Raspberry Pi

Les 1: Zaterdag 22 februari 2014

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LU1S041ALF
10/8M
OK
PWR
FDX
LNK
10M

Programma

Installatie

Basis Linux en de commando's

Pi als eenvoudig Linux servertje

Raspberry PI als mediaspeler

Aansturen en uitlezen motoren en LEDs

Raspberry PI als fm zender

Vandaag

- Beschrijving van de Pi
- Installatie
- Herhaling basis LINUX commandos

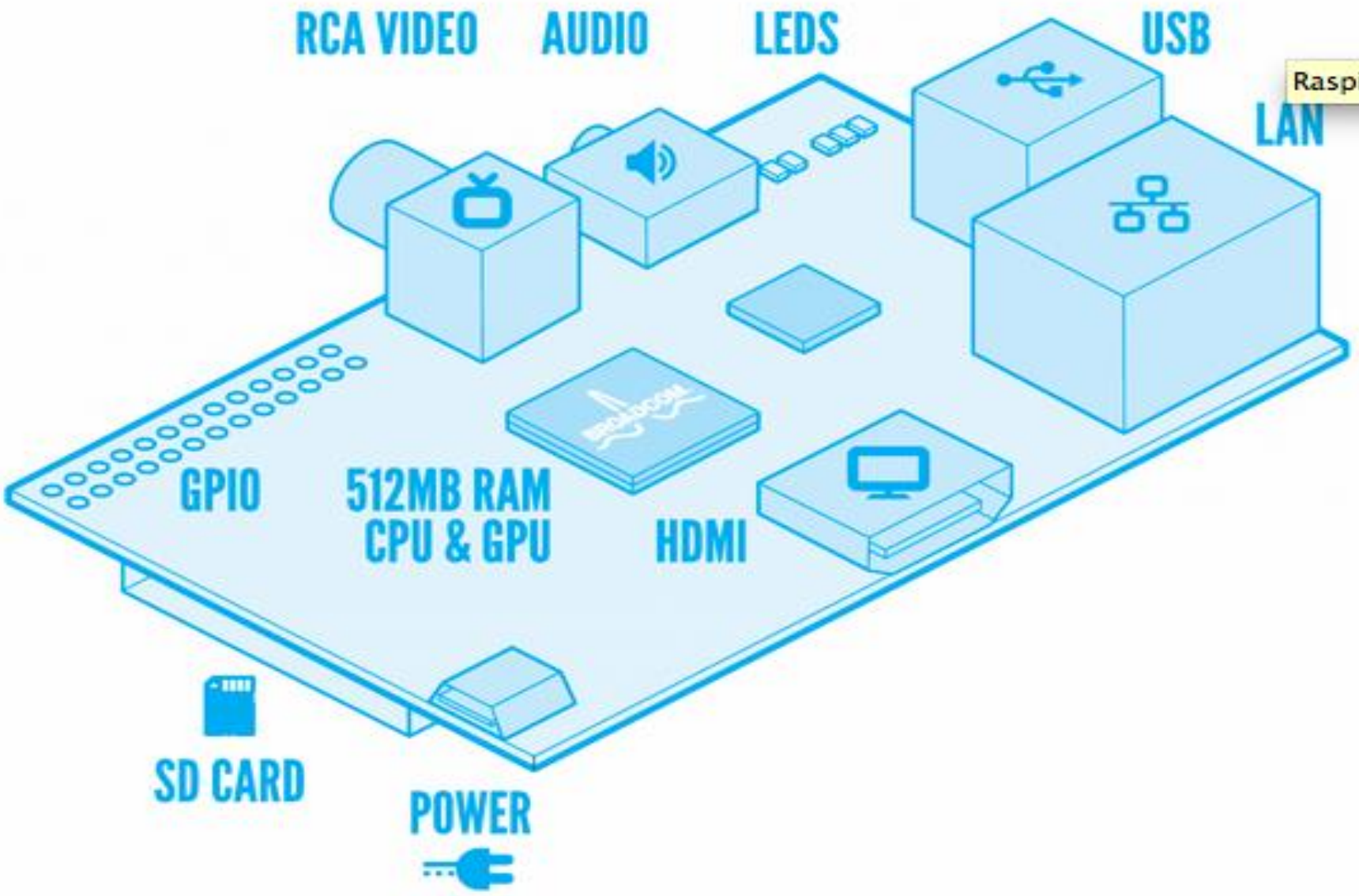
Wat zit er in de Pi?

- SoC: Broadcom BCM2835
  - CPU: 700 MHz ARM1176JZF-S core
  - GPU: Broadcom VideoCore IV @ 250 MHz
  - System on a Chip (SoC)
  - ARM (Acorn Risc Machine)
    - ARM11
- 512MB SDRAM
- SD kaart: 2GB of meer (wij 4GB)

Wat zit er in de Pi?

- 2 x USB 2.0 (480Mbit/s)
- Audio: via HDMI of Audio Jack
- Beeld
  - Composit Video (RCA: RGB TV)
  - HDMI (--> DVI werkt)
    - Pasieve HDMI naar VGA werkt niet
  - (DSI flat panel Displays)
- RJ45 Ethernet: 10/100Mbit/s

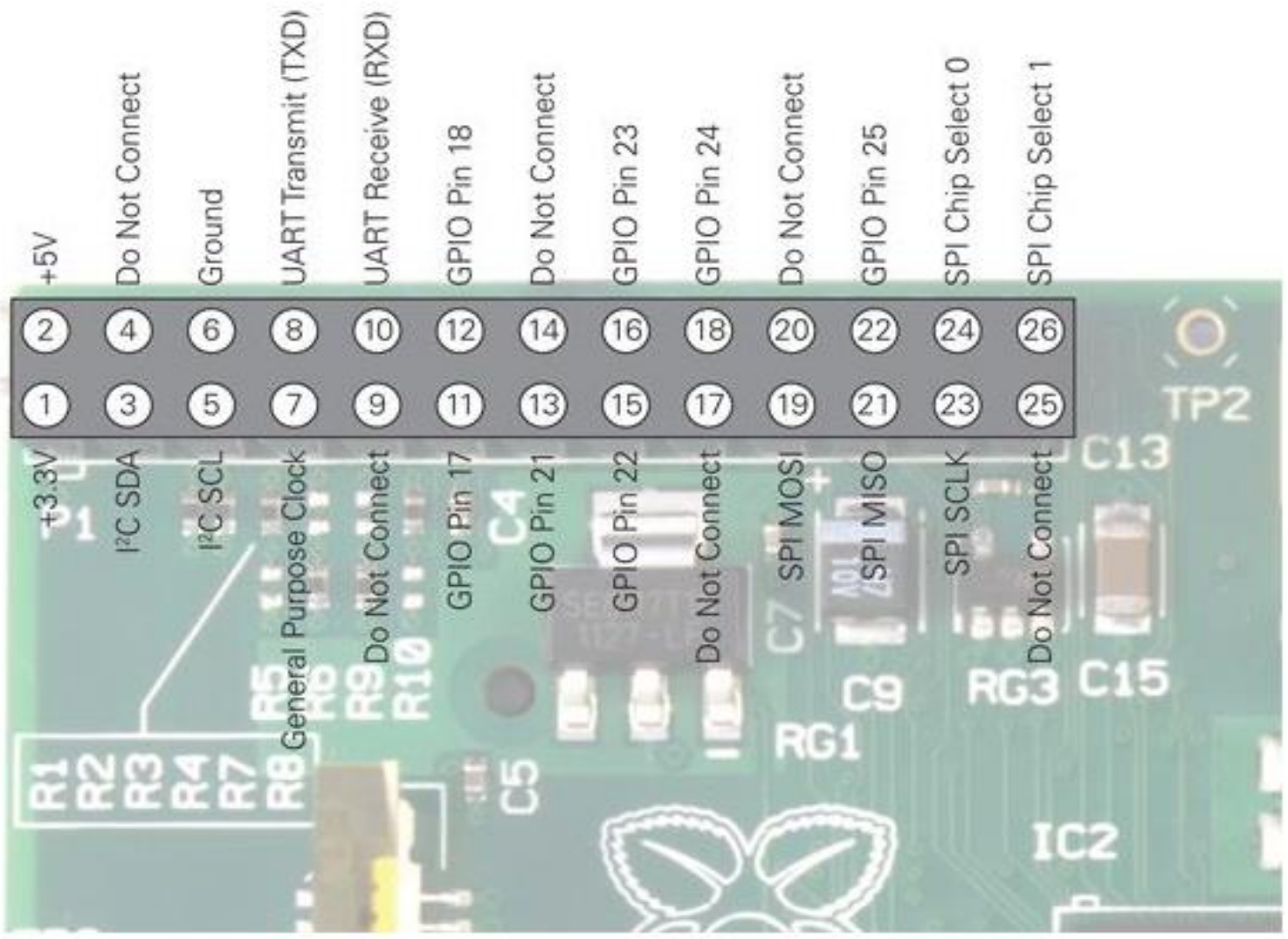
RASPBERRY PI MODEL B



Voeding

- Voeding voor de Pi
  - Model B: 5V met 700mA tot 1A
    - Opgepast voor je PC poort!
    - Beter externe voeding met micro USB

