

Wireless Client Installation

Developed by: Tomas Krag, wire.less.dk (Linux)
Bruno Roger, ESMT (Windows)

Goals

- To be able to make a good choice in terms of wireless hardware for Linux platforms
- To be able to successfully install a wireless client with or without native Linux support
- To be able to configure any wireless client (Linux/Win32) according to the settings in any AP

Table of Contents

- Introduction
- PART A: Linux
- PART B: Windows
 - Choosing a wireless device
 - Installing the wireless device
 - Configuring the wireless device

Introduction

- Linux vs Windows: hardware support
- A machine with a wireless networking card installed is needed
 - PC-cards (laptops) and Mini-PCI cards (laptops)
 - PCI cards (desktops) and USB adapters

PART A: LINUX

1. Wireless Hardware

2. Installation

3. Configuration

1. Wireless Hardware

- Wireless Network Cards
- Chipsets
- Supported or not?
- Drivers

Wireless Networking Hardware

- Desktops have PCI or ISA slots inside for additional components
 - Need tools
 - Must open the PC, install card, close and power on



Wireless Networking Hardware

- Laptops use PCMCIA slots
 - Slim card common to all laptops
 - Easy to plug-in, hotplug
- Recent laptops have wireless included
 - Mini-PCI slot inside (backplane)
 - Intel-M Centrino technology
- PCMCIA cards are more expensive than PCI cards

Wireless Networking Hardware

- USB devices are cheap, hotplug, and common to desktops and laptops
- External aspect like a USB memory key
- Plug in USB port without turning of the PC



Hardware Chipsets

- Drivers are typically written for a specific wireless chipset, and will work with any card that uses that chipset
- Common chipsets include
 - Atheros (madwifi)
 - Intel Pro/Wireless 2100 & 2200 (ipw2100/ipw2200)
 - Prism2/2.5/3 (hostap driver)
 - Orinoco (orinoco_cs)
 - Ralink
 - Broadcom

Linux Distributions

- Each Linux distribution has a list of supported hardware
- Each distribution will support some (but not all) devices by default
- If you have the option, **choose a card that is supported by your distribution**

Unsupported Hardware

If your hardware is not supported by your distribution

- Choose different hardware or distro
- See if a card with the same **chipset** is supported
- Search support forums of distribution
- Use vendor-supplied driver
- Use windows driver through ndiswrapper or linuxant driverloader compatibility layer

Driver Differences

- linux-wlan-ng driver: does not support wireless-tools, and is not supported by many wireless utilities
- orinoco_cs driver does not support scanning for networks unless patched and recompiled

Driver Differences

- madwifi (atheros chipset) is the only driver that supports multiband (802.11a/b/g) under linux
- hostap and madwifi drivers have good support for running a wireless access point (802.11 Master mode)

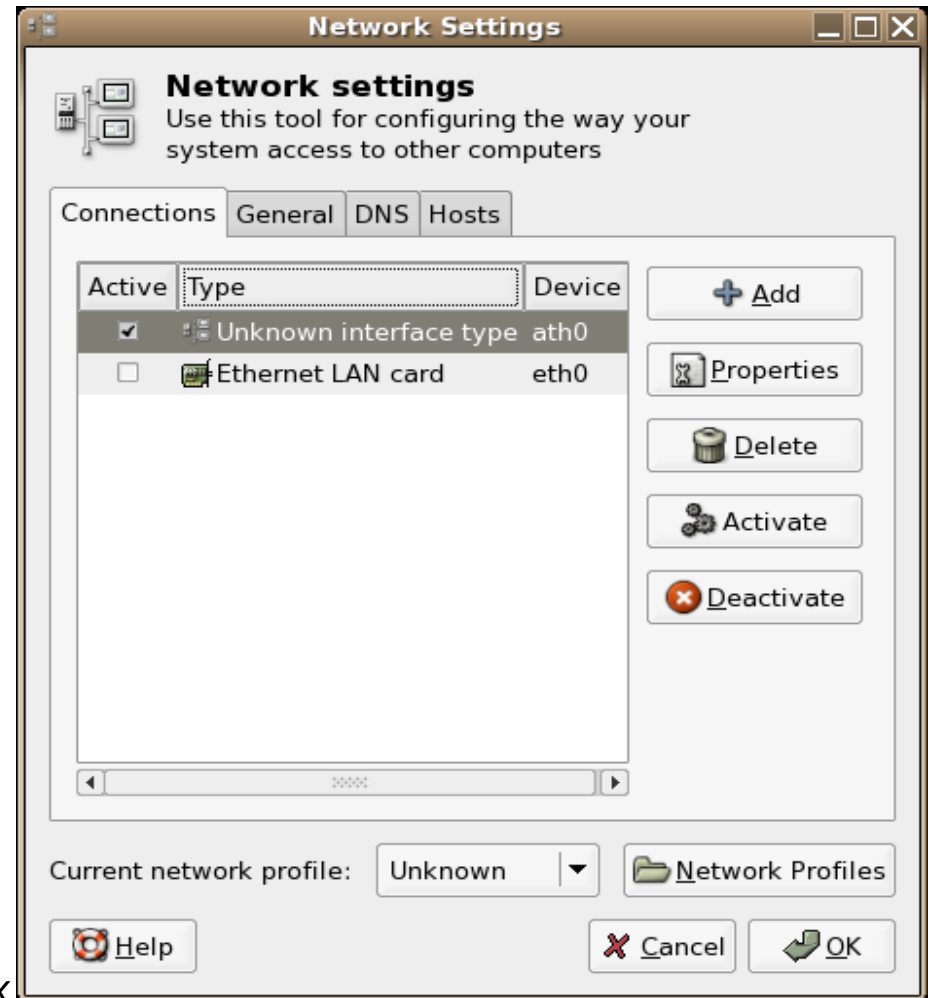
2: Installation of wireless device

Preparing for the installation

- Always check your distributions hardware support database
- Google for the card name and the name of your distribution (i.e. Linksys WPC54g Ubuntu). See what people have to say.
- Install the package wireless-tools using your distributions package manager
- Read card manual (search for Linux)
- Insert card and see what happens

If it just works

- To find out it just works use your distributions network manager interface
- Ubuntu (Warty Release) with Atheros card:



If it fails to work

- Identify the chipset on your hardware
- Use distribution support forum/maillist/wiki
- Identify potential drivers for your card
 - Use tools to identify chipset
 - Search for card in chipset list
- Use driver support forum/maillist/wiki
- See if there is a packaged driver available for your distribution (using package manager)

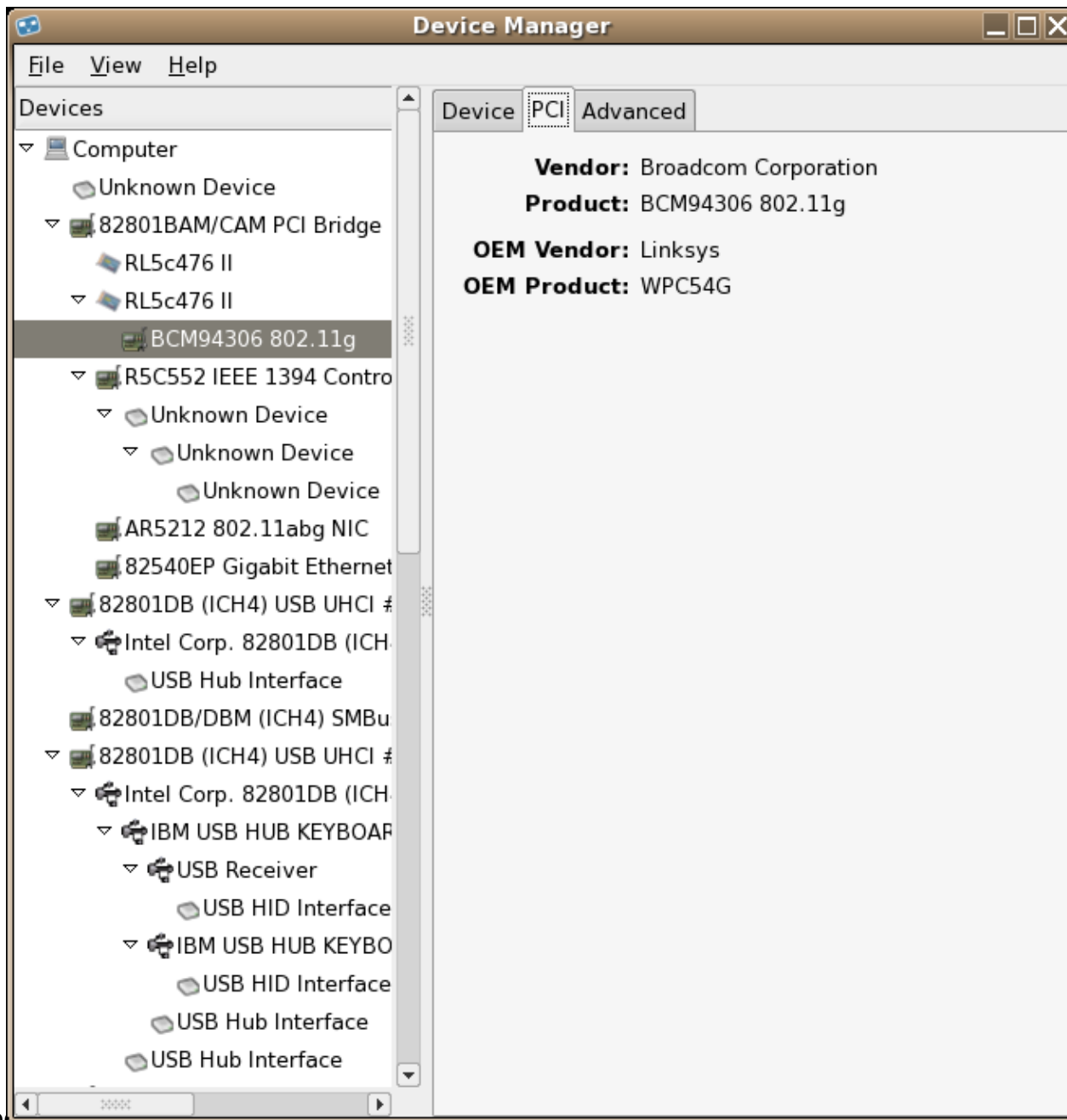
Identifying the Card

- Use command-line tools to identify card
 - lspci (for PCI and mini-PCI)
 - cardctl ident (for pcmcia)
 - hal-device-manager (for all types)
 - usbview (for usb)
 - dmesg (for all hardware)
- Look at
 - http://www.linux-wlan.org/docs/wlan_adapters.html.gz



