Universal Mobile Print Server – On the Cheap, and Cloud-free.

If you're like me, your house is full of mobile devices: my kids have iPads, my wife and I have Android tablets and phones. We all need to print at some point. It may be that your existing printer works with some devices but not others. Maybe you have several older printers, including a USB printer. Maybe you want to print MS Office documents from your phone without using the Cloud.

The one simple answer to this scenario is the "**Raspberry Pi**"; a dirt-cheap (USD$35) computer on a chip that costs less than a replacement ink-jet cartridge and can be made to connect to just about any mobile device and almost any printer. All you need is 2 hours and a desire to learn about Linux.

What You Will Need

Order a "Pi Model B" by following the links from here: http:/www.raspberrypi.org/ (Model B is the best choice because it has more memory and an Ethernet jack both of which we need for this project.)

If you are a Linux novice, make sure to order the preconfigured 8 Gb SD Card with the NOOBS software. If you have no Ethernet cable connectivity you will need a Wifi dongle. You can borrow a USB keyboard and mouse from another computer just for the setup phase. Use your television and an HDMI cable for the monitor. Once the setup is complete you won't need the monitor or keyboard/mouse anymore. (There are several Remote Desktop packages for the Pi which you can use to maintain your Pi after the initial setup.) For the power supply you can use an old USB phone charger with a Micro-B cable.

When it arrives, follow the Quick Start Guide and choose the Raspbian OS option from the NOOBS start-up menu. This will quickly give you a working "Pi".

Configuring your Pi as a Print Server

After you configure your Pi, boot it and login (userid=pi, password=raspberry), you will see a desktop with icons. Double click the "LX Terminal" to open a command line terminal and type:

> **sudo apt-get update**

   This will update your Raspbian OS and may take a few moments. (Figure 1)
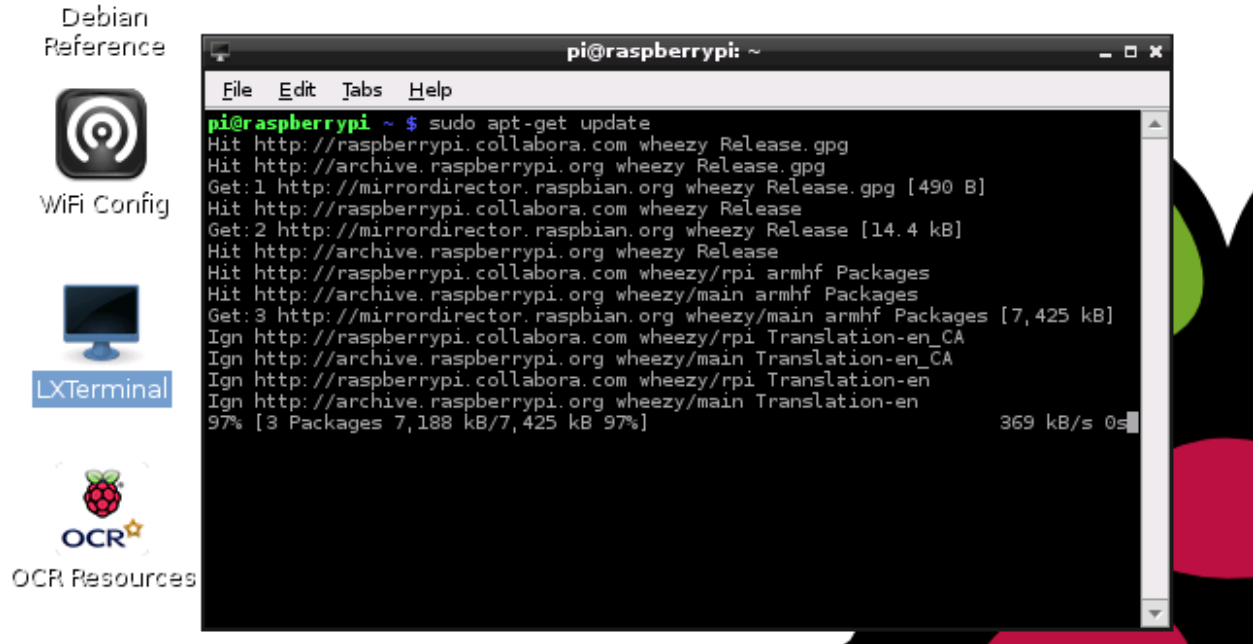
Figure 1 - Open LXTerminal and Update the OS.