GPIO: connector P1



GPIO

- 3,3V
  - Hoog/laag → 1/0
- Opgepast: niet beschermd
  - Kortsluiting → stuk
  - Spanning opzetten → stuk

Besturingssyteem

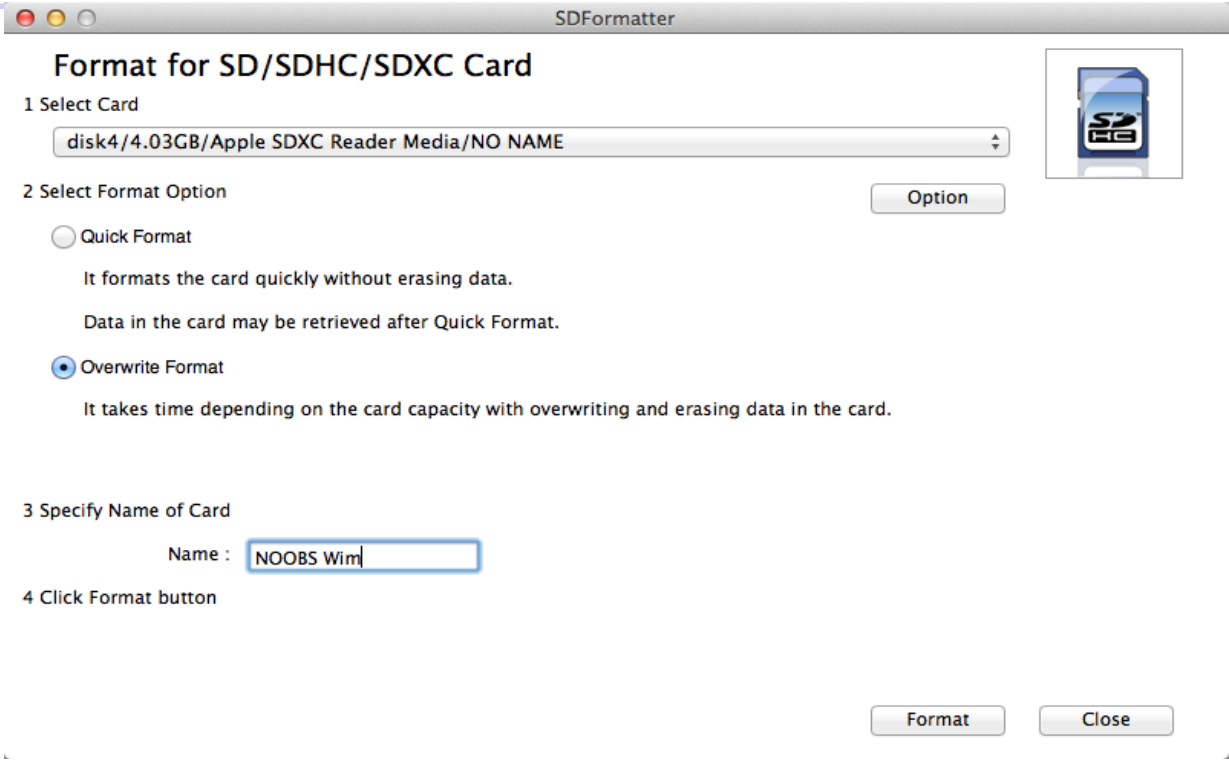
- NOOBS: New Out of Box Software
  - http://www.raspberrypi.org/downloads
- Raspian
  - Debian wheezy, optimised for the Raspberry Pi
- Pidora
  - Fedora Remix optimized for the Raspberry Pi
- RaspBMC
  - XBMC media center distribution f

NOOBS: New Out of Box Software

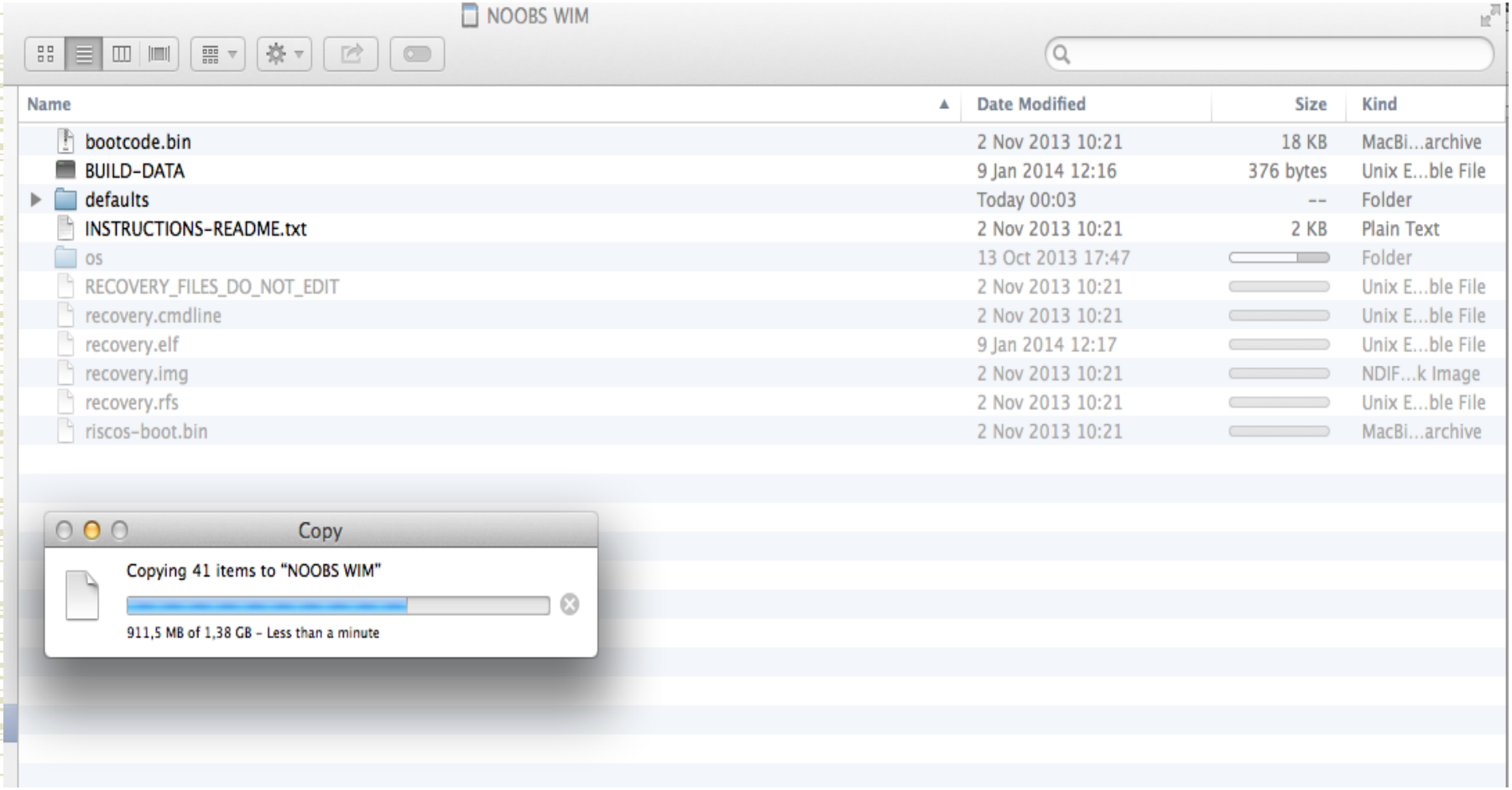
- SD-card
  - Windows
  - Apple
  - Linux
- http://www.raspberrypi.org/wp-content/uploads/2012/04/quick-start-guide-v2_1.pdf

