

# NETWORK GUIDE

*Central Finland Student Housing  
Foundation*

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# 1. Introduction

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You have the Central Finland Student Housing Foundation's (KOAS) Network Information booklet in your hand. The purpose of this booklet is to give you information on the computer networks and the Internet in general and also help you with the registration of your network connection. If you read these instructions carefully it'll save you time and it will be much easier for you to register your connection and get on line sooner. You don't have to remember or understand everything that is written here, but as the world gets more and more networked it is good to know something about that in advance.

These instructions and hints are all based on real life problems and the most common requests for help. The most common problems are easy to avoid by following the instructions listed later in this booklet even if you are not familiar with computers. Next we discuss briefly the KOAS network and what information you'll need to give to the tenant office ([koas@koas.fi](mailto:koas@koas.fi)), so that your account can be registered. Instructions on how to obtain your MAC-address and check your computer's settings can be found later in this booklet.

With freedom comes responsibility.

- Every user is personally responsible for their computers and other networked devices that they have connected to the network. This includes correct settings and security.
- Tenant's computer must have a firewall and a anti-virus installed and up to date.
- Network devices that distribute IP-addresses must not be visible to the Internet.
- Computers that send viruses or spam will be banned from the network until to computer is cleaned.
- You are personally responsible for keeping your computer free of malware and cleaning it if your computer is infected.

- If you install a cable modem, an ADSL-modem or hook up a router incorrectly to the network you will be banned for disrupting the network until further notice.
- Setting your IP-address manually is forbidden.

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## 2. Connecting to the network

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There is a 100 Mbps local area network based Internet connection in every KOAS apartment. All you need to have to get on line is a computer that works, a network card and at least a CAT5 RJ-45 network cable. The cable you'll need is described in detail in section (2.2).

In order to get on-line you will need a network card that has a RJ-45 socket. Note that a network card is neither a modem nor an ISDN-card. Also a network card is neither a HomePNA- nor a Firewire-adapter. Also there is no wireless network available so you can't use a wireless network adapter.

Network usage fee is included in the rent. You can access the Internet only if you send the following information to the tenant office. You can send them by email or by visiting the tenant office in person or by telephone. If you phone your information in, you may use the phonetic alphabet listed in chapter (A).

### 2.1 Network account registration

The steps taken to register your Internet connection are as follows: You sign the network agreement at the tenant office, you send/give out the required information to the tenant office and after that a KOAS employee will register your connection. The registration will take a few working days, please, be patient. If after a few days you can't get on-line check that your network settings are correct (3.5) and that you have a correct cable (2.2) and that you have given a correct MAC-address (3.3 or 3.4).

- Send your registration request to this address along with the following information `koas@koas.fi`.
- Ethernet-adapter's MAC-address, *NO wireless or WLAN-adapter's MAC-address.* (3.3 or 3.4)
- Name

- Address
- Code on the wall socket

## 2.2 Cable

In this section we discuss cabling. As we mentioned earlier, there is no wireless network unless you decide to build one for yourself. In any case you will need a cable and not just any cable. The cable is used to transmit packages (blocks of data) from your computer to the network and vice versa. So you'll definitely need one. Read on to find out what you need and what to avoid.

The network at KOAS buildings is an Ethernet based network. You will need an Ethernet cable to connect. *The cable has to be at least CAT5 RJ-45 unshielded twisted pair (UTP) cable.* CAT5 is an abbreviation of the term "Category 5" which means that the cable is the fifth generation twisted pair cable. The manufacturer guarantees that this cable supports connection speeds at least up to 100 Mbps. RJ-45 is the type of the connector. Do not confuse this with a modem cable's connector which is similar, but smaller. That is called RJ-11 and while it will fit loosely in the socket and the network card's light may be lit, modem cables will never work in this network.

If you are unsure whether you have a proper cable, compare it to a cable that definitely works. If you move in to a cell apartment there usually is someone who has a working network connection. This also means that this person has a proper cable. Computer cables are sold at the larger stores and naturally at the computer stores. They usually cost about 2 € / m. Ask a clerk for help and show her the type of the cable and you are sure to get a proper cable. The gravest mistake is to buy an arbitrary cable and leave without taking the receipt. You'll save your own time and trouble when you do things with care.

## 2.3 Browsers, firewall- and anti-virus software

We recommend that you use only up-to-date and patched browsers. If you use a proper browser it is more difficult for malware to infect your computer.

Among the safest browsers to use are Opera<sup>1</sup> and Mozilla Firefox<sup>2</sup>. You should avoid using older versions of Microsoft's Internet Explorer. If you insist on using the Internet Explorer install the latest version.

You can download an anti-virus program for free from the Internet. A light and automatically updating Avast!<sup>3</sup> is a good choice. Windows XP SP3/Vista/7 operating systems come with a firewall installed. It is usually turned on by default and we recommend that you leave it at that unless you plan on using another firewall software. If you have an older version of Windows (XP or older) download and install a free firewall from the Internet<sup>4</sup>.