Now install CUPS and AVAHI. CUPS is the Common UNIX Printing System an open-source printing solution. AVAHI is an open source Bonjour or ZeroConf package that is used for network discovery.

➢ **sudo apt-get install avahi-daemon cups cups-pdf**

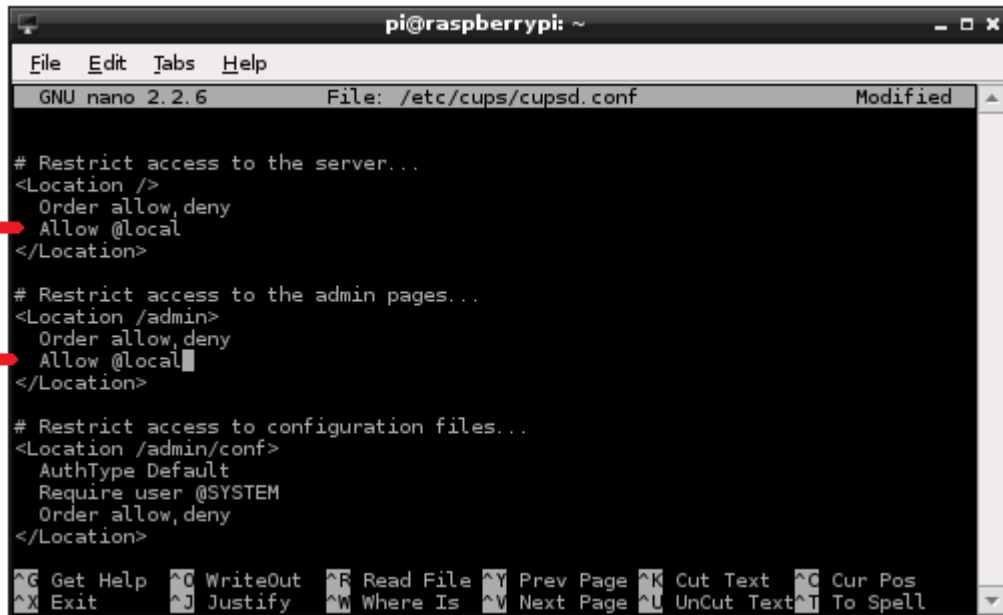Now make the "pi" userid capable of administering the CUPS config:

➢ **sudo usermod –a –G lpadmin pi**

Next you need to tweak the CUPS config file:

➢ **sudo nano /etc/cups.cupsd.conf**

You are now using a simple notepad style editor to make the following changes to the config file. (NOOB Hint: Use the cursor-arrow keys to navigate.)

- line 17: change "**Listen localhost:631**" to "**Listen 0.0.0.0:631**".
- Scroll down until you reach the "Location" and "Location /admin" sections. Insert two lines with the text "Allow @local" as shown in Figure 2
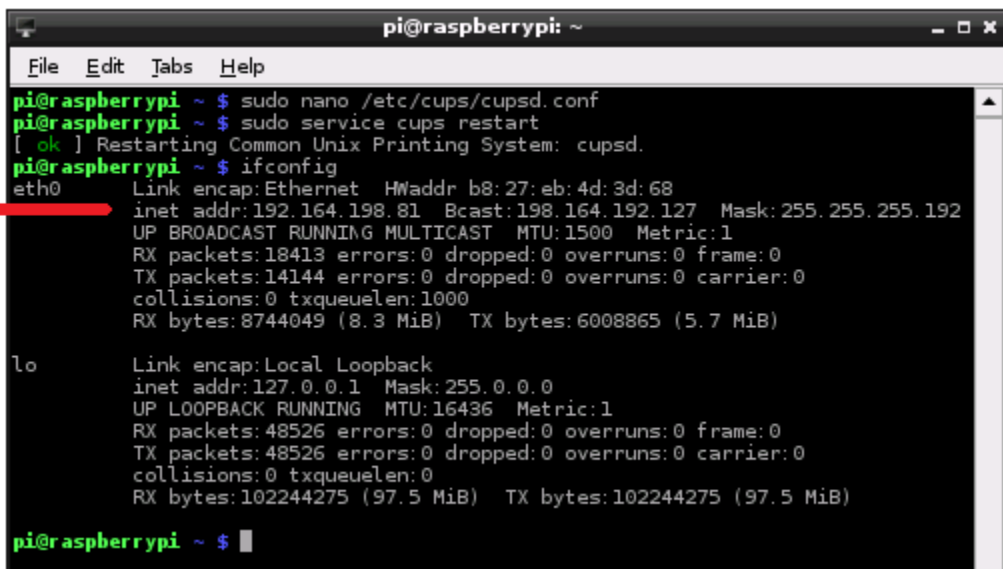
Figure 2 - Insert line "Allow all"

To save the changes hit CTRL-X, then "Y", then Enter.

