#!/bin/bash

# This file /etc/ppp/ip-down should not be modified -- make local changes to
# /etc/ppp/ip-down.local instead

LOGDEVICE=$6
REALDEVICE=$1

export PATH=/sbin:/usr/sbin:/bin:/usr/bin

[ -x /etc/ppp/ip-down.local ] && /etc/ppp/ip-down.local "$@"

/etc/sysconfig/network-scripts/ifdown-post ifcfg-${LOGDEVICE}

exit 0
```

8. Create a new file /etc/ppp/ip−down.local and insert lines like

```
#!/bin/sh

echo "  "
echo "Before doing route delete ......"
echo "Output from netstat -nr is : "
netstat -nr
echo "  "

echo " Doing route delete now....  "
# Lines below should be same as in ip-up.local but with delete
route del -net 156.15.24.0 netmask 255.255.255.0 dev ppp0
route del -net 172.28.36.0 netmask 255.255.255.0 dev ppp0
route del -net 172.23.2.0 netmask 255.255.255.0 dev ppp0

echo "After doing route delete ......"
echo "Output from netstat -nr is : "
netstat -nr

echo "  "
```

When **pppd** is stopped it automatically calls this script to clean up whatever ip−up script did. See 'man pppd'.

9. Edit /etc/ppp/peers/wvdial and insert lines like

```
noauth user john
name wvdial
```

Change john with whatever.

10. If you have an external modem, then just before dialing, switch off/on the power to modem to reset it.

```
bash$ su - root
bash# tail -f /var/log/messages

Bring up another xterm shell window and
bash$ su - root
bash# man pppd
bash# man wvdial
bash# cd /etc/ppp
bash# nohup wvdial myconnection &
bash# tail -f nohup.out

Bring up another xterm shell window and
bash$ su - root
bash# ifconfig -a
And you should see ppp device listed and up and running.
bash# netstat -nr
And you should see ppp device listed along with other interfaces.
```

11. By this step the **pppd** should have established the routes to remote networks with ip−up.local script. Also **pppd** should have created the /etc/ppp/resolv.conf for DNS servers. Now, try connect to remote host and verify connections.

```
bash$ su - root
bash# tail -100 /var/log/messages | less
bash# cat /etc/ppp/resolv.conf
bash# ifconfig -a
bash# netstat -nr
I looked for route to network 156.15.24.0 (You should see your
network as per /etc/ppp/ip-up.local)
bash# ping 156.15.24.68
bash# telnet 156.15.24.68

You can also edit /etc/hosts and add these hosts
156.15.24.64    starship
172.28.36.131   gemstone
bash# ping starship
bash# ping gemstone
bash# telnet gemstone
bash# ftp gemstone
```

12. To stop the PPP :

```
bash$ su - root
bash# killall wvdial
bash# killall pppd
bash# man killall
```

13. Now enable non−root user to do dial−up networking with PPP. Make sure that the user belongs to the groups `uucp' and `dialout'.

```
bash$ su - root
bash# su - someuser
```

```
bash$ id
uid=501(someuser) gid=501(maingid) groups=501(maingid),503(staroffice),505(staff)
This shows the groups 'someuser' belongs.

bash$ exit
bash# usermod --help
bash# usermod -g maingid -G staroffice,staff,uucp,dialout someuser
bash# chgrp -R uucp /etc/ppp
bash# chmod -R ug+r /etc/ppp
bash# chmod -R o-rwx /etc/ppp
bash# chmod go-rwx /etc/ppp/*secrets
bash# chmod u+s /usr/sbin/pppd
bash# su - someuser
bash$ id
This will display groups someuser belongs and you should see uucp.
bash$ nohup wvdial myconnection &
bash$ tail -f nohup.out
```

It is very strongly recommended that you use wvdial as `normal' user, and make sure that the user belongs to the groups `uucp' and `dialout'.

14. See also the frontend tool for wvdial at X−wvdial.
15. If you do not have any other interface ethernet cards for Cable modem or DSL modem then you can setup telephone dial−up modem as the default route for all outside conections to internet. Assuming you only have modem connection via POTS (Plain Old Telephone System) you can do −