Example 1: Installation of Linksys WPC54G on Ubuntu (Warty Release)

```
tkrag@tkragX31: /home/tkrag
File Edit View Terminal Tabs Help
tkrag@tkragX31: /home/tkrag tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ sudo cardctl ident
Socket 0:
  product info: "Broadcom", "802.11b CardBus", "8.0"
  manfid: 0x02d0, 0x0406
  function: 6 (network)
Socket 1:
  no product info available
tkrag@tkragX31:~ $ █
```

```
tkrag@tkragX31: /home/tkrag
File Edit View Terminal Tabs Help
tkrag@tkragX31: /home/tkrag tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ lspci
0000:00:00.0 Host bridge: Intel Corp. 82855PM Processor to I/O Controller (rev 03)
0000:00:01.0 PCI bridge: Intel Corp. 82855PM Processor to AGP Controller (rev 03)
0000:00:1d.0 USB Controller: Intel Corp. 82801DB (ICH4) USB UHCI #1 (rev 01)
0000:00:1d.1 USB Controller: Intel Corp. 82801DB (ICH4) USB UHCI #2 (rev 01)
0000:00:1d.2 USB Controller: Intel Corp. 82801DB (ICH4) USB UHCI #3 (rev 01)
0000:00:1d.7 USB Controller: Intel Corp. 82801DB (ICH4) USB2 EHCI Controller (rev 01)
0000:00:1e.0 PCI bridge: Intel Corp. 82801BAM/CAM PCI Bridge (rev 81)
0000:00:1f.0 ISA bridge: Intel Corp. 82801DBM LPC Interface Controller (rev 01)
0000:00:1f.1 IDE interface: Intel Corp. 82801DBM (ICH4) Ultra ATA Storage Controller (rev 01)
0000:00:1f.3 SMBus: Intel Corp. 82801DB/DBM (ICH4) SMBus Controller (rev 01)
0000:00:1f.5 Multimedia audio controller: Intel Corp. 82801DB (ICH4) AC'97 Audio Controller (rev 01)
0000:00:1f.6 Modem: Intel Corp. 82801DB (ICH4) AC'97 Modem Controller (rev 01)
0000:01:00.0 VGA compatible controller: ATI Technologies Inc Radeon Mobility M6 LY
0000:02:00.0 CardBus bridge: Ricoh Co Ltd RL5c476 II (rev aa)
0000:02:00.1 CardBus bridge: Ricoh Co Ltd RL5c476 II (rev aa)
0000:02:00.2 FireWire (IEEE 1394): Ricoh Co Ltd R5C552 IEEE 1394 Controller (rev 02)
0000:02:01.0 Ethernet controller: Intel Corp. 82540EP Gigabit Ethernet Controller (Mobile) (rev 03)
0000:02:02.0 Ethernet controller: Atheros Communications, Inc. AR5212 802.11abg NIC (rev 01)
0000:03:00.0 Network controller: Broadcom Corporation BCM94306 802.11g (rev 03)
tkrag@tkragX31:~ $
```



File Edit View Go Bookmarks Tools Help


 http://www.google.com/search?hl=en&lr=&safe=off&q=linksys+wpc54g+ubuntu&btr
 

X31 misc Blogs wireless FLOSS ict4dev entertain MyStuff Feeds IP? del.icio.us


 Web [Images](#) [Groups](#) [News](#) [Froogle](#) [Local](#) **New!** [more](#) »

linksys wpc54g ubuntu

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WebResults **1 - 10** of about **150** for **linksys wpc54g ubuntu**. (0.31 seconds)[Linksys WPC54G and Mandrake Linux](#)... **Linksys WPC54G** and Mandrake Linux (1/1). Forum overview » Hardware » **Linksys****WPC54G** and Mandrake Linux. apropos (Member) Posts: 5 ...www.linuxcompatible.org/thread28636-1.html - 92k - [Cached](#) - [Similar pages](#)[Linksys PLUSB10 USB Adapter](#)... **Linksys** USB200M (**Linksys**); **Linksys** Wireless-G **WPC54G** PC-Card (**Linksys**); **Linksys**Wireless-G ... Forum overview » Hardware » **Linksys** PLUSB10 USB Adapter. ... **Ubuntu**. ...www.linuxcompatible.org/thread724-1.html - 52k - [Cached](#) - [Similar pages](#)[[More results from www.linuxcompatible.org](#)][Ubuntu - How To - Set up Linksys cards](#)... **Ubuntu**. Sections. ... These instructions for Debian have been helpful for several peopleconfiguring **linksys** cards Arthur's homepage: using **WPC54G** with Debian. ...www.ubuntulinux.org/support/documentation/howto/helpcenterhowto.2004-10-07.3532963119 - 36k - [Cached](#) - [Similar pages](#)[LinuxQuestions.org - Linksys WPC54G ver. 2 ndiswrapper cardctl ...](#)... **Linksys WPC54g** v. 2 and ndiswrapper 1.0 connection issue, yohan77, Linux - WirelessNetworking, 0, ... **linksys** wusb11 v1.6 on **Ubuntu**, c00ly, Linux - Hardware, 0, ...www.linuxquestions.org/questions/showthread.php?s=&goto=lastpost&threadid=295388 - 42k - [Cached](#) - [Similar pages](#)[LinuxQuestions.org - FC3/Linksys WPC54G/Newbie/HELP - where Linux ...](#)... I thought i read a post to use LSTINDS for the **Linksys WPC54G**? I ... Post. **linksys**wusb11 v1.6 on **Ubuntu**, c00ly, Linux - Hardware, 0, Today ...www.linuxquestions.org/questions/history/285772 - 101k - [Cached](#) - [Similar pages](#)[[More results from www.linuxquestions.org](#)][Ubuntu Linux Forums - Linksys WPC54G](#)

Done

0

[Adblock](#)

Quote

11-24-2004, 03:40 PM #4

ramze
 Ubuntu Newbie Brew

ramze is Offline:

Join Date: Nov 2004

Posts: 4

Style: [Ubuntu_Red_Yellow](#)

Re: Linksys WPC54g

actually it is very simple

install ndiswrapper from synaptic package manager.

then download ftp://ftp.linksys.com/pub/network/w...tility_v2.0.zip

unzip the downloaded zipfile, find the correct .inf (lsbcmnds.inf in my case) file and run
 sudo ndiswrapper -i lsbcmnds.inf

load the module and make it reload on reboot:
 modprobe ndiswrapper
 echo ndiswrapper >> /etc/modules

in gnome, goto networking and put your settings.

hope it helps.

Quote

11-26-2004, 02:30 PM #5

danpre
 Ubuntu Newbie Brew

danpre is Offline:

Re: Linksys WPC54g

ramirez:

thx

but it is too late now

Reload Mark All Upgrades Apply Properties Search

- All
- ndiswrapper

S	Package	Installed Version	Latest Version	Size	Description
<input checked="" type="checkbox"/>	ndiswrapper	0-10-1	0-10-1	98,3 kB	User space tools for ndiswrapper

- Unmark
- Mark for Installation
- Mark for Reinstallation
- Mark for Upgrade
- Mark for Removal
- Mark for Complete Removal
- Properties
- Mark Recommended for Installation
- Mark Suggested for Installation

User space tools

Some wireless LAN vendors refuse to release hardware specifications or drivers for their products for operating systems other than Microsoft Windows. NdisWrapper makes it possible to use such hardware with Linux by means of a loadable kernel module that "wraps around" NDIS (Windows network driver API) drivers.

This package provides user space tools for NdisWrapper.

Sections Status

Search Custom

Loading *ndiswrapper*

- Download windows driver

```
$ wget ftp://...../drivename.zip
```

- Unzip

```
$ unzip drivename.zip
```

- Install windows driver (as root user)

```
# ndiswrapper -i filename.inf
```

- List devices (as root user)

```
# ndiswrapper -l
```

- load kernel module (as root)

```
# modprobe ndiswrapper
```

- make changes permanent (see docs for your distro)

```
# ndiswrapper -m
```

```
# echo ndiswrapper >> /etc/modules
```

Last updated: 23 April 2006

ltrainOnline MMTK www.itrainonline.org

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Various drivers

- hostap for prism2/2.5/3: <http://hostap.epitest.fi/>
- Madwifi: <http://www.mattfoster.clara.co.uk/madwifi-faq.htm>
- Orinoco: <http://www.nongnu.org/orinoco/>
- ndiswrapper: <http://ndiswrapper.sourceforge.net/>
- Intel wireless/PRO 2100: <http://ipw2100.sourceforge.net/>
- Intel wireless/PRO 2200: <http://ipw2200.sourceforge.net/>
- prism54: <http://www.prism54.org/>
- Cisco airo: <http://sourceforge.net/projects/airo-linux/>
- Ralink: <http://rt2x00.serialmonkey.com/>
- More info <http://www.seattlewireless.net/index.cgi/LinuxDrivers>

3: Configuring the wireless device

Configuration

- Once the driver is installed, you need to configure the network
 - Setup essid (name of wireless network)
 - Choose DHCP or static IP address
 - WEP Security Key
 - Activate network