You must now restart the CUPS server for your changes to be complete:

- **sudo service cups restart**
- **ifconfig**

Figure 3 - cups re-start, finding the IP Address

The "ifconfig" shows the address of your Pi on your network. Now open a browser session on your Pi or from any computer on your local network and type the following where the x's are your Pi's IP address:

 ➢ https://xxx.xxx.xxx.xxx:631

 And you should see the following

Figure 4 - CUPS Web interface

You may see a warning about the web site's certificate. You can ignore this as you should trust this site, after all you just installed it. If you are prompted for a userid/password then use your "pi" userid and password. At this point be sure your printer is powered on.

Choose the Administration tab and then the "Find New Printers" button. If you are lucky you will see your printer(s) listed among the Discovered Printers. (If you do not see your printer, see the Manual Print Config section below.)   If the printer is shown then select it and press continue. Choose the default Connection and press Continue. Choose Share This Printer and continue. (Figure 5)

Figure 5 - sharing the new printer

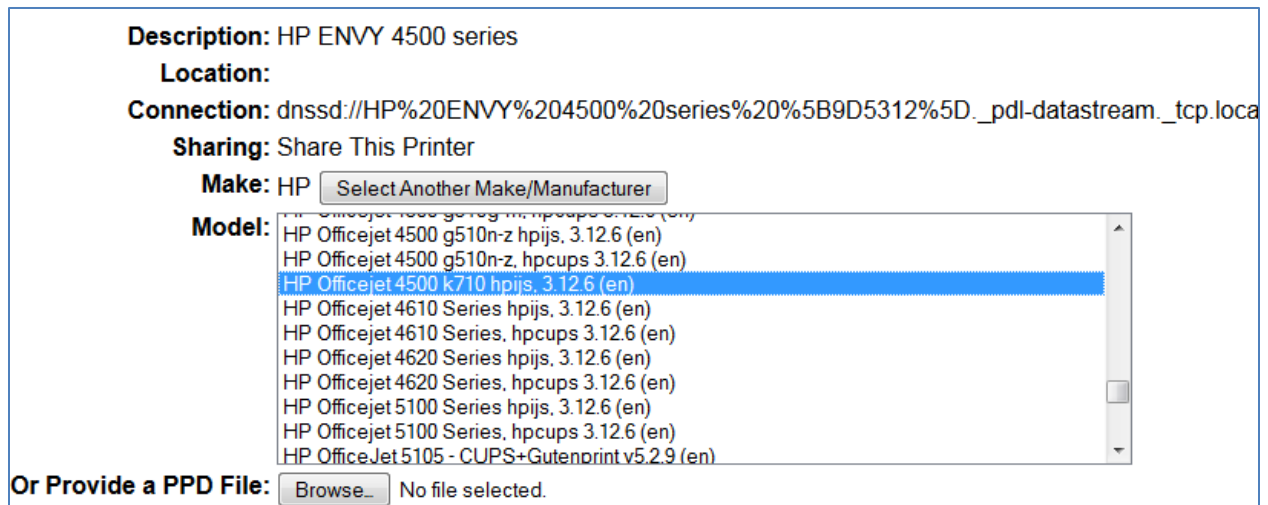You will need to select an appropriate driver. (Figure 6)