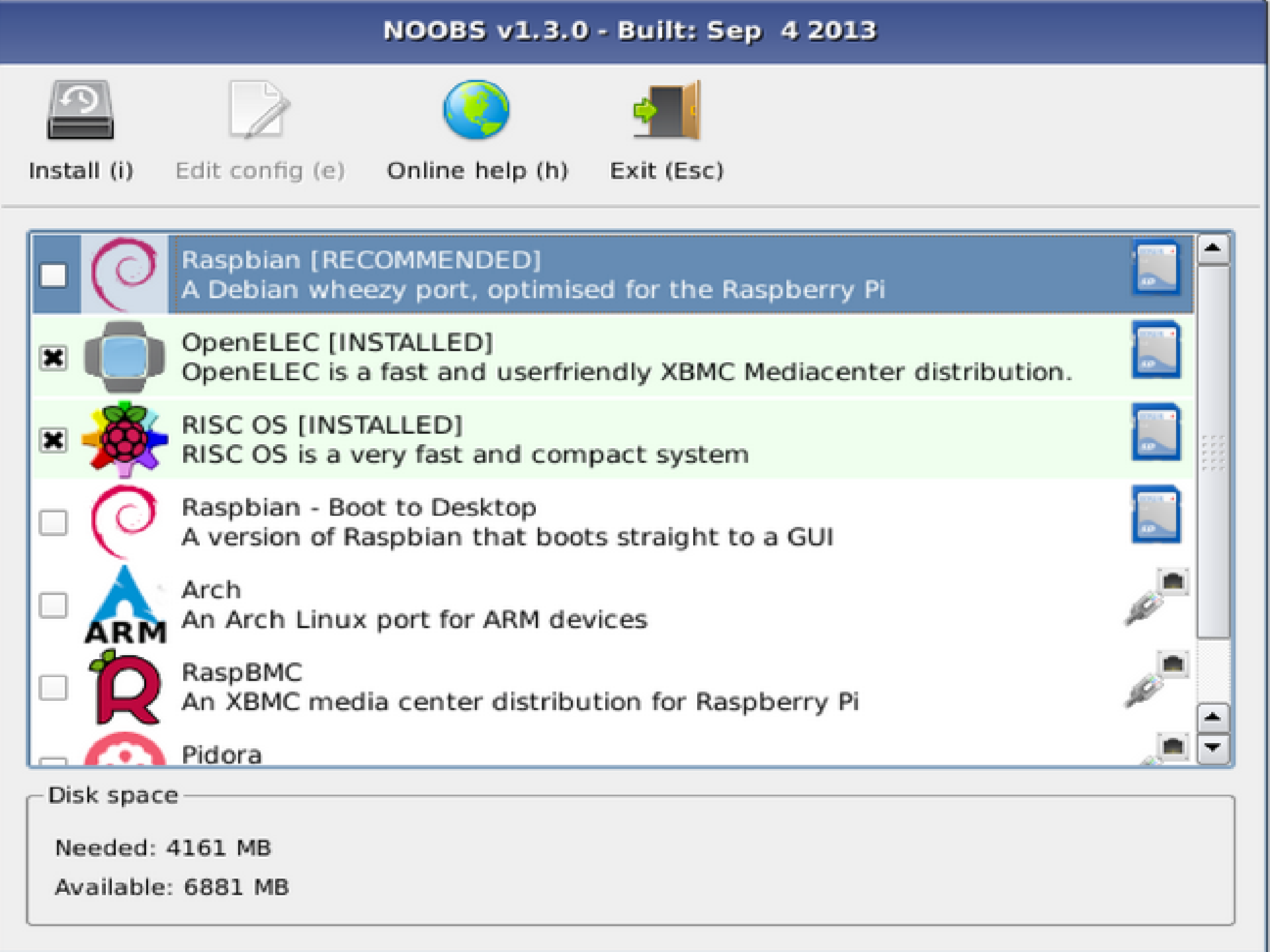
Voorbeeld: Apple

- Formateer de 4GB SD kaart
  - https://www.sdcard.org/downloads/formatter_4/eula_mac/



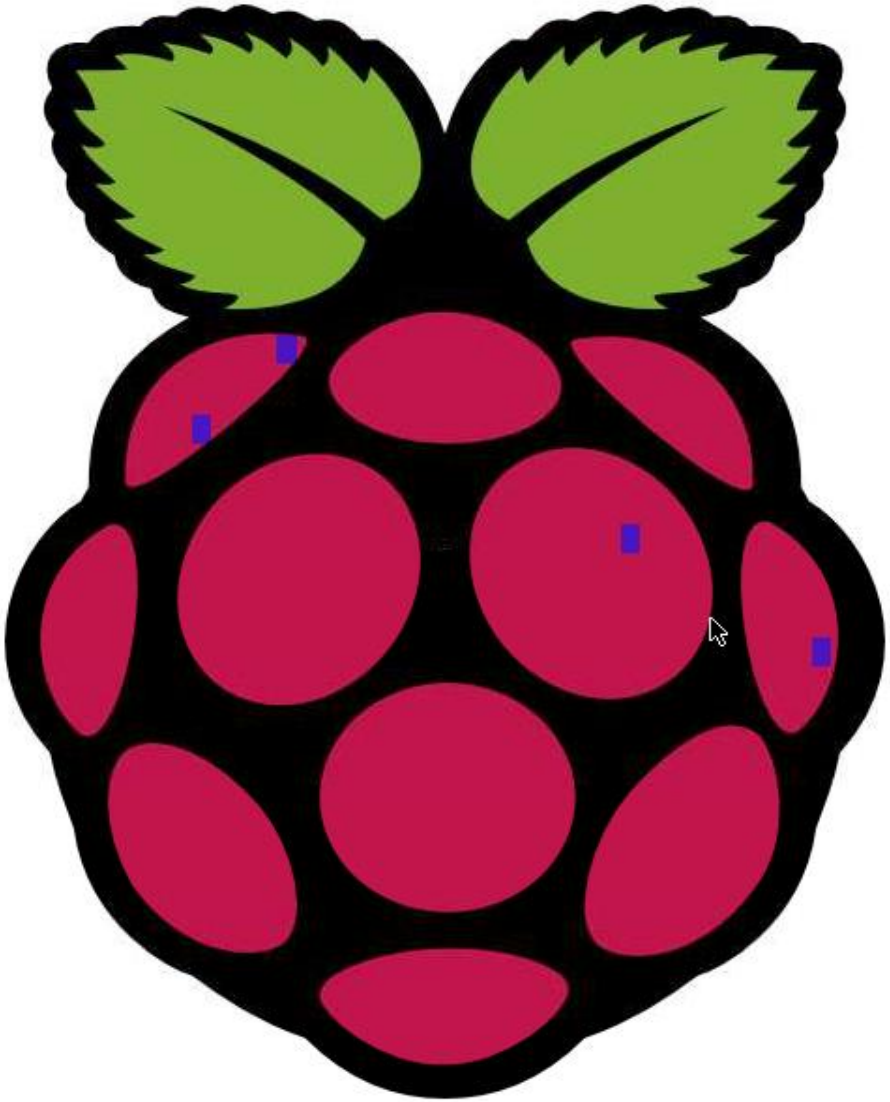
NOOBS image: 1.38GB



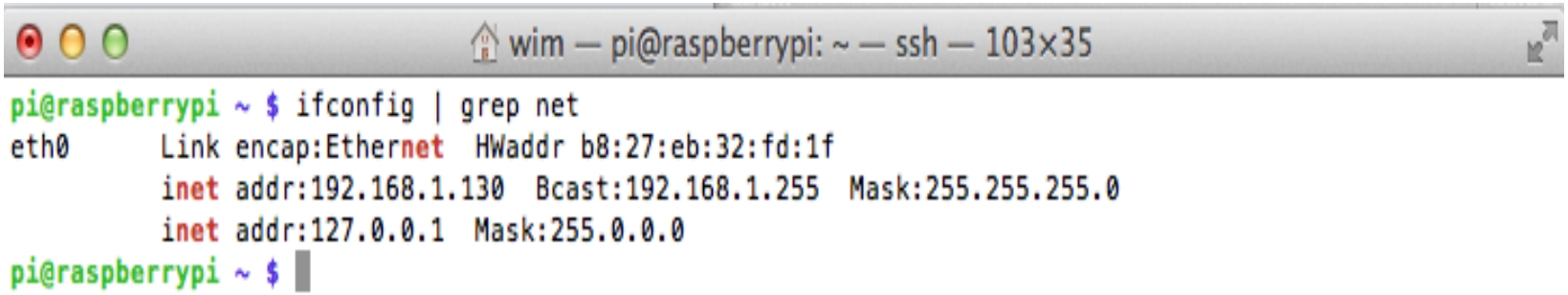

NOOBS v1.3.0 - Built: Sep 4 2013
Install (i)
Edit config (e)
Online help (h)
Exit (Esc)
Raspbian [RECOMMENDED]
A Debian wheezy port, optimised for the Raspberry Pi
OpenELEC [INSTALLED]
OpenELEC is a fast and userfriendly XBMC Mediacenter distribution.
RISC OS [INSTALLED]
RISC OS is a very fast and compact system
Raspbian - Boot to Desktop
A version of Raspbian that boots straight to a GUI
Arch
An Arch Linux port for ARM devices
RaspBMC
An XBMC media center distribution for Raspberry Pi
Pidora
Disk space
Needed: 4161 MB
Available: 6881 MB

Raspian: 780MB

- Debian wheezy
  - Versie 7 van Debian, mei 2013
  - optimised for the Raspberry Pi
- http://www.raspbian.org/
  - Of direct van de NOOBS