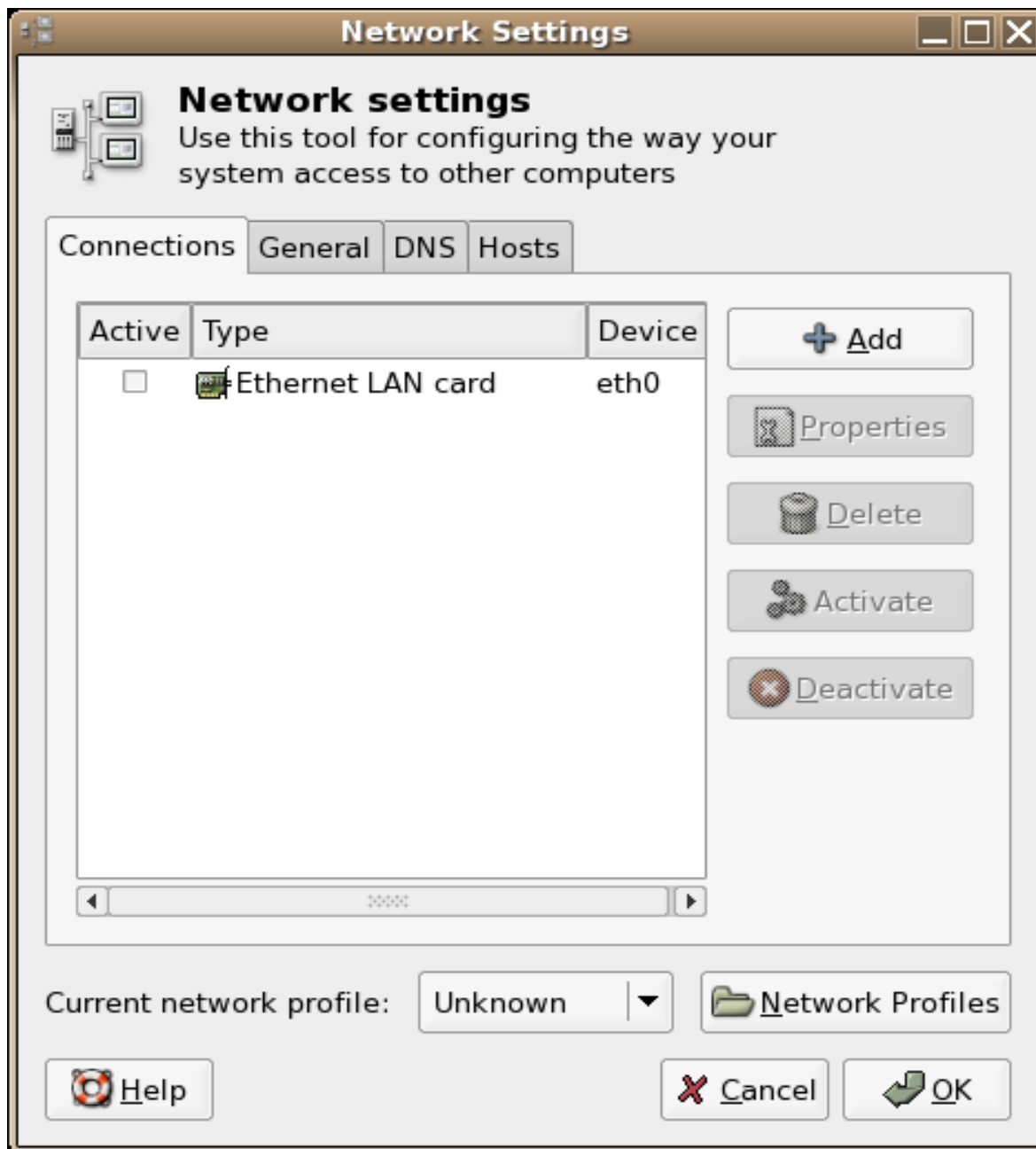
Example 2: Configuring Ubuntu with GNOME

Should be the same on many
Gnome based Distributions

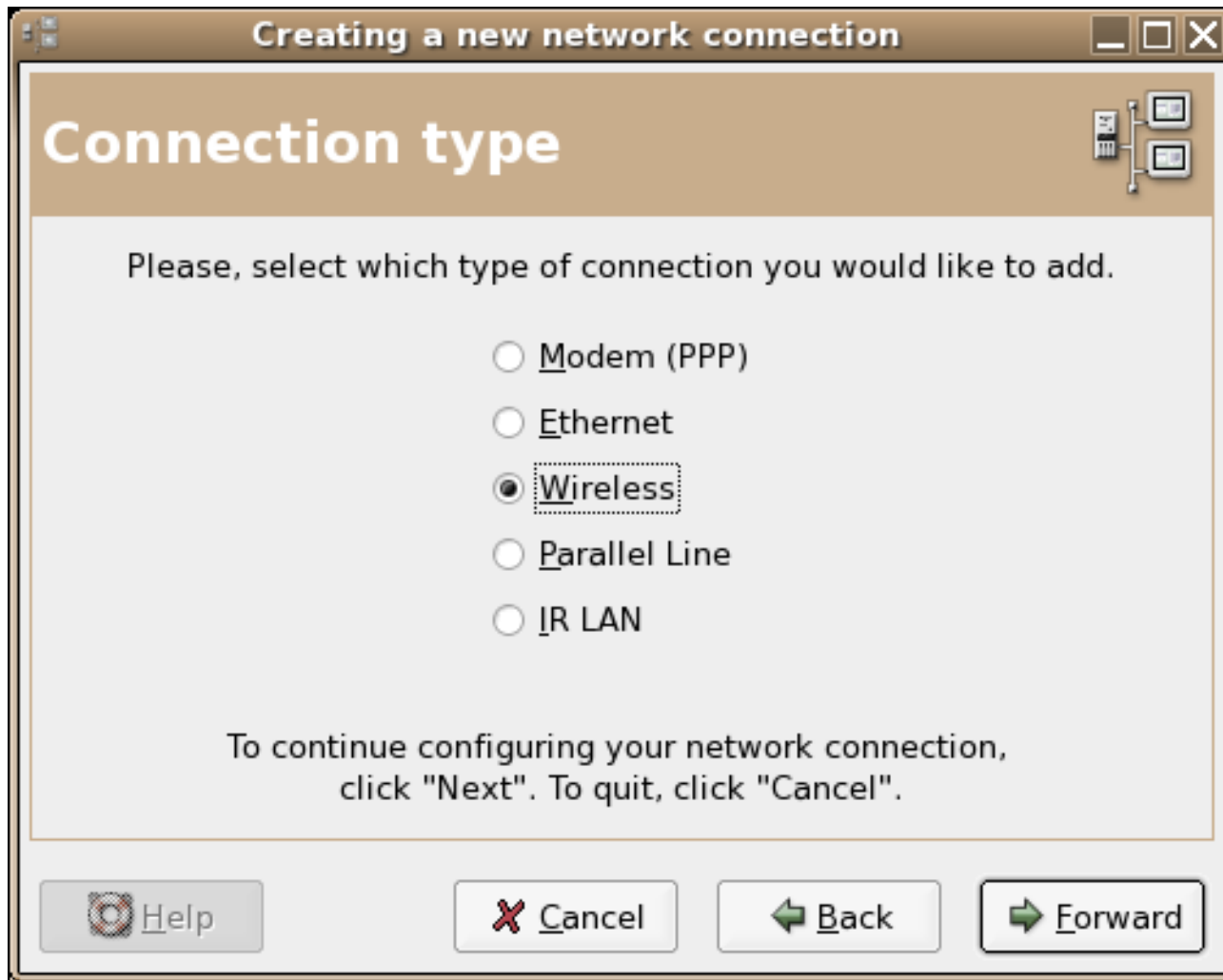
Open GNOME network-admin

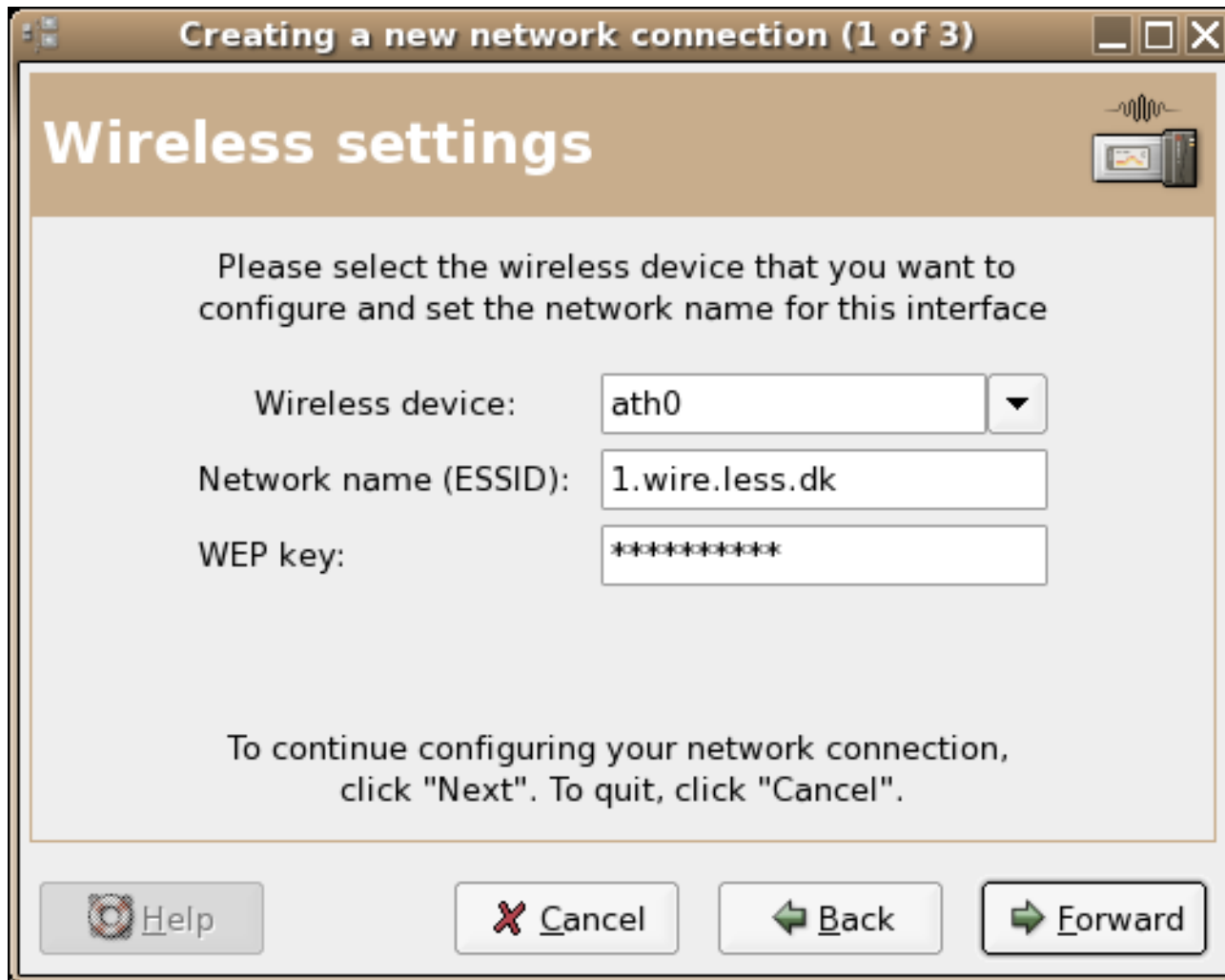
- Menu
 - Computer
 - System Configuration
 - Networking
- Enter password