```
bash$ su - root
bash# man route
bash# ifconfig -a
And look for the IP address of the ppp device, and use it below
bash# route add default gw  IP_of_ppp_device
For example -
bash# route add default gw  172.28.36.3
```

2.1 Troubleshooting

In case you have problems:

```
bash$ su - root
bash# tail -f /var/log/messages
And then start myconnection in /etc/wvdial.conf
bash# wvdial myconnection

bash# ifconfig -a
Should list ppp

bash# netstat -nr
Should list ppp

If you have multiple interfaces, like ethernet cards to DSL or Cable modem,
to check which route is being used, do:
bash# traceroute www.yahoo.com
bash# traceroute remotehostname
```

2.2 Graphical Tools

Preference should be given the console line commands as in previous section, but some people prefer GUI interface. You can use graphical tools like Linuxconf, KPPP, GnomePPP and many others.

Note: I very strongly recommend using command−line console commands 'wvdial' as demonstrated in previous sections, as they are lot simpler and easy to use.

```
bash$ su - root
bash# linuxconf &
And select Networking->Client Tasks->Routing & Gateways->Set Other Routes to networks->Add network
. Also select Networking->PPP

bash# rp3 &
bash# rp3-config &
```

3. Remote connection with VNC

Once you have connection through PPP to remote machines, you can use the VNC to display remote machines on your local display.

- The VNC is at http://www.uk.research.att.com/vnc
- Get VNC rpms from rpmfind.
- The best Window manager for VNC is QVWM which is like MS Windows 98/NT/2000 interface, get it from http://www.qvwm.org.
- After starting vncserver, you can start the **vncviewer** program on clients like MS Windows, Mac or Linux.
- See also the List of X11 Windows Managers.

Compiling qvwm on Solaris : On Solaris you should install the following packages which you can get from http://sun.freeware.com − xpm, imlib, jpeg, libungif, giflib, libpng, tiff. And you can download the binary package for solaris from http://www.qvwm.org.

Or you can download the qvwm source for solaris from http://www.qvwm.org and compile it using gcc.

Troubleshooting compile: You should put unsigned long before arg in usleep() usleep((unsigned long) 10000)

3.1 Microsoft "MS Outlook" Email from PPP

1. At office, start VNC server on your Windows NT/2000 desktop.
2. Connect from home using modem via PPP.
3. Once the PPP is established, you can start the **vncviewer** program. Just type */usr/bin/vncviewer*.
4. Enter your office Windows NT/2000 desktop's hostname and vnc password
5. The entire desktop of your remote office Windows NT/2000 is displayed. Now you can read your MS Outlook email.

---

4. Related URLs

- The **best document** is : Mandrake Dial up networking
- Suse PPP wvdial document and PPP categories

- PPP HOWTO
- PPP−NT−HOWTO
- Modem HOWTO
- ISP Hookup HOWTO: Chapter 6

- Linux PPP FAQ
- PPP Design & Debugging
- Suomeksi PPP page
- Unix Serial Port Resources
- Linux Dial−in server − Setup guide.

- List of PPP utilities go here and type "ppp" in the search box.
- General PPP and IPX over PPP

- VPN HOWTO
- VPN−Masquerade howto
- Java based MindTerm−SSH−HOWTO

Linux goodies main site is at http://www.milkywaygalaxy.freeservers.com Mirror sites are at − http://aldev0.webjump.com, angelfire, geocities, virtualave, 50megs, theglobe, NBCi, Terrashare, Fortunecity, Freewebsites, Tripod, Spree, Escalix, Httpcity, Freeservers.

---

5. Other Formats of this Document

This document is published in 14 different formats namely: DVI, Postscript, Latex, Adobe Acrobat PDF, LyX, GNU−info, HTML, RTF(Rich Text Format), Plain−text, Unix man pages, single HTML file, SGML (Linuxdoc format), SGML (Docbook format), and MS WinHelp format.

This howto document is located at:

- http://www.linuxdoc.org and click on HOWTOs and search for the howto document name using CTRL+f or ALT+f within the web−browser.

You can also find this document at the following mirrors sites:

- http://www.caldera.com/LDP/HOWTO
- http://www.linux.ucla.edu/LDP
- http://www.cc.gatech.edu/linux/LDP
- http://www.redhat.com/mirrors/LDP
- Other mirror sites near you (network−address−wise) can be found at http://www.linuxdoc.org/mirrors.html select a site and go to directory /LDP/HOWTO/xxxxx−HOWTO.html

- You can get this HOWTO document as a single file tar ball in HTML, DVI, Postscript or SGML formats from − ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO/other−formats/ and http://www.linuxdoc.org/docs.html#howto

- Plain text format is in: ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO and http://www.linuxdoc.org/docs.html#howto

- Single HTML file format is in: http://www.linuxdoc.org/docs.html#howto

  A single HTML file can be created with the command (see man sgml2html) − sgml2html −split 0 xxxxhowto.sgml

- Translations to other languages like French, German, Spanish, Chinese, and Japanese are in ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO and http://www.linuxdoc.org/docs.html#howto Any help from you to translate to other languages is welcome.

The document is written using a tool called "SGML−Tools" which can be got from: http://www.sgmltools.org Compiling the source you will get the following commands like:

- sgml2html xxxxhowto.sgml (to generate html file)
- sgml2html −split 0 xxxxhowto.sgml (to generate a single page html file)
- sgml2rtf xxxxhowto.sgml (to generate RTF file)
- sgml2latex xxxxhowto.sgml (to generate latex file)

5.1 Acrobat PDF format

A PDF file can be generated from postscript file using either acrobat **distill** or **Ghostscript**. And a postscript file is generated from DVI which in turn is generated from a LaTex file. You can download distill software from http://www.adobe.com and from unix and from windows . Given below is a sample session:

```
bash$ man sgml2latex
bash$ sgml2latex filename.sgml
bash$ man dvips
bash$ dvips -o filename.ps filename.dvi
bash$ distill filename.ps
bash$ man ghostscript
bash$ man ps2pdf
bash$ ps2pdf input.ps output.pdf
bash$ acroread output.pdf &
```

Or you can use the Ghostscript command **ps2pdf**. ps2pdf is a work−alike for nearly all the functionality of Adobe's Acrobat Distiller product: it converts PostScript files to Portable Document Format (PDF) files. **ps2pdf** is implemented as a very small command script (batch file) that invokes Ghostscript, selecting a special "output device" called **pdfwrite**. In order to use ps2pdf, the pdfwrite device must be included in the makefile when Ghostscript was compiled; see the documentation on building Ghostscript for details.

5.2 Convert Linuxdoc to Docbook format

This document is written in linuxdoc SGML format. The Docbook SGML format supercedes the linuxdoc format and has a lot more features than linuxdoc. The linuxdoc is very simple and easy to use. To convert linuxdoc SGML file to Docbook SGML use the program **ld2db.sh** and some Perl scripts. The ld2db output is not 100% clean and you need to use the **clean_ld2db.pl** Perl script. You may need to manually correct a few lines in the document.

- Download the ld2db program from http://www.dcs.gla.ac.uk/~rrt/docbook.html or from Milkyway Galaxy site
- Download the cleanup_ld2db.pl perl script from from Milkyway Galaxy site

The ld2db.sh is not 100% clean, so you will get some errors when you run it.

```
        bash$ ld2db.sh file-linuxdoc.sgml db.sgml
        bash$ cleanup.pl db.sgml > db_clean.sgml
        bash$ gvim db_clean.sgml
        bash$ docbook2html db.sgml
```

And you may have to manually edit some of the minor errors after running the Perl script. For example you may need to put closing tag < /Para> for each < Listitem>

5.3 Convert to MS WinHelp format

You can convert the SGML howto document to a Microsoft Windows Help file, First convert the sgml to html using:

```
        bash$ sgml2html xxxxhowto.sgml     (to generate html file)
        bash$ sgml2html -split 0   xxxxhowto.sgml (to generate a single page html file)
```

Then use the tool HtmlToHlp. You can also use sgml2rtf and then use the RTF files for generating winhelp files.

5.4 Reading various formats

In order to view the document in dvi format, use the xdvi program. The xdvi program is located in tetex−xdvi*.rpm package in Redhat Linux which can be located through ControlPanel | Applications | Publishing | TeX menu buttons. To read a dvi document give the command:

```
                xdvi -geometry 80x90 howto.dvi
                man xdvi
```

And resize the window with the mouse. To navigate use Arrow keys, Page Up, Page Down keys, also you can use 'f', 'd', 'u', 'c', 'l', 'r', 'p', 'n' letter keys to move up, down, center, next page, previous page etc. To turn off expert menu press 'x'.

You can read a postscript file using the program 'gv' (ghostview) or 'ghostscript'. The ghostscript program is in the ghostscript*.rpm package and the gv program is in the gv*.rpm package in Redhat Linux which can be located through ControlPanel | Applications | Graphics menu buttons. The gv program is much more user friendly than ghostscript. Also ghostscript and gv are available on other platforms like OS/2, Windows 95 and NT. You can view this document even on those platforms.

- Get ghostscript for Windows 95, OS/2, and for all OSes from http://www.cs.wisc.edu/~ghost

To read a postscript document give the command:

```
gv howto.ps
ghostscript howto.ps
```

You can read an HTML format document using Netscape Navigator, Microsoft Internet explorer, Redhat Baron Web browser or any of the 10 other web browsers.

You can read the latex, LyX output using LyX an X Window front end to LaTex.

5.5 Convert HTML to SGML html2sgml

To convert any HTML document to Linuxdoc SGML use the tool 'html2sgml' from http://www.abc.se/~m9339/prog/html2sgml.html.

---

6. Copyright

---

7. Appendix A Connecting Linux + PPP < −− > NT + RAS...

This section is written by John Newbigin, Email: jn@it.swin.edu.au Below is extract from http://uranus.it.swin.edu.au/~jn/linux/ppp/linuxppp.htm

See also PPP HOWTO

- **Part 1... The easy bit :** Use minicom or your favourite terminal program to dial the NT RAS Server. Once you have a connection you can proceed to Part 2. Make sure you can quit your terminal without resetting the modem.

- **Part 2... The harder bit :** Setting up the /etc/ppp/options file may be a bit tricky. The important things to do are... Make sure you do not have any of the following entries:

    - auth #This will demand that the NT machine authenticate it's self to your machine, this is generally not possible, or needed
- +pap #This will demand that the NT machine authenticates it's self using PAP, see above
- −pap #This says that you won't agree to use PAP
- +chap #This will demand that the NT machine authenticates it's self using CHAP, see above

Make sure the RAS server will accept plain text passwords. You need this to use PAP authentication. This can be set by going to Control Panel −> Network −> Services −> Remote Access Service −> Properties. Select the modem or dial up device, go to Network −> Server Settings −> Encryption Settings and select "allow any authentication including plain text". Then hit OK, Save etc. to close it all.

- **Part 3... The hardest bit (without this document) :** NOTE: If you use my pppd patch, you will not have to do this In the /etc/ppp/pap−secretes file, add the following lines:

```
"" * ""
"jn" * "MyPassword"
```

Where jn is your user name on the NT machine. But what if you are a member of a domain? Then use this instead (where csse−mm is replaced with your domain name)

```
"" * ""
"csse-mm\\jn" * "MyPassword"
```

Note that you must escape the "\" character as "\\". then, back to the /etc/ppp/options file and add the following line:

```
name "jn"
or
name "csse-mm\\jn"
```

depending what you put in the pap−secretes file.

- **Part 4... Another easy bit :** Dial in to the server, like in step one, or using your custom script. Start ppp with the following line: pppd 115200 /dev/cua1 or whatever your settings might be. You may want to enable debug information if something does not work, but everything should. Run "ifconfig" and you should see an entry for ppp0. If you do then you are cooking with gas. Restart pppd using the "defaultroute" option and start surfing the internet. If you are still having trouble, or can't understand any of these instructions, drop me an e−mail John Newbigin (jn@it.swin.edu.au).