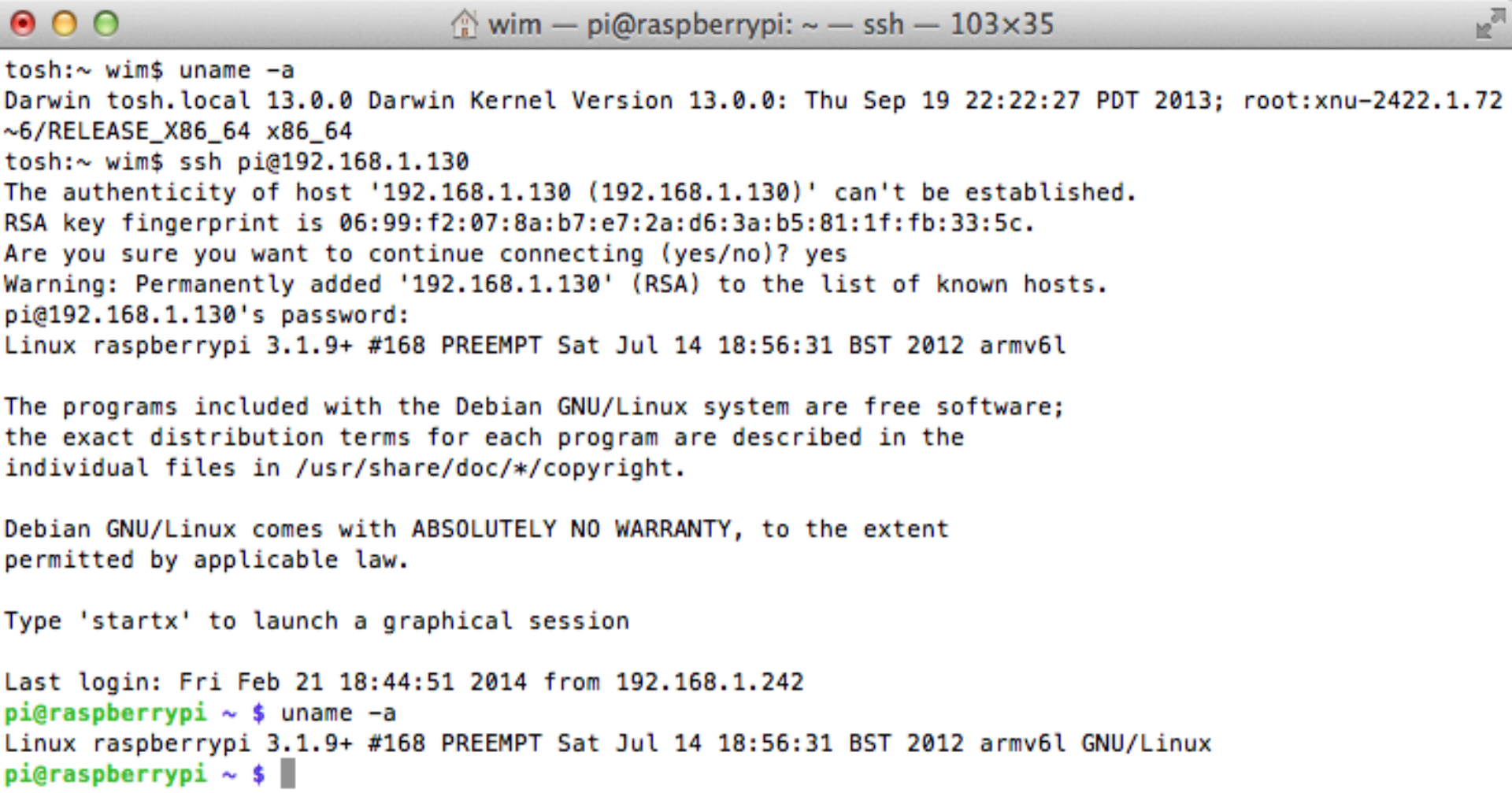
Netwerk adres zoeken



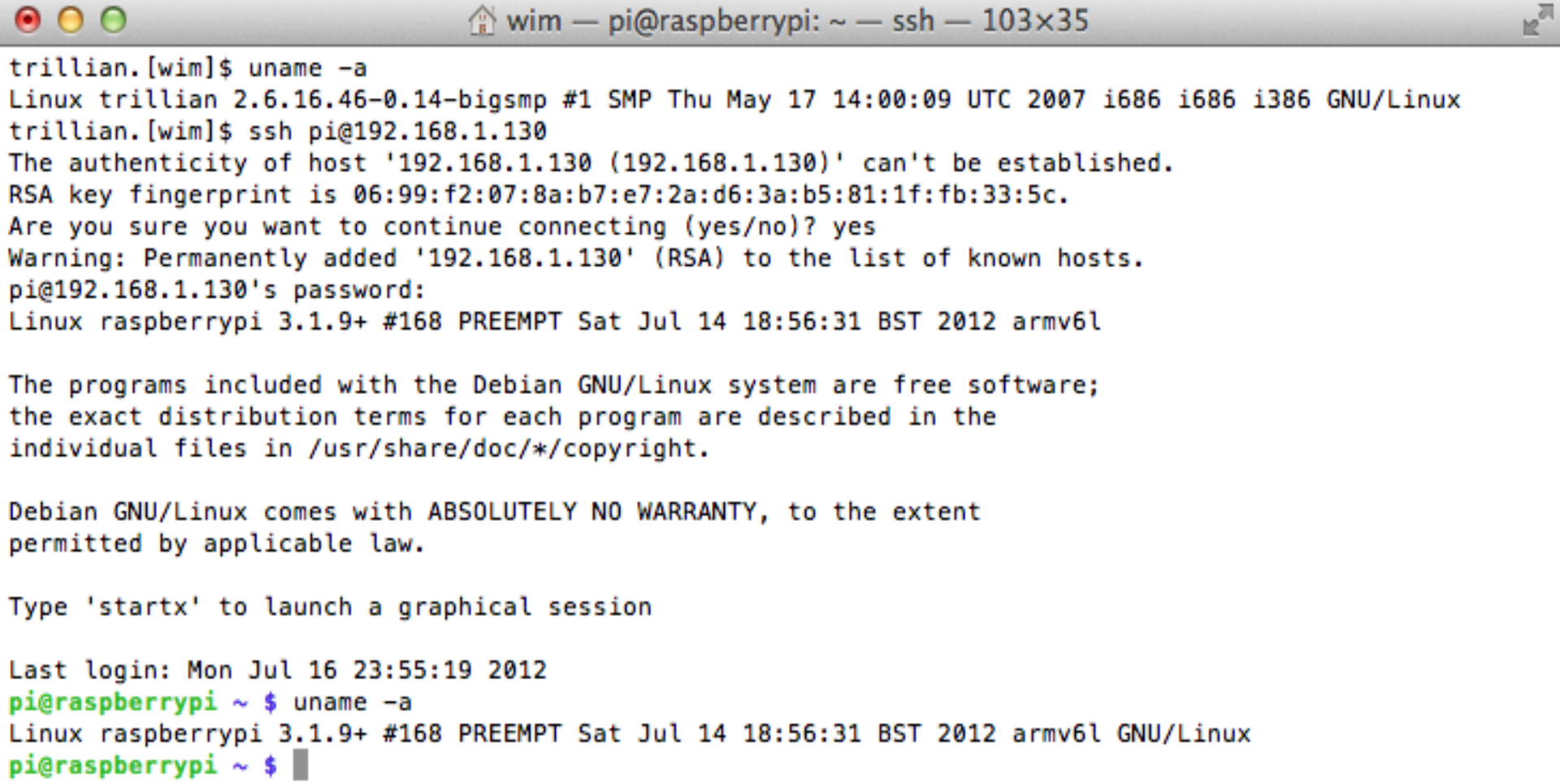
- Commando: ifconfig
  - ifconfig -a
  - ifconfig eth0
- Tweede IP-adres op zelfde interface
  - sudo ifconfig eth0:1 192.168.66.1

Inloggen over het netwerk: SSH

- SSH secure shell:
  - Ge-encrypteerd kanaal over het netwerk
  - ssh user@system
  - Of ssh –l user system
  - Of ssh –l user IP-adress
- Is op Linux en Apple standaard aanwezig, maar je moet de service opzetten