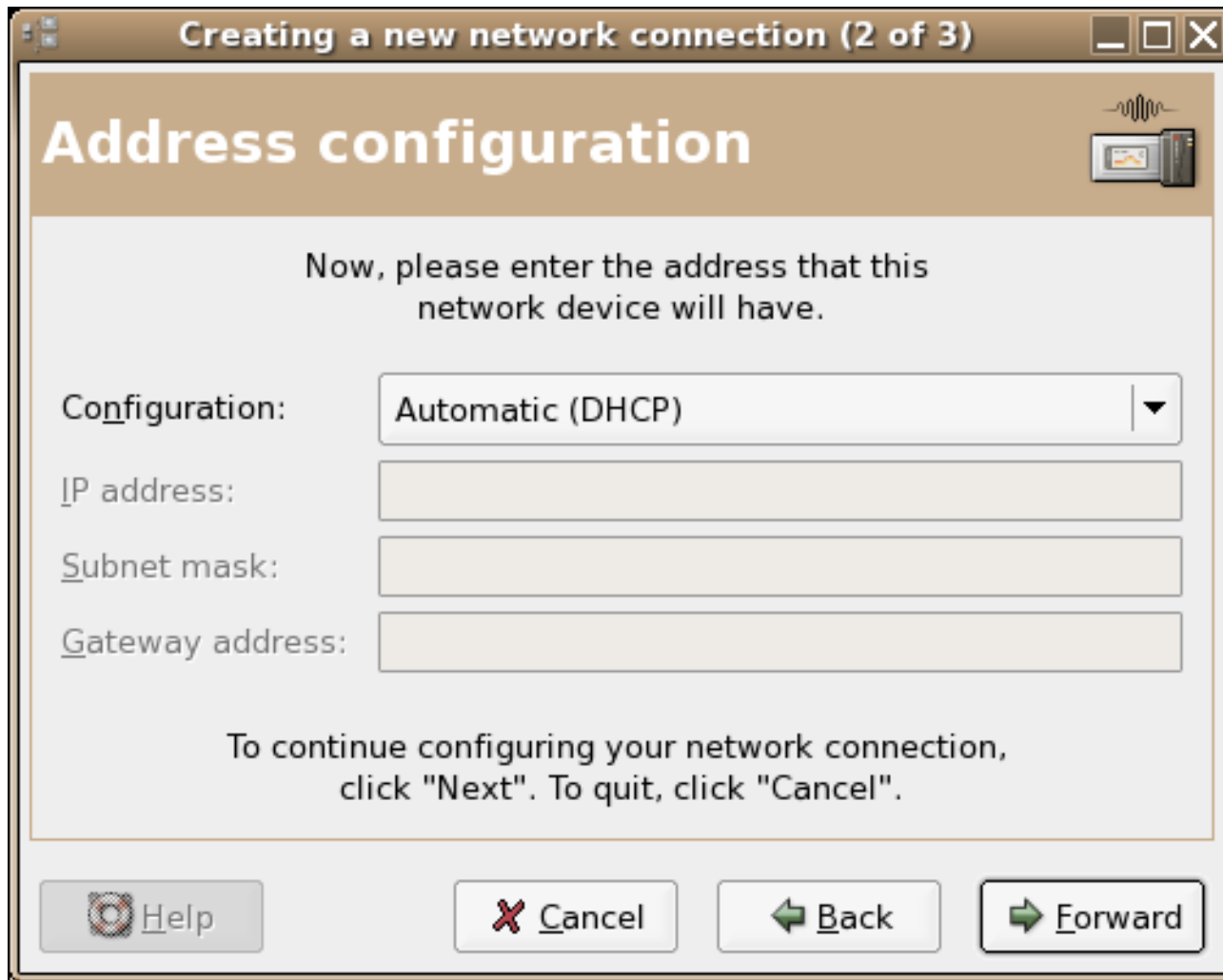




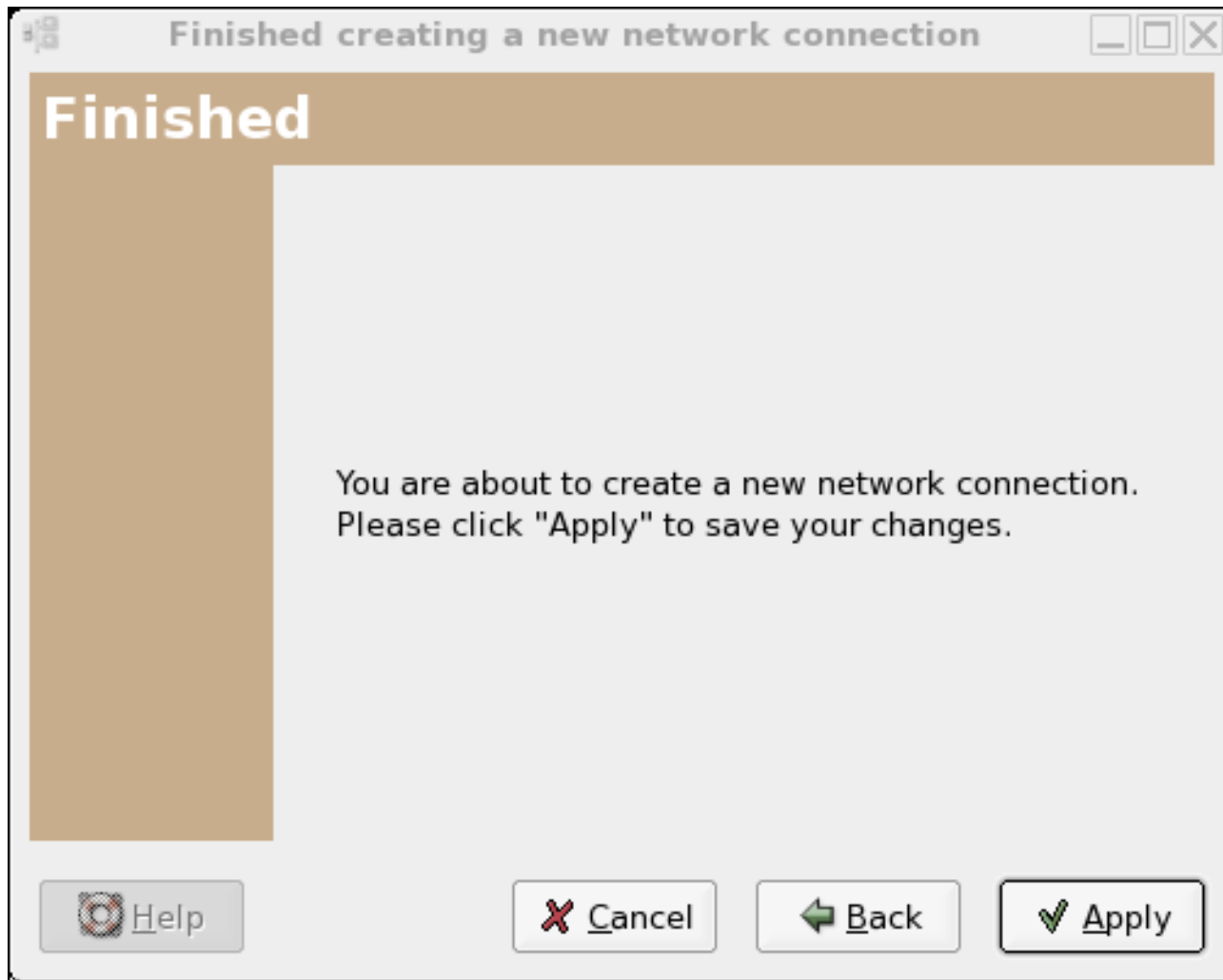


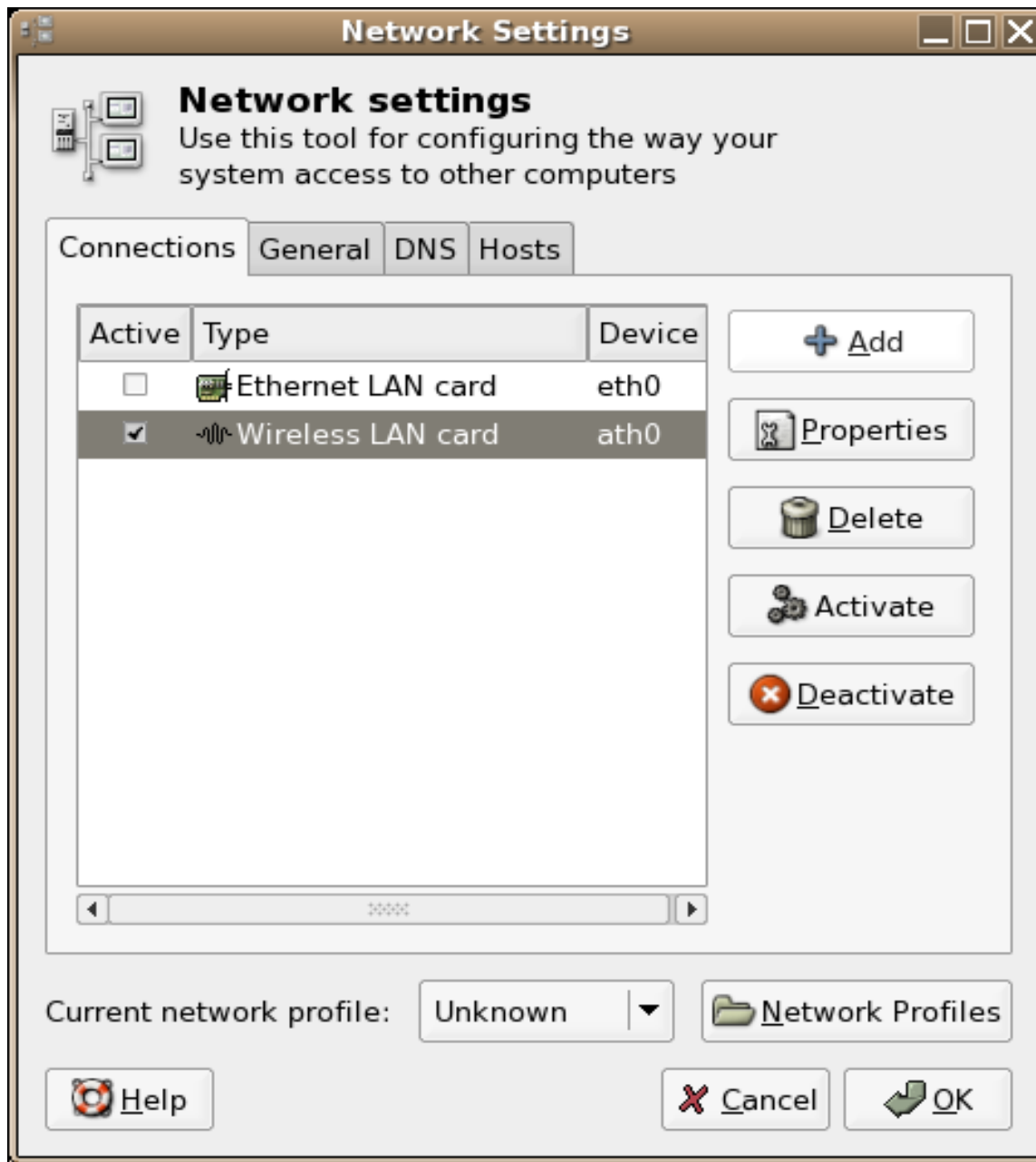












Interface eth1 - KWIFI-Verwaltung

File Settings Help

Connection speed [MBit/s]:

0 1 2 5.5 11

OUT OF RANGE

Signal strength: 0

Scan for Networks...

AccessPoint: UNKNOWN

Status of Active Connection

Searching for network:

Access point: 44:44:44:44:44:44

Local IP: unavailable

Frequency [channel]: 2.412 [1]

Interface wlan0 - KWIFI-Verwaltung

File Settings Help

Connection speed [MBit/s]:

0 11 22 54 108

GOOD

Signal strength: 23

Scan for Networks...

AccessPoint: LU, Luxembourg, rue Richard Coudenhove-Calergi, Fondation RESTENA

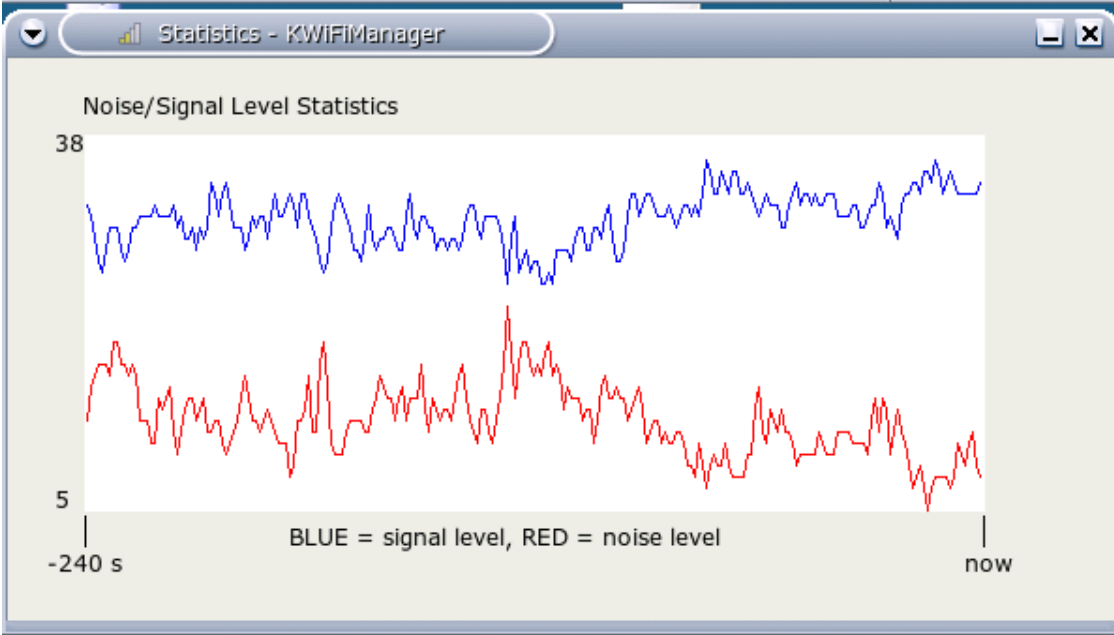
Status of Active Connection

Connected to network: uni-exp

Access point: 00:07:85:92:5B:13

Local IP: 158.64.11.38

Frequency [channel]: 2.442 [7]



Information - uni-exp

Available networks:

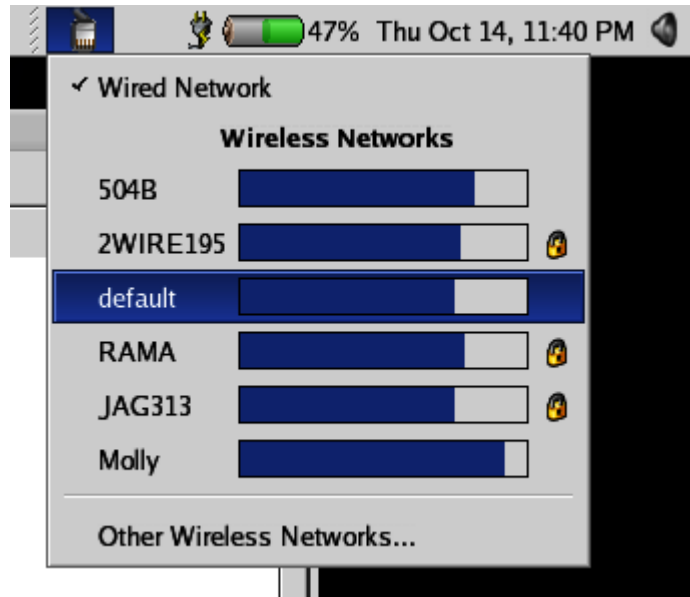
uni-exp

OK

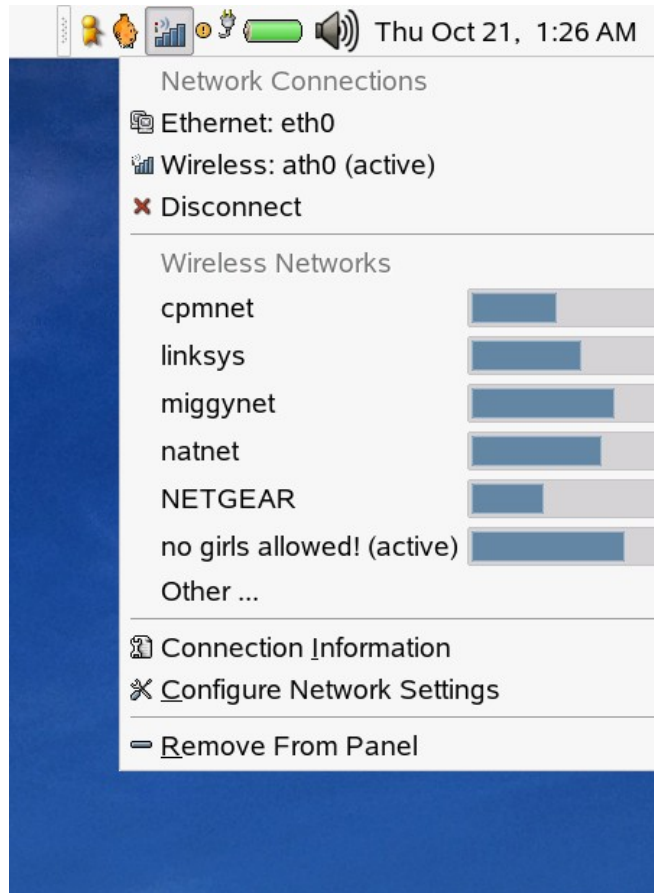
Example 3: Other GUI Tools

New tools are being developed all the time...