Figure 6 - select make and model to assign the correct driver

Once complete, return to Administration Tab, then choose "Manage Printers". Select your printer and print a test page. (Figure 7)
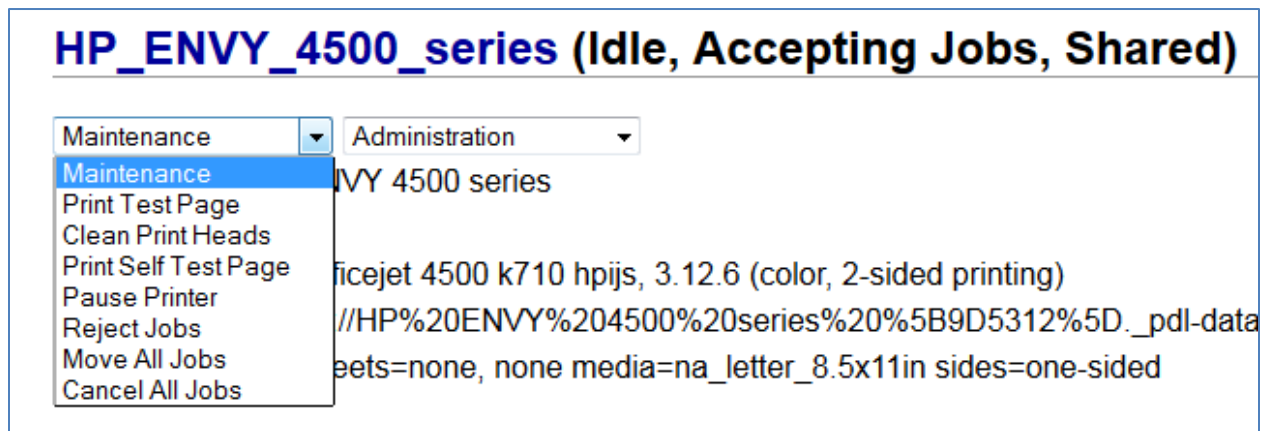

Figure 7 - print a test page

If the test page does not print you have likely chosen the wrong driver model. Do a Google search of your make/model to see if anyone else has configured it using CUPS. Then choose the Administration pull-down menu this time (Figure 7) for that printer and select Modify to change it as needed
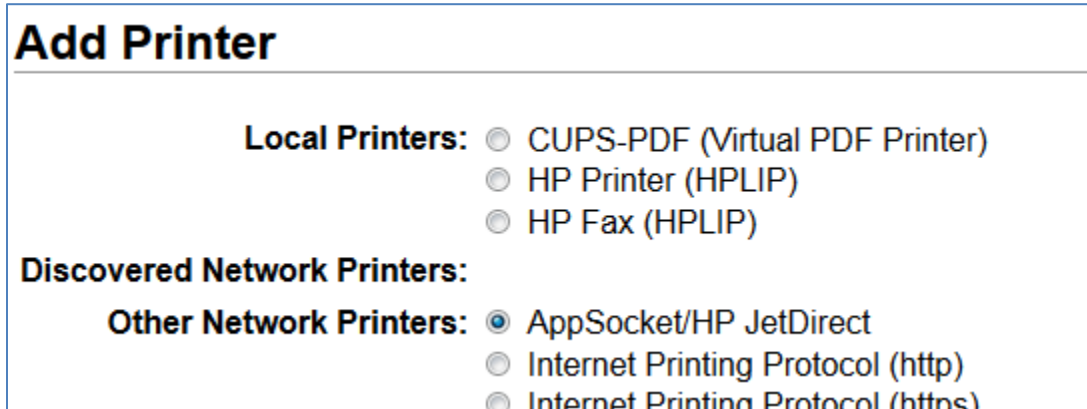
Manual Printer Config

Not every printer will be discovered correctly by CUPS. If your printer was not shown, you will have to manually configure the settings and this can be hit-or-miss. Try using Google to see if anyone out there has configured your make/model in CUPS. . Here are some web sites to help you choose the correct driver:

http://www.openprinting.org/printers

http://gimp-print.sourceforge.net/p_Supported_Printers.php

If you have a laser printer that you know understands HP PCL or Postscript (the two most common varieties) and you know its IP address then manual config should be easy. Choose the "AppSocket/HP Jet Direct" connection option under the Add Printer page (Figure 8):

Add Printer

Local Printers:	○ CUPS-PDF (Virtual PDF Printer)
	○ HP Printer (HPLIP)
	○ HP Fax (HPLIP)
Discovered Network Printers:	
Other Network Printers:	● AppSocket/HP JetDirect
	○ Internet Printing Protocol (http)
	○ Internet Printing Protocol (https)
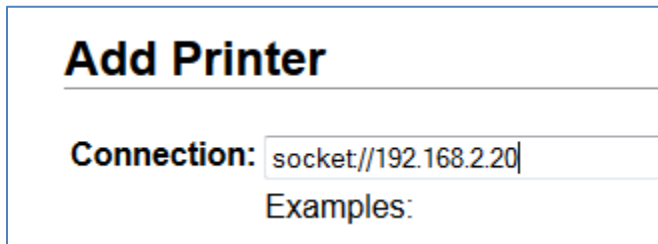
Figure 8 - Choosing JetDirect (port 9100) for a manual config