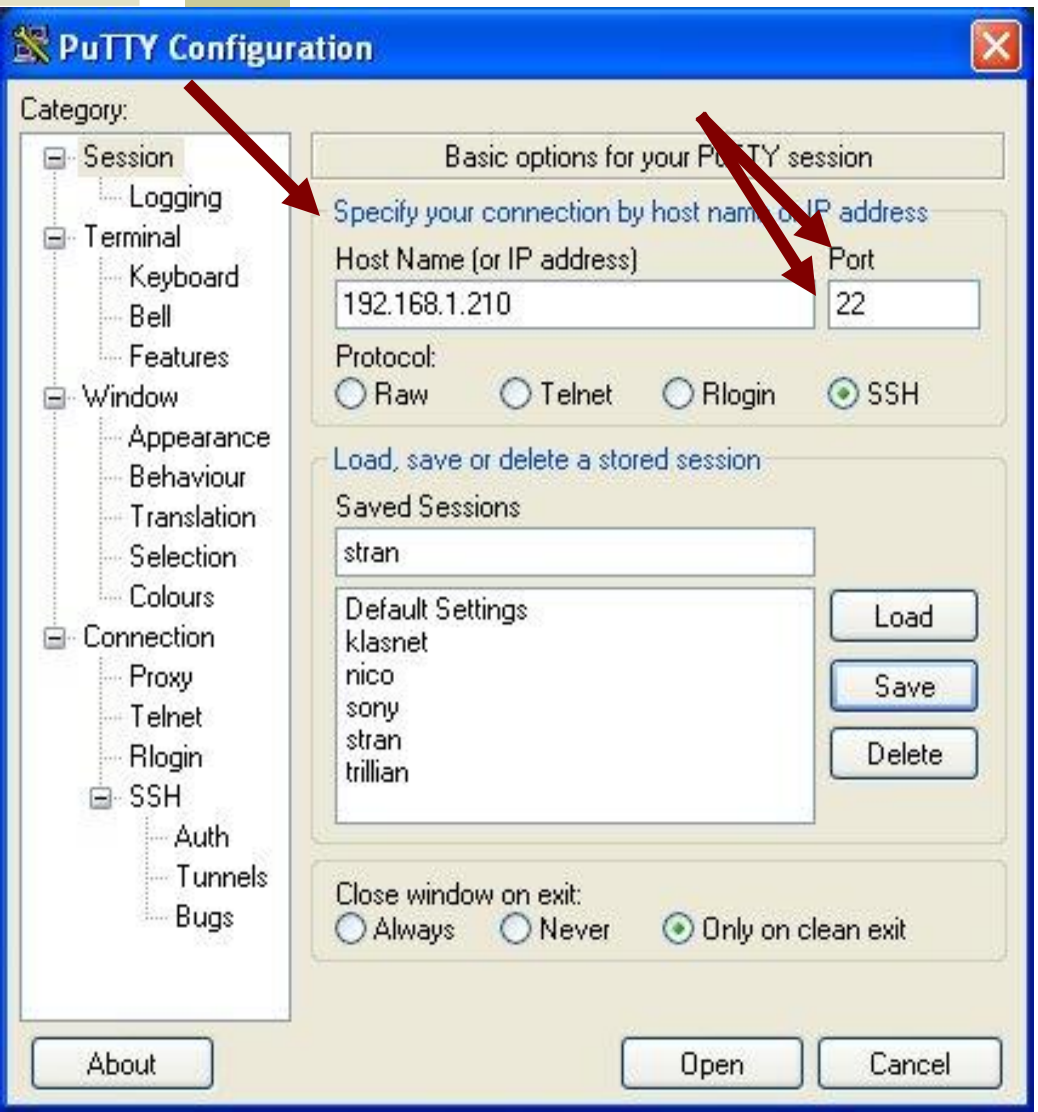
- Vanuit een Apple Terminal:
- Ssh pi@IP-address



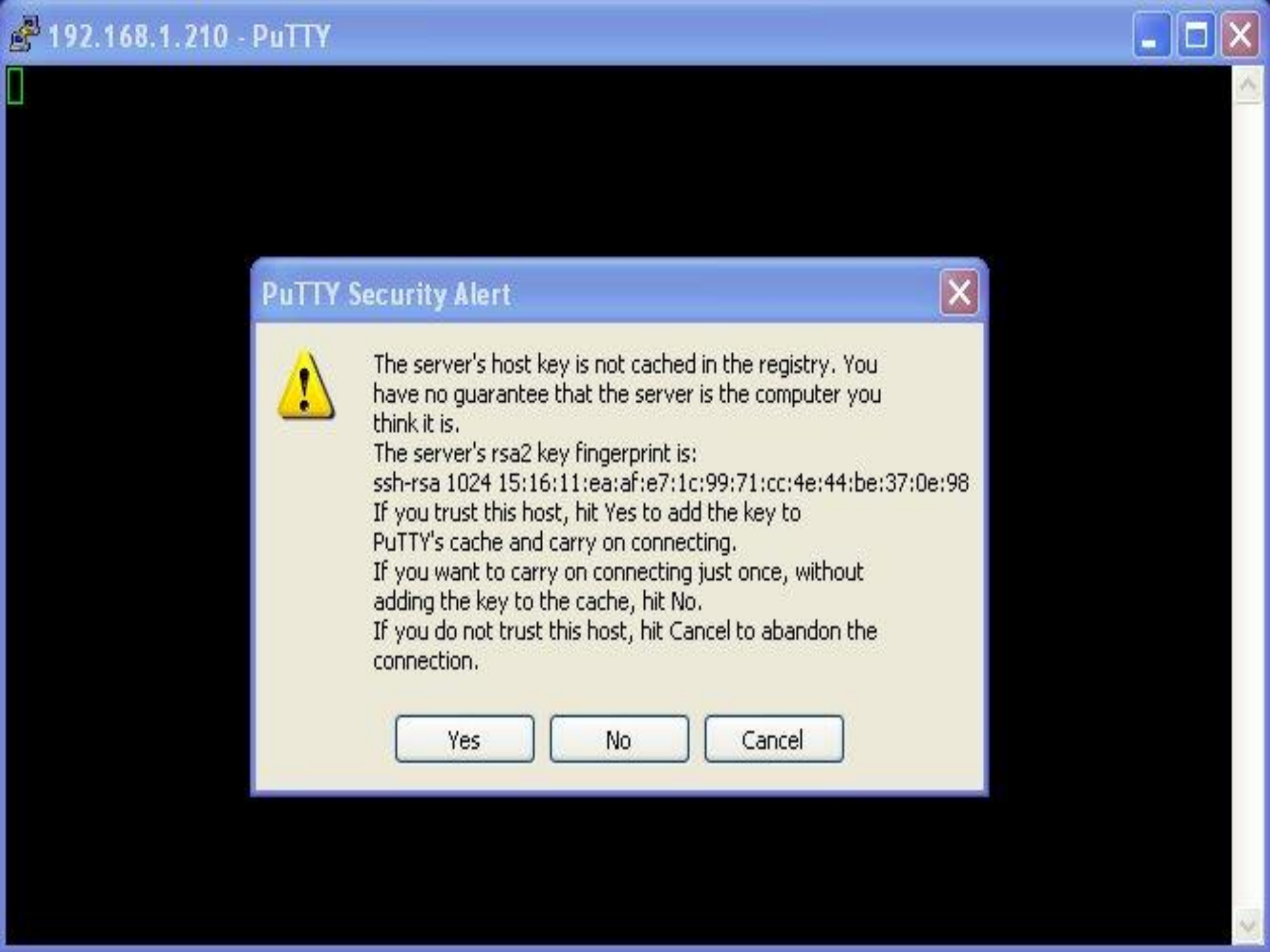
- Vanuit een Linux Terminal:
- ssh pi@IP-address