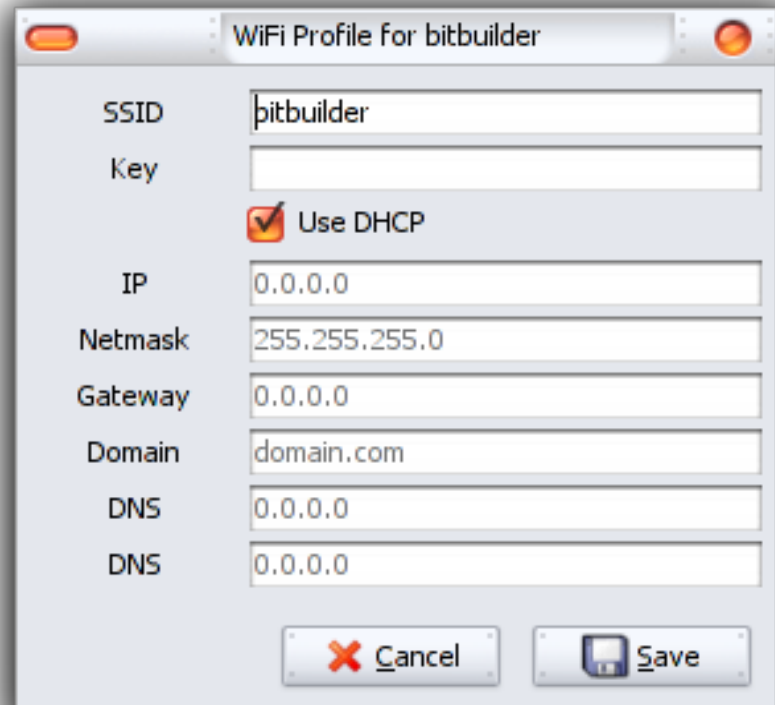
Red-Hat NetworkManager



Gnome netapplet



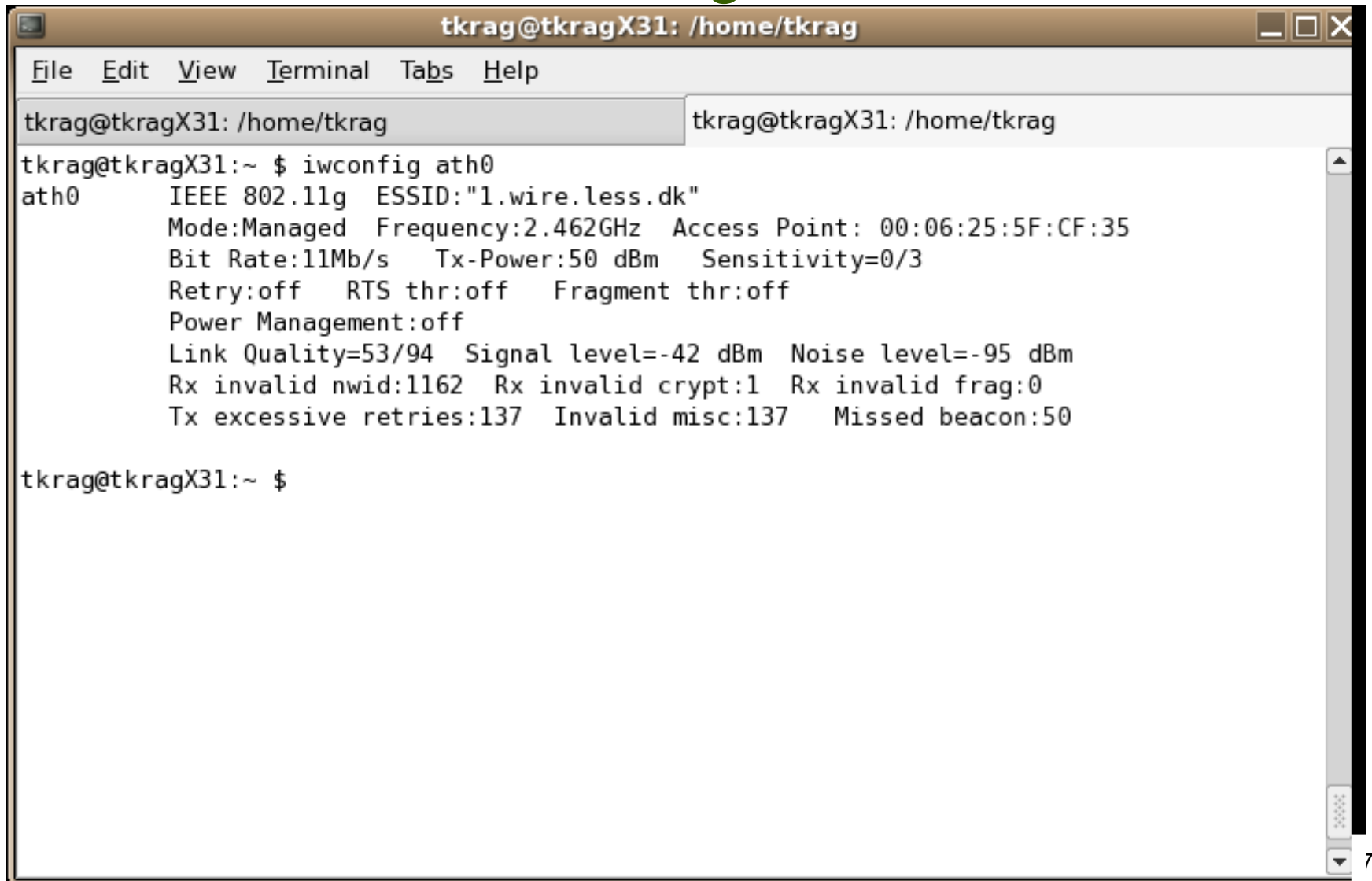
wifi_radar



Example 4: The command line

When everything else fails....

iwconfig ath0



```
tkrag@tkragX31: /home/tkrag
File Edit View Terminal Tabs Help
tkrag@tkragX31: /home/tkrag tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ iwconfig ath0
ath0 IEEE 802.11g ESSID:"1.wire.less.dk"
Mode:Managed Frequency:2.462GHz Access Point: 00:06:25:5F:CF:35
Bit Rate:11Mb/s Tx-Power:50 dBm Sensitivity=0/3
Retry:off RTS thr:off Fragment thr:off
Power Management:off
Link Quality=53/94 Signal level=-42 dBm Noise level=-95 dBm
Rx invalid nwid:1162 Rx invalid crypt:1 Rx invalid frag:0
Tx excessive retries:137 Invalid misc:137 Missed beacon:50

tkrag@tkragX31:~ $
```

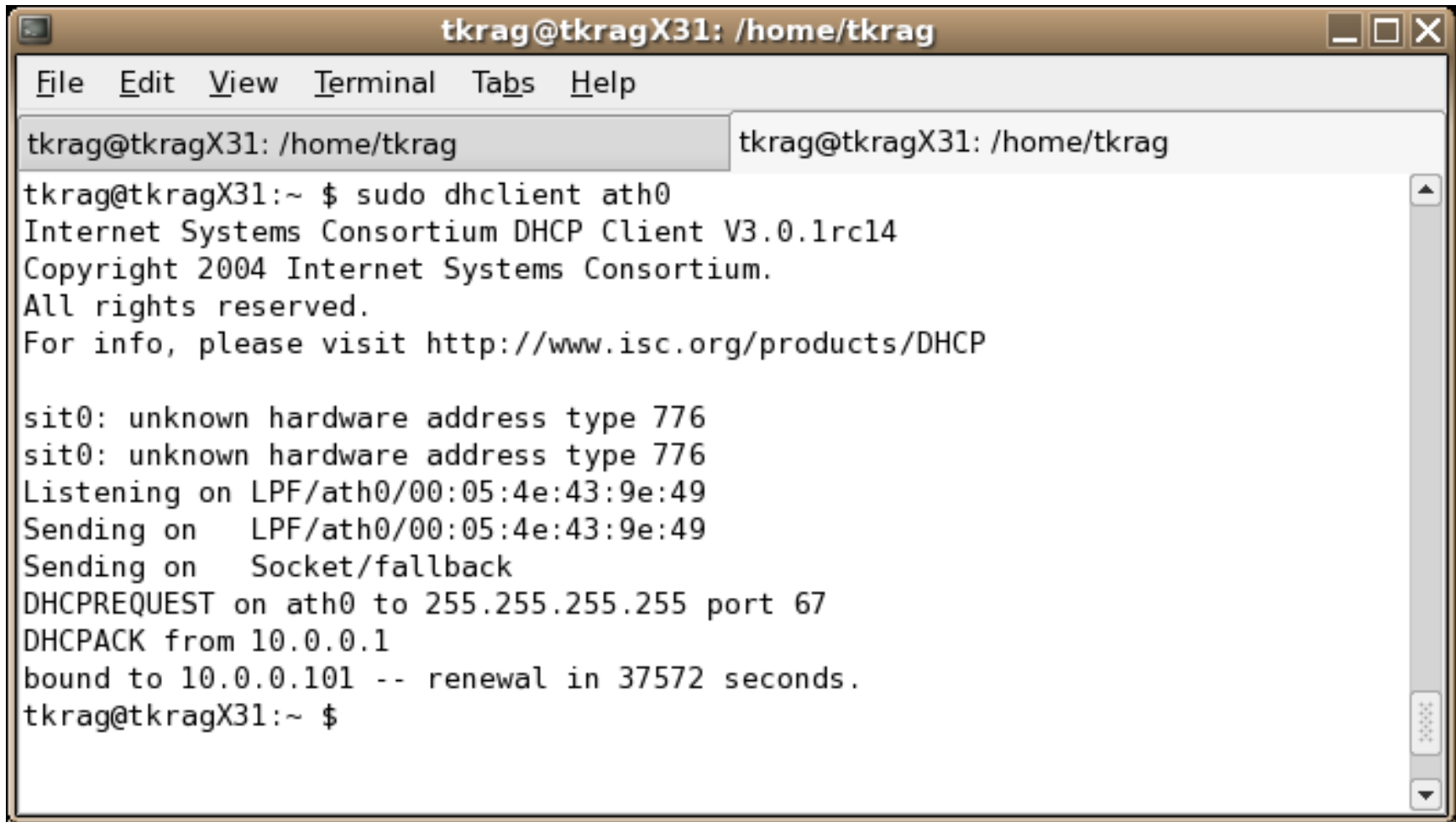
iwlist ath0 scan

```
tkrag@tkragX31: /home/tkrag
File Edit View Terminal Tabs Help
tkrag@tkragX31: /home/tkrag tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ iwlist ath0 scan
ath0 Scan completed :
  Cell 01 - Address: 00:0C:41:D7:32:E2
           ESSID:"free.wire.less.dk"
           Mode:Master
           Frequency:2.437GHz (Channel 6)
           Quality=32/94 Signal level=-63 dBm Noise level=-95 dBm
           Encryption key:off
           Bit Rate:1Mb/s
           Bit Rate:2Mb/s
           Bit Rate:5Mb/s
           Bit Rate:11Mb/s
           Extra:bcn_int=100
  Cell 02 - Address: 00:02:6F:34:E1:FD
           ESSID:"Metrix HostAP 1"
           Mode:Master
           Frequency:2.437GHz (Channel 6)
           Quality=30/94 Signal level=-65 dBm Noise level=-95 dBm
           Encryption key:off
           Bit Rate:1Mb/s
           Bit Rate:2Mb/s
           Bit Rate:5Mb/s
           Bit Rate:11Mb/s
           Extra:bcn_int=100
  Cell 03 - Address: 00:06:25:5F:CF:35
           ESSID:"l.wire.less.dk"
           Mode:Master
           Frequency:2.462GHz (Channel 11)
           Quality=58/94 Signal level=-37 dBm Noise level=-95 dBm
           Encryption key:on
           Bit Rate:1Mb/s
           Bit Rate:2Mb/s
           Bit Rate:5Mb/s
           Bit Rate:11Mb/s
           Extra:bcn_int=100
tkrag@tkragX31:~ $ █
```