Type your printers IP Address in the connection after the socket prefix (Figure 9):

Add Printer

Connection: socket://192.168.2.20
Examples:

Figure 9 - Type your printers IP Address

Choose Generic for the Make if you know that your printer is compatible with HP PCL or Postscript. (Figure 10)

Once the printer is added, print a test page as described above. (Figure 7)

Mobile Printing

Once you get one or more printers working on your Pi, something magical happens: CUPS "publishes" these printers and then the Avahi software "advertises" them on your local network.

You should now be able to print from your iOS devices. Try going through printer discovery by attempting to print a web page from the Safari browser. After a few seconds delay, your printers should show up as "**printername @ raspberrypi**".

To print from Android, install the app Let's Print Droid on your Android devices. If you have the KitKat OS or better then you can also install Let's Print Framework.

On your Android devices, run the Let's Print Droid application, choose **menu->New Printer** and select the Scan option. The scan should find each of your printers and configure them with a name like "**printername @ raspberrypi**". After the scan completes you can print a test page by hitting "**menu->Test Print**" from the scan window.
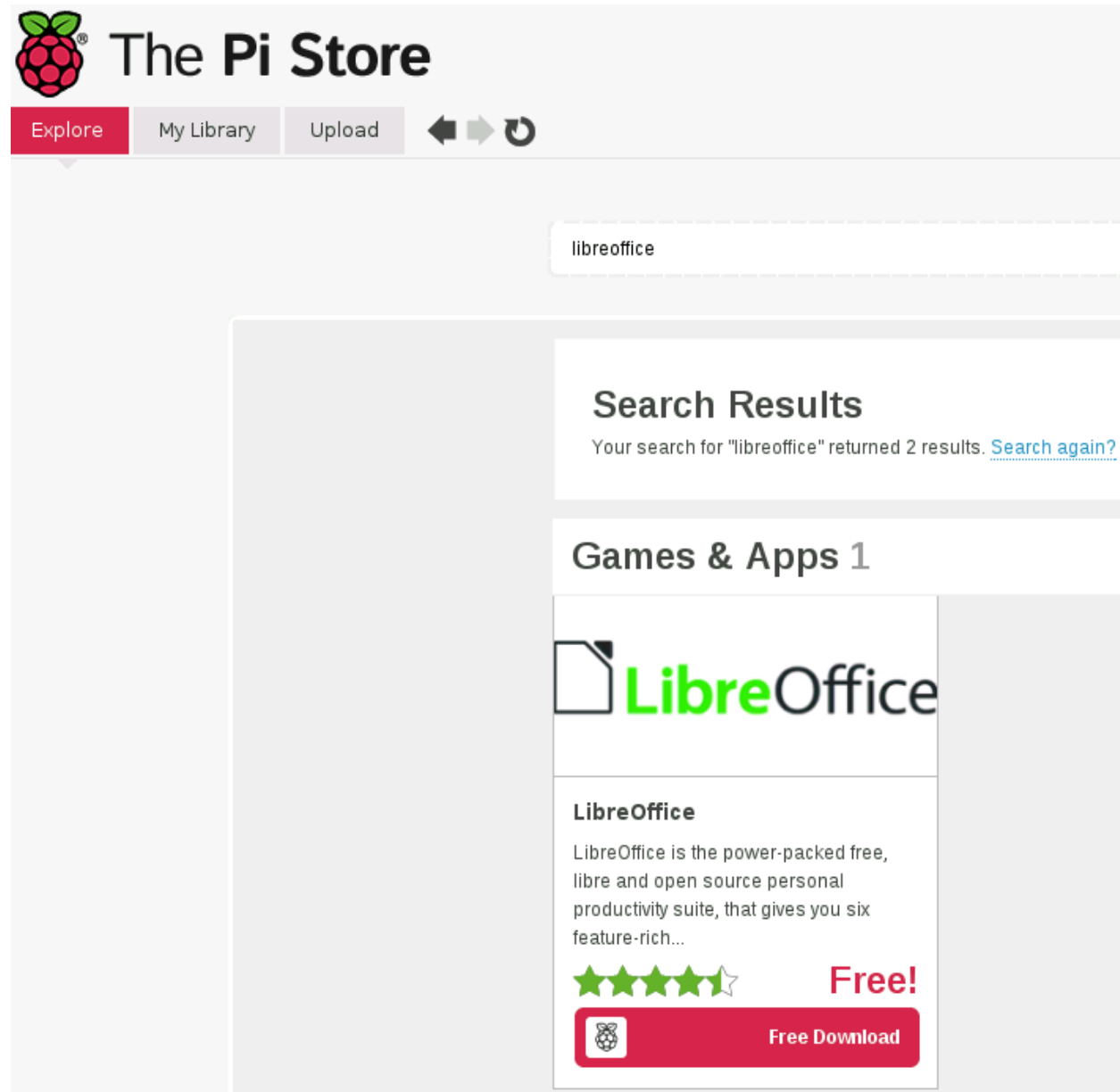
Advanced config - Printing Office Documents from Android