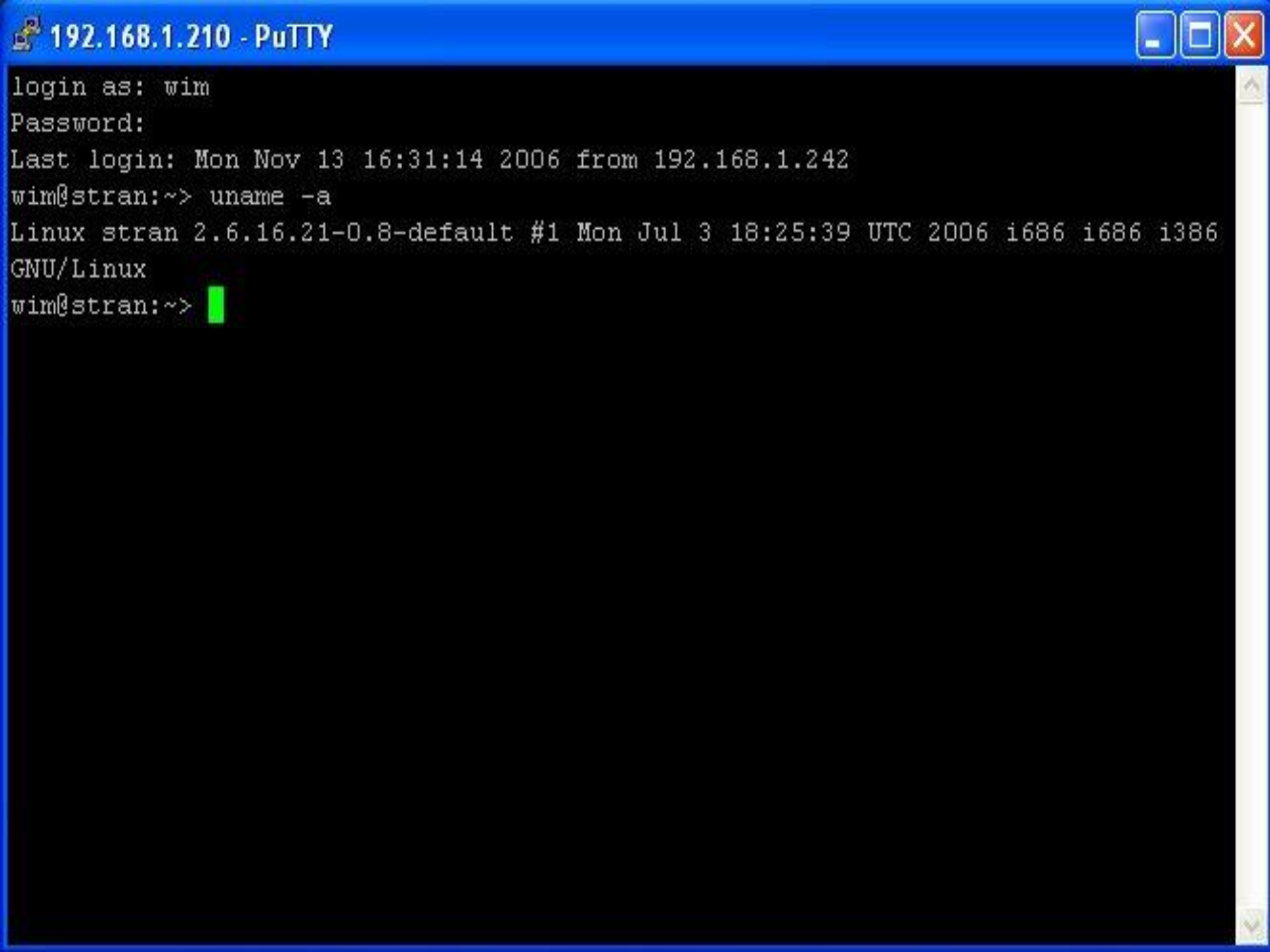
Voorbeeld vanuit Windows: Putty

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html



- SSH client op windows
- Vrij beschikbaar


192.168.1.210 - PuTTY
PuTTY Security Alert
The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.
The server's rsa2 key fingerprint is:
ssh-rsa 1024 15:16:11:ea:af:e7:1c:99:71:cc:4e:44:be:37:0e:98
If you trust this host, hit Yes to add the key to PuTTY's cache and carry on connecting.
If you want to carry on connecting just once, without adding the key to the cache, hit No.
If you do not trust this host, hit Cancel to abandon the connection.
Yes
No
Cancel

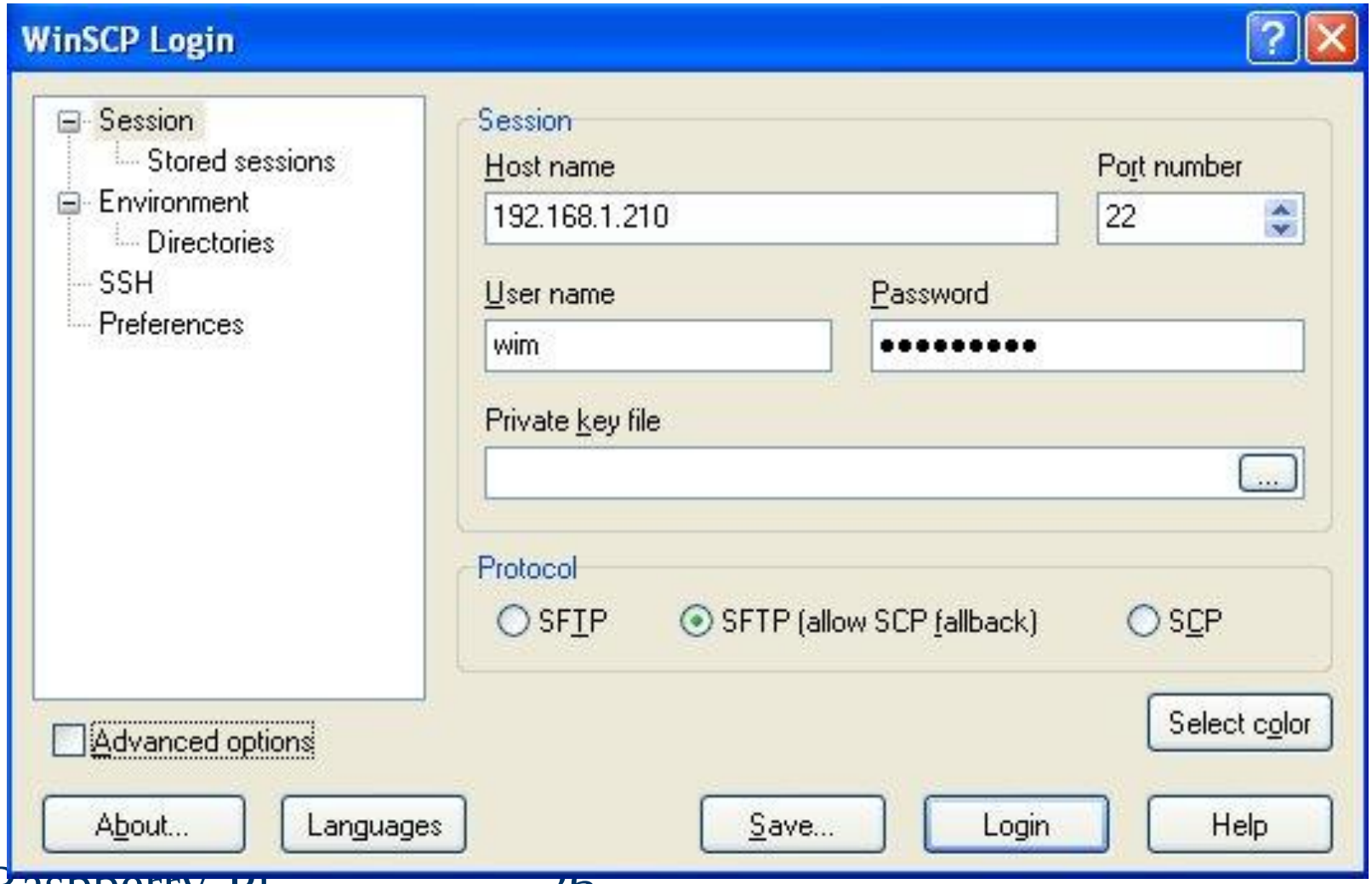

192.168.1.210 - PuTTY
login as: wim
Password:
Last login: Mon Nov 13 16:31:14 2006 from 192.168.1.242
wim@stran:~> uname -a
Linux stran 2.6.16.21-0.8-default #1 Mon Jul 3 18:25:39 UTC 2006 i686 i686 i386
GNU/Linux
wim@stran:~>

Secure copy over het netwerk: scp

- Gebruikt het SSH protocol om een copy te maken over een versleuteld kanaal.
- scp user@host:van_path naar_path
- B.v:
  - scp wim@pi:/home/wim/lijst .
  - scp wim@192.168.1.130:/home/wim/lijst .