Last updated: 1

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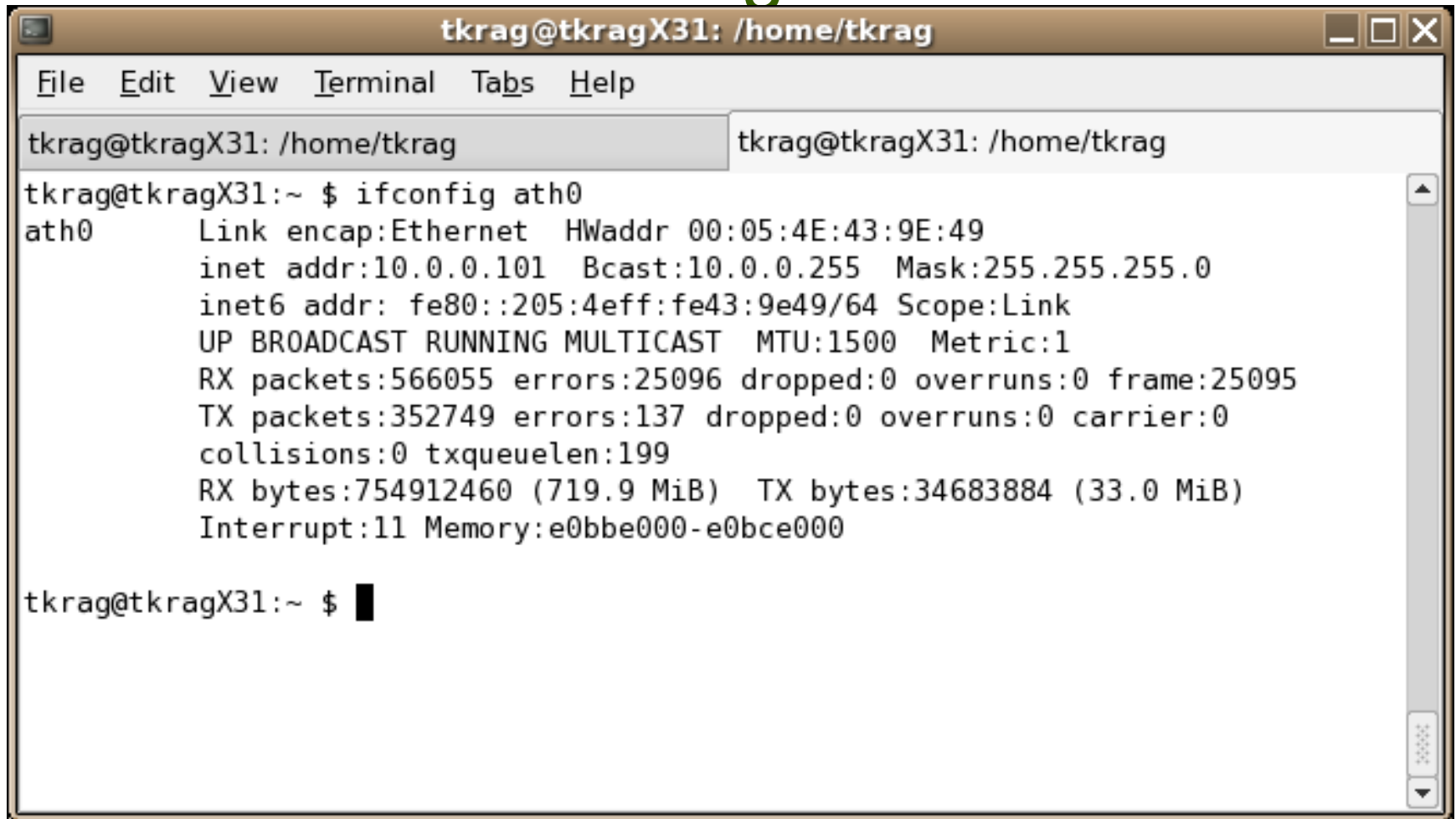
sudo dhclient ath0

A terminal window titled 'tkrag@tkragX31: /home/tkrag' with a menu bar containing 'File', 'Edit', 'View', 'Terminal', 'Tabs', and 'Help'. The terminal shows the command 'sudo dhclient ath0' being executed. The output includes the DHCP client version (V3.0.1rc14), copyright information, and the process of sending DHCP requests and receiving a response from 10.0.0.1, resulting in the IP address 10.0.0.101 being assigned with a 37572-second renewal period.

```
tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ sudo dhclient ath0
Internet Systems Consortium DHCP Client V3.0.1rc14
Copyright 2004 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/products/DHCP

sit0: unknown hardware address type 776
sit0: unknown hardware address type 776
Listening on LPF/ath0/00:05:4e:43:9e:49
Sending on   LPF/ath0/00:05:4e:43:9e:49
Sending on   Socket/fallback
DHCPREQUEST on ath0 to 255.255.255.255 port 67
DHCPCACK from 10.0.0.1
bound to 10.0.0.101 -- renewal in 37572 seconds.
tkrag@tkragX31:~ $
```

iwconfig ath0



A terminal window titled "tkrag@tkragX31: /home/tkrag" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the command "ifconfig ath0" and its output. The output displays network statistics for the ath0 interface, including link encap, hardware address, IP address, broadcast address, mask, MTU, and various packet statistics.

```
tkrag@tkragX31: /home/tkrag
tkrag@tkragX31: /home/tkrag
tkrag@tkragX31:~ $ ifconfig ath0
ath0      Link encap:Ethernet  HWaddr 00:05:4E:43:9E:49
          inet addr:10.0.0.101  Bcast:10.0.0.255  Mask:255.255.255.0
          inet6 addr: fe80::205:4eff:fe43:9e49/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:566055  errors:25096  dropped:0  overruns:0  frame:25095
          TX packets:352749  errors:137  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:199
          RX bytes:754912460 (719.9 MiB)  TX bytes:34683884 (33.0 MiB)
          Interrupt:11  Memory:e0bbe000-e0bce000

tkrag@tkragX31:~ $ █
```

PART B: WINDOWS

1. Wireless Hardware
2. Installation
- 3. Configuration**

1. Wireless Hardware

- Support for Windows is trivial

2. Installation of wireless device

Windows Version?

- Windows XP
 - Most drivers are included
 - Plug in wireless adapter and let software detect
 - SP2
- Windows 2000
 - Plug and play, driver database is often not up to date.
 - Need additional software or internet connection (wired) to download

Windows Version?

- Windows NT, 95/98
 - No USB support on NT and 95
 - Manual install required for 98
 - Consider updating your OS
 - See “Win98 Wireless Client Installation”

3. Configuring the wireless device

- Select network to associate with
 - SSID, broadcasted or not?
- WEP encryption
 - On/off
- IP parameters
 - DHCP or static IP

Configuration Management Tools

- Windows (XP wireless manager)
 - Used in this example
- Vendor specific

Disable one of them as conflict can arise

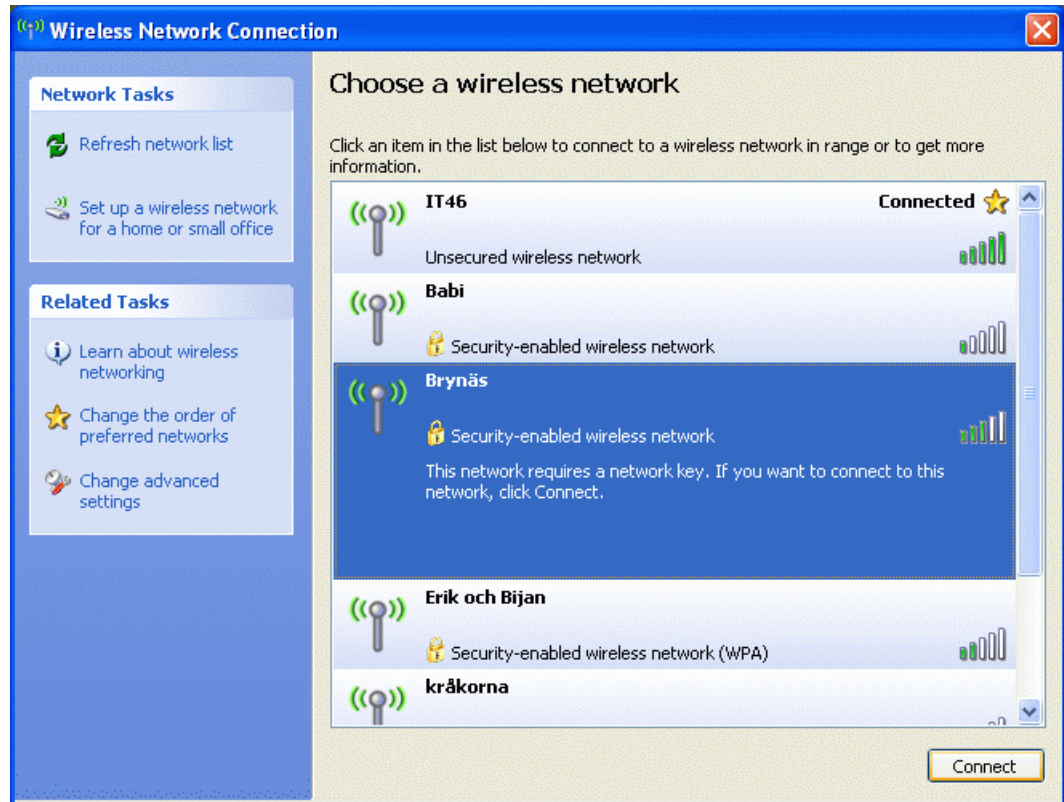
Step 1: Select Network

- Will connect to AP providing the best signal
 - Confirm connection to a non-encrypted network
- *Wireless networks detected* in notification area
- Select among available wireless networks