Normally to print Office documents from a device, you need an Office program on the same device. Starting in Android KitKat there are some Office apps that allow you to print through the OS print framework by converting the Documents to PDF format. If you install "Let's Print Framework" then you can print this way. These print capabilities are done through the Cloud and not every Android device can access them.

We can get by these problems by using free Pi software which will allow us to print DocX, XLSX (spreadsheet) or Power Point files from Android without an Office app installed and without using Cloud Printing.

We start by installing LibreOffice for the Pi. Open the Pi Desktop agin and double-click on the "Pi Store" icon.

Do a search for "libreoffice" and click on it to install. It's free.

With LibreOffice installed you can create and print office documents from your Pi. To print Office documents from your Android device we need to configure something called a "CUPS Filter". We will leverage LibreOffice to render and print documents that arrive from our Android devices.

Start the File Manager on your Pi and right-click in your home directory and choose "Create New ->
Blank File". Create three files named; "**droid.types**" , "**droid.convs**" and "**droid**". Right-click
"**droid.types**" and open it with the LeafPad editor and type the text shown:
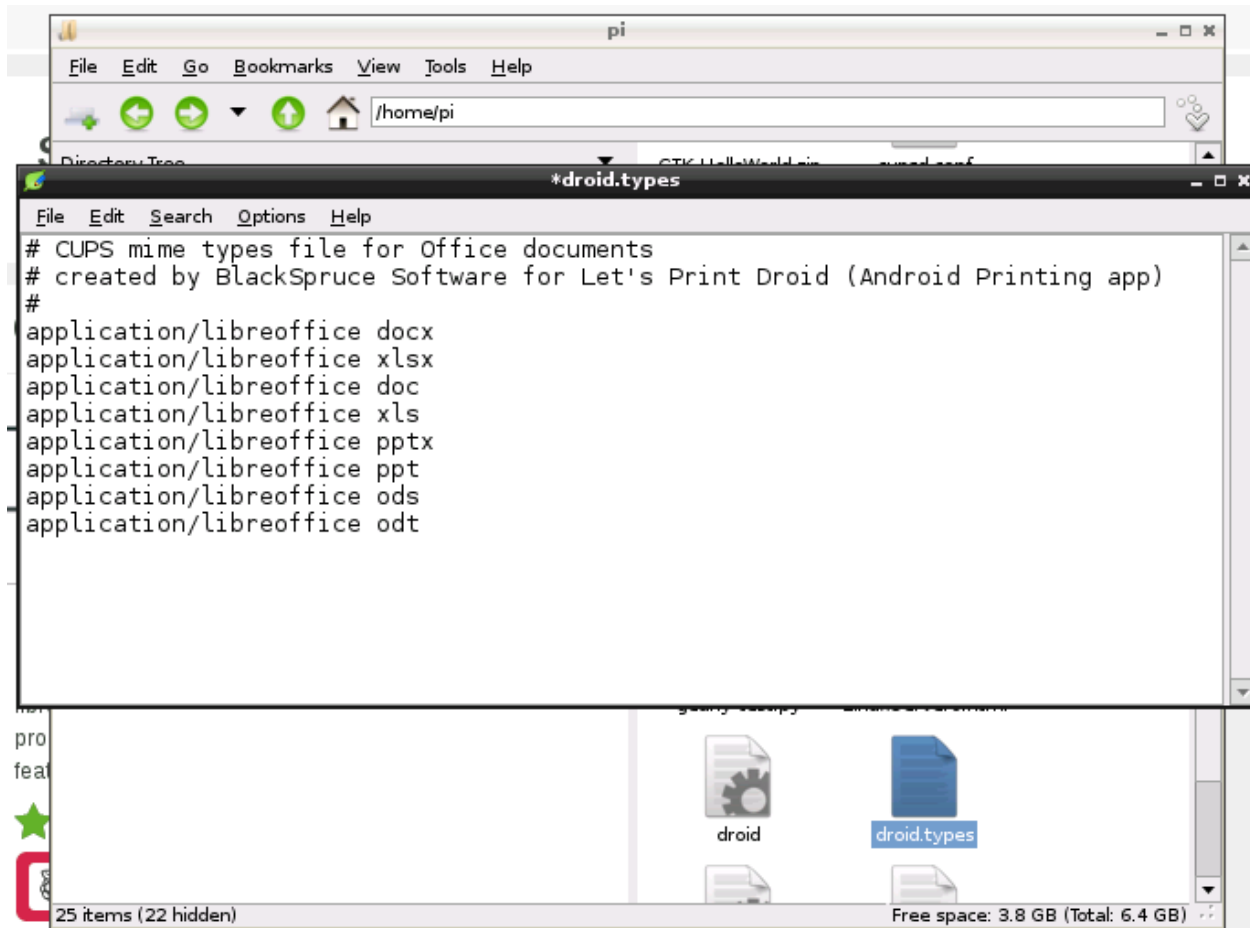
Edit "**droid.convs**" and type the text shown:
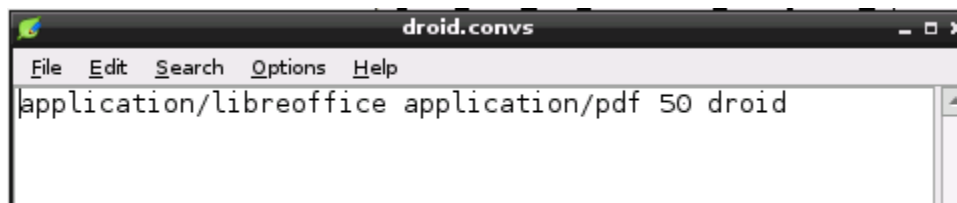
Edit "**droid**" and type the text as shown:

```bash
#!/bin/bash
# CUPS filter to process multiple file-types using libreoffice
# by BlackSpruce Software for Let's  Print Droid
sandbox=${TMPDIR-/tmp}/cups-droid
# remove any previous sandbox
if [ -e "$sandbox" ]; then
rm -rf "$sandbox"
fi
# Create a sandbox
(umask 077 && mkdir $sandbox) || {
echo "Cannot create temporary directory! Exiting."
exit 1
}
# find the filter input file
if [ $# -lt 6 ]; then
fn="$sandbox/input"
cat > "$fn"
else
fn="$6"
fi
echo "Input file is $fn" >> "$sandbox/droid.txt"

# Call libreoffice quietly
libreoffice --headless -convert-to pdf -outdir "$sandbox" "$fn" \
 1>>"$sandbox/droid.txt"

# Send PDF to stdout
basename=`basename "$fn"`
destpdf="$sandbox/$basename.pdf"
if [ -e "$destpdf" ]; then
cat "$destpdf"
# success - Erase sandbox
rm -rf "$sandbox"
else
echo "No PDF file! Exiting " >> "$sandbox/droid.txt"
# leave sandbox for trouble shooting
exit 1
fi
```

Now we copy the three files to their correct directories:

> ➢ sudo cp droid.convs /etc/cups
> ➢ sudo chmod 644 /etc/cups/droid.convs
> ➢ sudp cp droid.types /etc/cups
> ➢ sudo chmod 755 /etc/cups/droid.types
> ➢ sudo cp droid /usr/lib/cups/filter
> ➢ sudo chmod 755 /usr/lib/cups/filter/droid

Create a sandbox directory :

> ➢ sudo mkdir /tmp/cups-droid

Restart CUPS :

> sudo service cups restart

Now select an MS Word or Open Office Doc from your Android device using Let's Print Droid and print to your Pi printer.