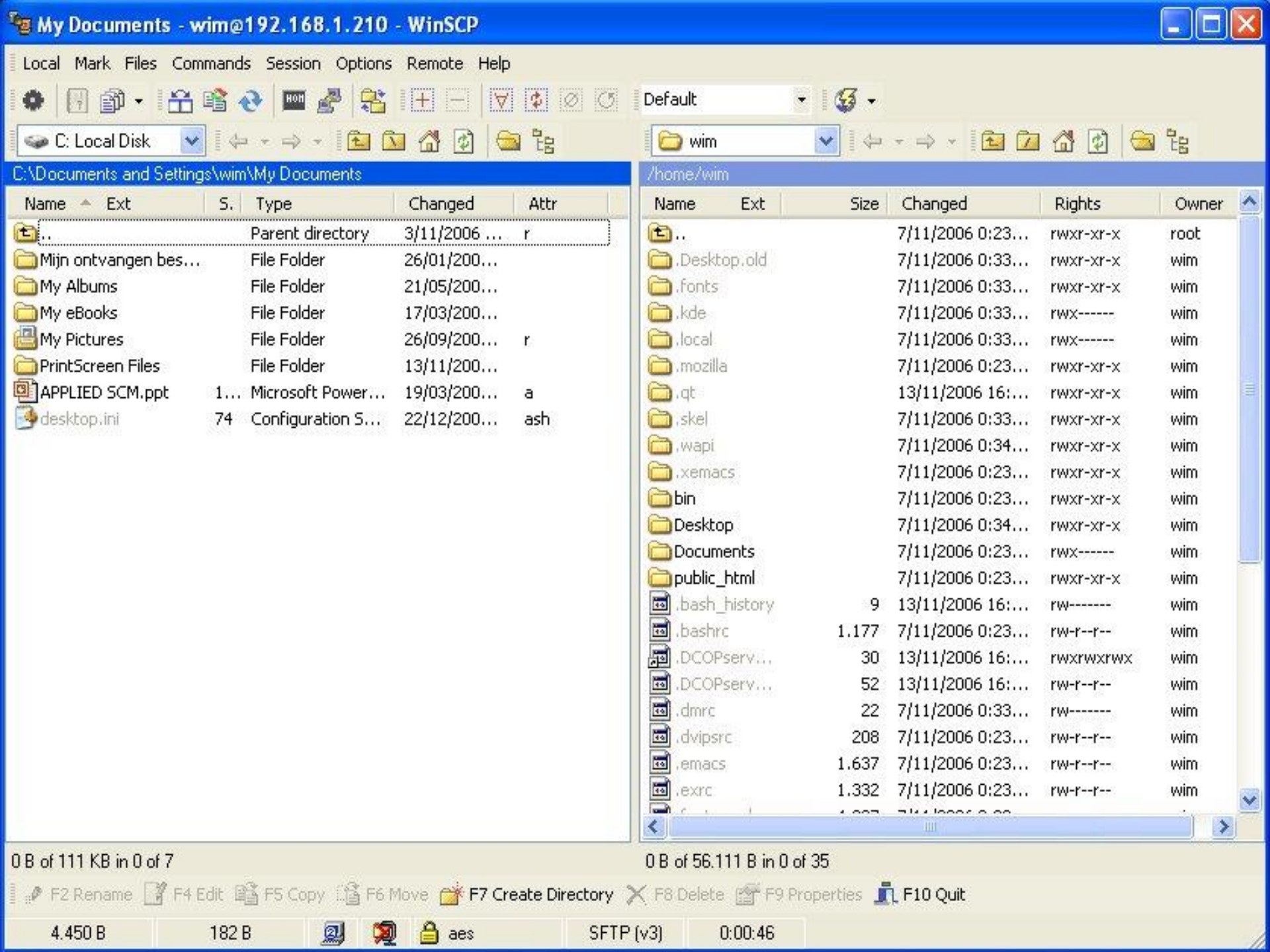
SCP vanuit windows: winscp

http://winscp.net/eng/docs/lang:nl

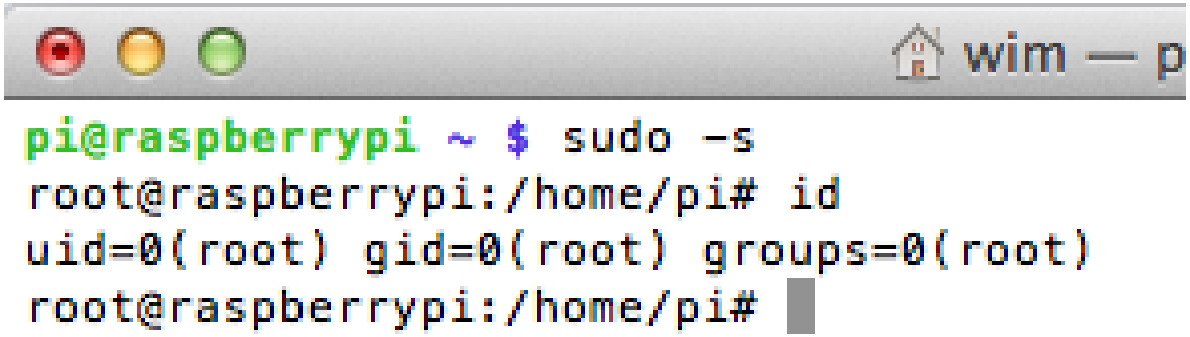


Key controle

- Steeds dezelfde fingerprint

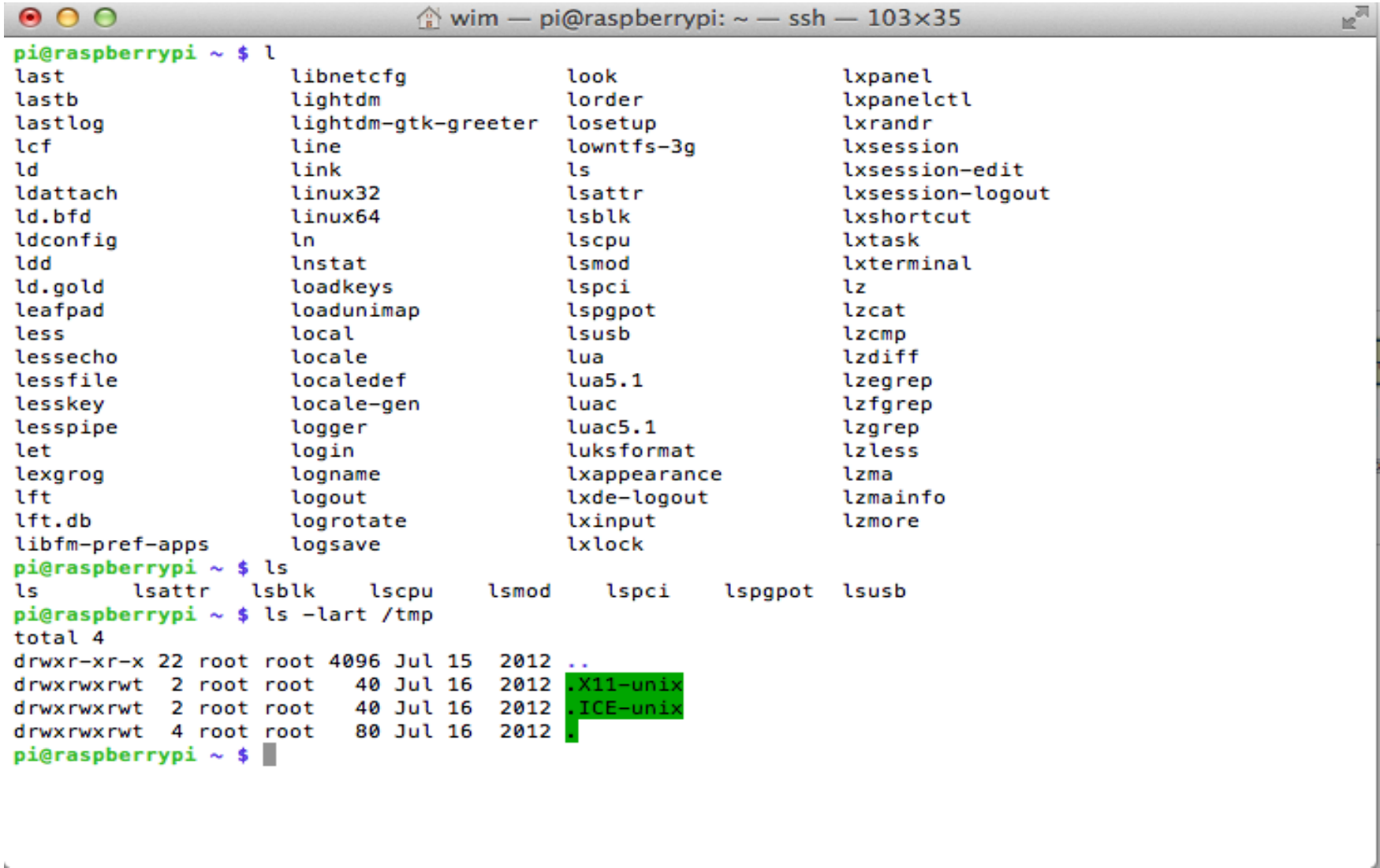

My Documents - wim@192.168.1.210 - WinSCP
Local Mark Files Commands Session Options Remote Help
Default
C: Local Disk
wim
C:\Documents and Settings\wim\My Documents
/home/wim
Name Ext S. Type Changed Attr
.. Parent directory 3/11/2006 ... r
Mijn ontvangen bes... File Folder 26/01/200...
My Albums File Folder 21/05/200...
My eBooks File Folder 17/03/200...
My Pictures File Folder 26/09/200... r
PrintScreen Files File Folder 13/11/200...
APPLIED SCM.ppt 1... Microsoft Power... 19/03/200... a
desktop.ini 74 Configuration S... 22/12/200... ash
Name Ext Size Changed Rights Owner
.. 7/11/2006 0:23... rwxr-xr-x root
.Desktop.old 7/11/2006 0:33... rwxr-xr-x wim
.fonts 7/11/2006 0:33... rwxr-xr-x wim
.kde 7/11/2006 0:33... rwx------ wim
.local 7/11/2006 0:33... rwx------ wim
.mozilla 7/11/2006 0:23... rwxr-xr-x wim
.qt 13/11/2006 16:... rwxr-xr-x wim
.skel 7/11/2006 0:33... rwxr-xr-x wim
.wapi 7/11/2006 0:34... rwxr-xr-x wim
.xemacs 7/11/2006 0:23... rwxr-xr-x wim
bin 7/11/2006 0:23... rwxr-xr-x wim
Desktop 7/11/2006 0:34... rwxr-xr-x wim
Documents 7/11/2006 0:23... rwx------ wim
public_html 7/11/2006 0:23... rwxr-xr-x wim
.bash_history 9 13/11/2006 16:... rw------- wim
.bashrc 1.177 7/11/2006 0:23... rw-r--r-- wim
.DCOPserv... 30 13/11/2006 16:... rwxrwxrwx wim
.DCOPserv... 52 13/11/2006 16:... rw-r--r-- wim
.dmrc 22 7/11/2006 0:33... rw------- wim
.dvipsrc 208 7/11/2006 0:23... rw-r--r-- wim
.emacs 1.637 7/11/2006 0:23... rw-r--r-- wim
.exrc 1.332 7/11/2006 0:23... rw-r--r-- wim
0 B of 111 KB in 0 of 7
0 B of 56.111 B in 0 of 35
F2 Rename F4 Edit F5 Copy F6 Move F7 Create Directory F8 Delete F9 Properties F10 Quit
4.450 B 182 B aes SFTP (v3) 0:00:46