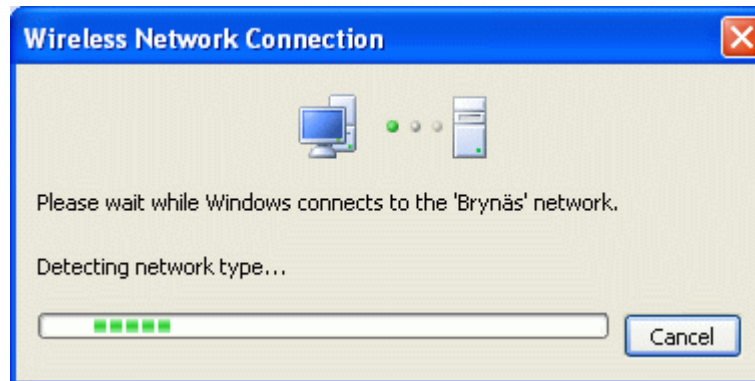
Available Wireless Networks

- Status message
- Signal strength
- SSID
- Encryption



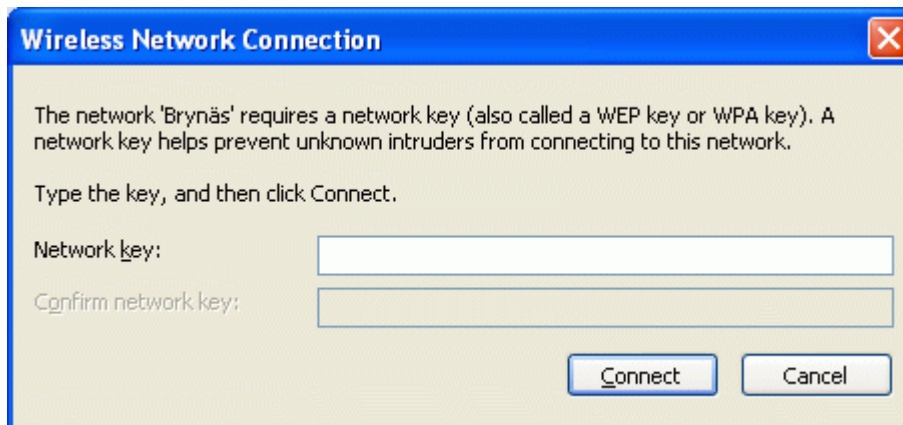
Associating with AP

- Select SSID
- WEP encryption = Golden lock



WEP Encryption

- Enter WEP key (identical to AP WEP key)



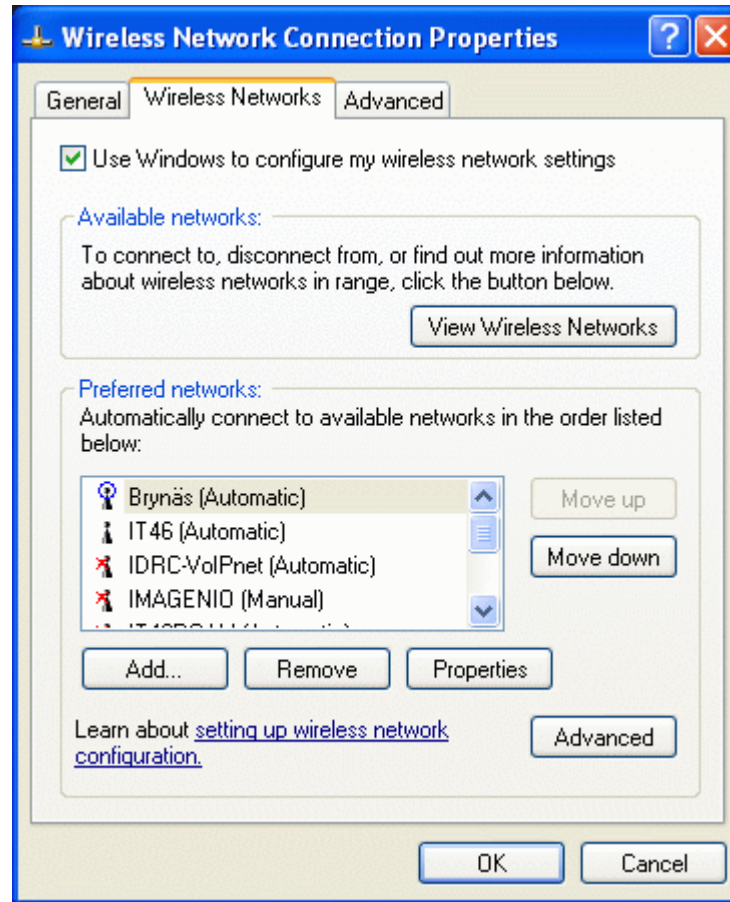
Status Message

- Status message of connection
 - Connected: Configuration completed
 - Authentication did not succeed

Authentication did not succeed

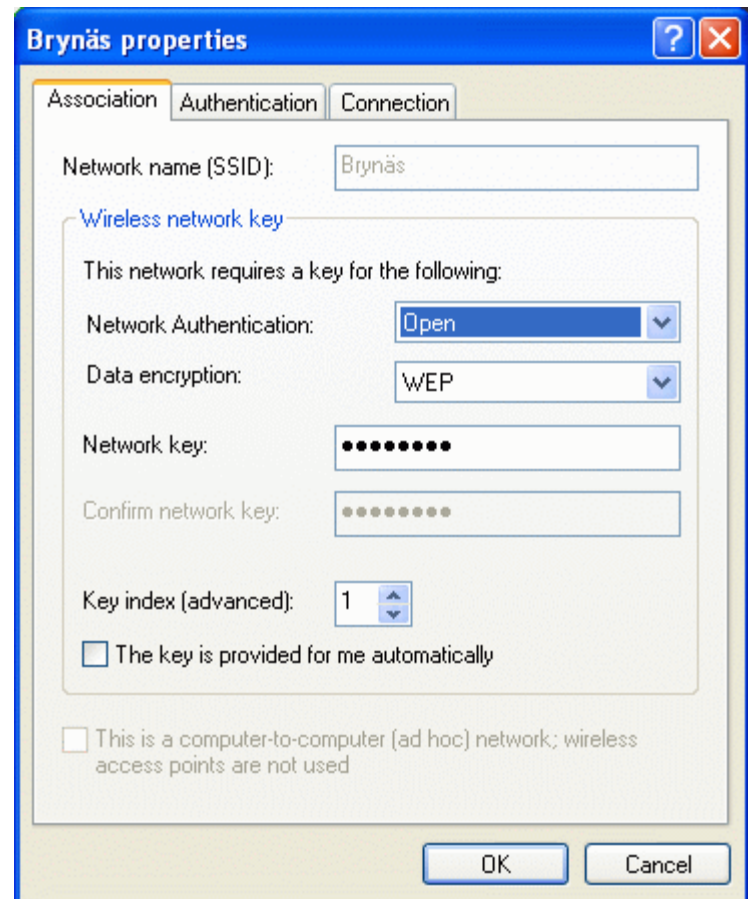
- Select **Change the order of preferred networks** (in the list of Related tasks)
- Select the tab **Wireless Networks** from the properties of your wireless network adapter
- Click on the name of your wireless network (**SSID**) in **Preferred networks**.
- Click **Properties**

Manual Configuration



Manual Configuration

- Network Authentication: Open
- Type WEP key (twice)
- Select the key index (encryption key memory position in AP)
- Click OK twice (apply changes in wireless network and wireless network adapter)



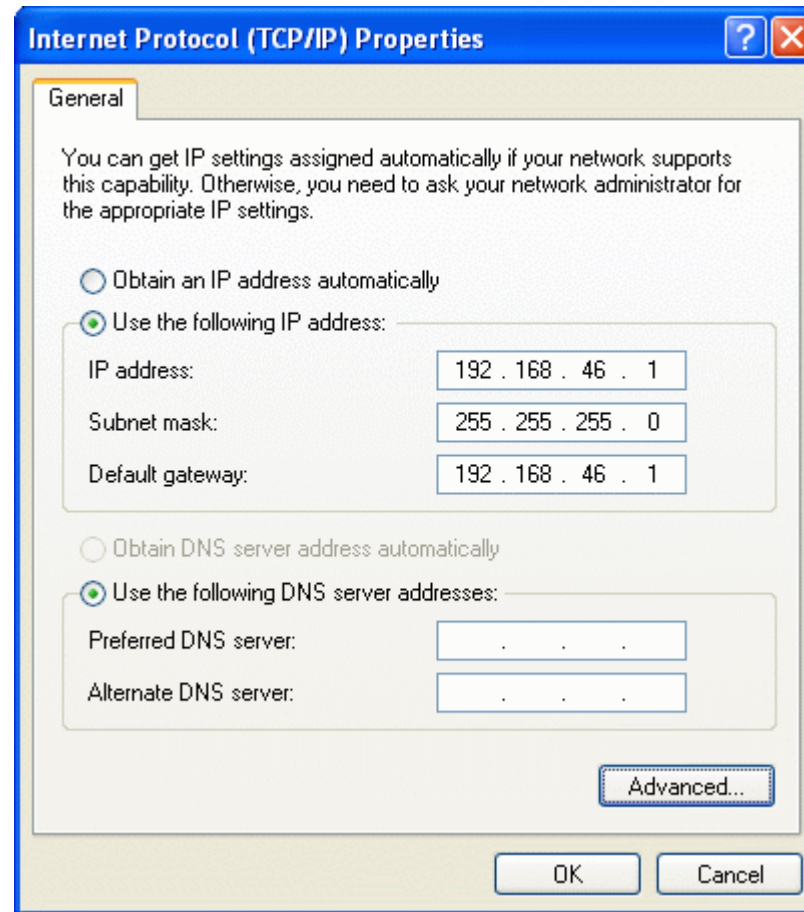
Step 2: IP settings

- IP address
- Subnet mask
- Gateway
- DNS

IP settings

- DHCP
 - # ipconfig
 - # ipconfig /release all
 - # ipconfig /renew
- Manually set IP address
 - Start > Control Panel > Network Connections
 - Wireless Network Connection > Properties
 - General > Internet Protocol (TCP/IP) > Properties

Manually set IP parameters



Conclusions: Linux

- Check for support in your Linux distribution before buying a wireless card
- Use the Internet to find out about “known issues”
- Read users Forum and learn from others

Conclusions: Windows

- Make sure that only one configuration manager is running to avoid conflicts
- Make sure that the radio is switched on (in laptop)
- Make sure that you have the right IP parameters for the AP that you want to connect to
- Make sure that you connect to the “right” network as Windows will choose the AP with the strongest signal (non-encrypted)