Administrator/root rechten



- sudo <commando>
- Sudo -s
  - Geeft een root shell

<tab> <tab>

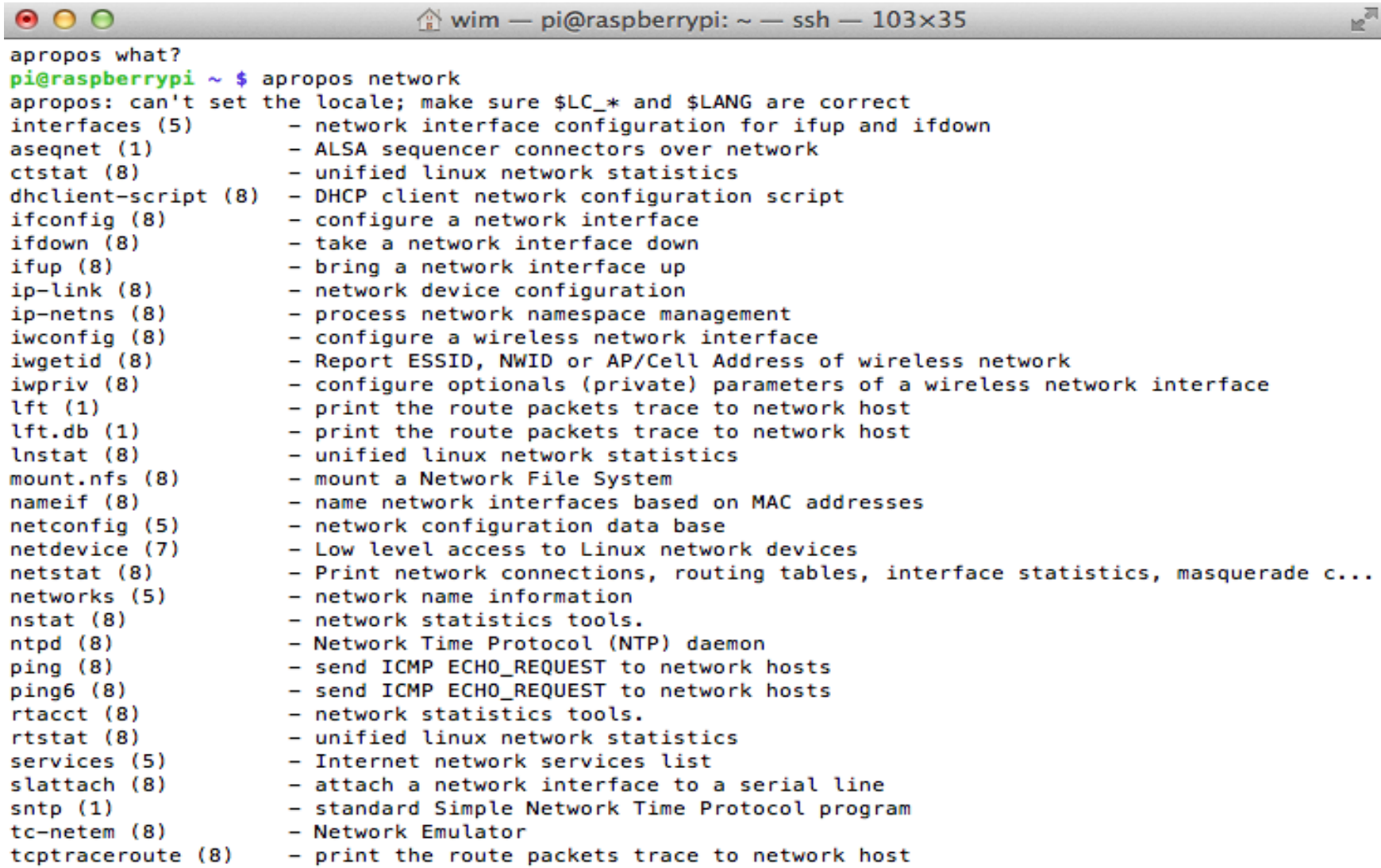

wim — pi@raspberrypi: ~ — ssh — 103×35
pi@raspberrypi ~ $ l
last libnetcfg look lxpanel
lastb lightdm lorder lxpanelctl
lastlog lightdm-gtk-greeter losetup lxrandr
lcf line lowntfs-3g lxsession
ld link ls lxsession-edit
ldattach linux32 lsattr lxsession-logout
ld.bfd linux64 lsblk lxshortcut
ldconfig ln lscpu lxtask
ldd lnstat lsmod lxterminal
ld.gold loadkeys lspci lz
leafpad loadunimap lspgpot lzcat
less local lsusb lzcmp
lessecho locale lua lzdiff
lessfile localedef lua5.1 lzegrep
lesskey locale-gen luac lzfgrep
lesspipe logger luac5.1 lzgrep
let login luksformat lzless
lexgrog logname lxappearance lzma
lft logout lxde-logout lzmainfo
lft.db logrotate lxinput lzmore
libfm-pref-apps logsave lxlock
pi@raspberrypi ~ $ ls
ls lsattr lsblk lscpu lsmod lspci lspgpot lsusb
pi@raspberrypi ~ $ ls -lart /tmp
total 4
drwxr-xr-x 22 root root 4096 Jul 15 2012 ..
drwxrwxrwt 2 root root 40 Jul 16 2012 .X11-unix
drwxrwxrwt 2 root root 40 Jul 16 2012 .ICE-unix
drwxrwxrwt 4 root root 80 Jul 16 2012 .
pi@raspberrypi ~ $

Man man

- Manual pages (handleiding)
  - Raadplegen met commando: man
  - man man
- Toont de manual voor man

  man bash
  - Geeft de manual van bash

Apropos what?



Software installeren: APT

- sudo apt-get update
  - “app store connection update”
- sudo apt-get upgrade
  - Upgraden naar de laatste versies
- sudo apt-get install <Packet>
  - Installeren van “Packet”
- apt-cache search <patroon>

wim — pi@raspberrypi: ~ — ssh — 103×35

```
pi@raspberrypi ~ $ sudo apt-get update
Hit http://archive.raspberrypi.org wheezy InRelease
Hit http://mirrordirector.raspbian.org wheezy InRelease
Hit http://archive.raspberrypi.org wheezy/main armhf Packages
Hit http://mirrordirector.raspbian.org wheezy/main armhf Packages
Hit http://mirrordirector.raspbian.org wheezy/contrib armhf Packages
Hit http://mirrordirector.raspbian.org wheezy/non-free armhf Packages
Hit http://mirrordirector.raspbian.org wheezy/rpi armhf Packages
Ign http://archive.raspberrypi.org wheezy/main Translation-en
Ign http://mirrordirector.raspbian.org wheezy/contrib Translation-en
Ign http://mirrordirector.raspbian.org wheezy/main Translation-en
Ign http://mirrordirector.raspbian.org wheezy/non-free Translation-en
Ign http://mirrordirector.raspbian.org wheezy/rpi Translation-en
Reading package lists... Done
pi@raspberrypi ~ $ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages have been kept back:
  alsa-base gnome-themes-standard lxde lxsession openssh-client openssh-server raspi-config scratch
  wpasupplicant
The following packages will be upgraded:
  alsa-utils apt apt-utils aptitude aptitude-common base-files bash binutils bsdutils bzip2
  ca-certificates console-setup console-setup-linux consolekit coreutils cpio cpp cpp-4.6
  cryptsetup-bin curl dbus dbus-x11 dconf-gsettings-backend dconf-service debconf debconf-i18n
  debconf-utils debian-reference-common debian-reference-en desktop-base dictionaries-common dmsetup
  dpkg dpkg-dev e2fslibs e2fsprogs eject file firmware-atheros firmware-brcm80211 firmware-libertas
  firmware-ralink firmware-realtek fontconfig fontconfig-config fuse g++ g++-4.6 gcc gcc-4.4-base
  gcc-4.6 gcc-4.6-base gcc-4.7-base gconf-service gconf2 gconf2-common gdb gdbserver
  gir1.2-gst-plugins-base-0.10 gir1.2-gstreamer-0.10 gnupg gpgv gsettings-desktop-schemas idle
  idle-python2.7 idle-python3.2 idle3 ifupdown initscripts insserv iptables isc-dhcp-client
  isc-dhcp-common iso-codes keyboard-configuration kmod krb5-locales libapt-inst1.5 libapt-pkg-dev
  libapt-pkg4.12 libasound2 libavahi-client3 libavahi-common-data libavahi-common3 libblkid1
  libboost-iostreams1.49.0 libbsd0 libbz2-1.0 libc-bin libc-dev-bin libc6 libc6-dev libcairo-gobject2
  libcairo2 libcap2 libck-connector0 libcomerr2 libcroco3 libcryptsetup4 libcups2 libcurl3
```