If you plan on installing Windows again on your computer, make sure that your network cable is NOT plugged in during the installing procedure. Keep your system unplugged until you have installed a firewall and an anti-virus software. An unprotected and unpatched windows system may get infected from the Internet. Infected computers will be cut off from the network until they are disinfected.

For Linux/(\*NIX) users we recommend that you use the firewall provided by your distribution even if there are no services running that are visible to the Internet. If you run `sshd-service` on your computer we recommend that you disable root logins for the SSH service. You can do this by editing `/etc/ssh/sshd_conf` as a root. Check that `PermitRootLogin yes` is commented out (`#` in front of the line). Save and restart the service or your computer.

## 2.4 Quota and the units of information

Transferring data over the network costs money. This is always true. It doesn't matter what kind of data is being transferred. It may be sound, text, images or any of them together. The only thing that matters is the amount (and sometimes the distance). To reduce the cost of the network usage, the amount of data that you can transfer in 24 hours is limited. Every tenant pays for the network usage. The fee is included in the rent. So if the cost of the network goes up so does the rent. Before we discuss more about the transfer

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<sup>1</sup><http://www.opera.com/>

<sup>2</sup><http://www.firefox.com/>

<sup>3</sup><http://www.avast.com/>

<sup>4</sup><http://www.firewallguide.com/>

limitation let us concentrate first on what data is and how the amount of data is measured.

On a basic level, the world of a computer is quite black and white. Every statement to the computer is either true or not true. You could say that a computer interprets the world the same way a light bulb interprets a light switch: on and off. Information, data, is stored with the same crude logic in the background. There are “holes” in the computer memory (for example RAM, a diskette, a CD-ROM, a hard disk, etc.). These “holes” or “bits” can be on (full) [1] or off (empty) [0]. So there are two possible states for every bit: on and off. Single bits rarely mean anything to a mere mortal, but when you put a series of them together you will get something that you can make sense out of.

Next we introduce a byte. A byte has eight bits in a row. So when we have a bit with two states (on/off) we can have a byte that has eight bits and therefore  $2^8=256$  different states. This is very convenient. We can present numbers from 0 to 255 by only using ones and zeros! This is called binary. We can have longer and shorter bytes if we want to, and the use of the name byte as the name for only 8 bits is slowly becoming obsolete.

We can use prefixes to indicate thousands, millions, billions etc. when talking about data (Finnish abbreviation in parenthesis):

- 1024 bytes = 1 kilobyte = 1 kB (kt) = for example 1024 characters.
- 1024 kilobytes = 1 megabyte = 1 MB (Mt) = about 1 floppy disk full of data
- 1024 megabytes = 1 gigabyte = 1 GB (Gt) = about 2 CDs full of data.

Why 1024 bytes and not 1000? 1024 is an obvious choice because  $2^{10}=1024$  and digital information is stored in bits and bytes. Now that you know the prefixes you can tell your friend that the DVD you have contains 4.284 GB of data and he instantly knows that he can't fit it all on a single CD.

Now that we've discussed the units of data we can talk about the transfer limitation also known as the quota. The network quota was set to limit the growth of network transfers. The speed of the network is not limited. Only the amount of data that you can transfer in and out of the FUNET network is limited. After your quota is depleted, the speed of your network connection is reduced severely. The quota is large enough that it is difficult to deplete it just by surfing the Internet and reading email. It is possible to deplete it by downloading or uploading large files.

In short: the quota is a certain amount of data that you are allowed to transfer / 24 hour sliding window. This means that if you transfer (upload or download), for example, 2000 MB of data tonight between 18:00 and 19:00 (6 pm - 7 pm) this transfer amount is deducted from your “quota account” and this transfer will be cleared after 19:00 (7 pm) the next evening.

Transfers are being monitored constantly and your quota status will be updated every hour. You can check your own quota status.<sup>5</sup> Note that your connection speed is slightly reduced when you have less than 100 MB transfer quota left and connection speed is severely reduced after you have depleted your quota. There are no other sanctions besides reduced connection speed if you deplete your quota.

Using a proxy will speed up surfing the Internet and increase your anonymity and it will not use up your quota. Proxy and proxy settings are discussed in section (3.6).

## 2.5 P2P-networks and copyrights

Peer-to-Peer or P2P traffic is usually (mostly on media) perceived only as an illegal way of networking, but the means of networking do not create evil or illegal traffic. P2P-network is a network in which every client may also be a server. This kind of network does not necessarily have a centralized server but clients in the network balance the load between themselves. An advantage of P2P-networking is fault tolerance, since the clients/servers are situated all over the Internet. Local disruptions have little or no effect on the network as a whole.

Some P2P networks are for example: TOR, BOINC, Spotify and Skype. TOR is an encrypted network operating in the Internet. In theory it enables you to browse the Internet in complete anonymity. For example, TOR is sometimes used to communicate and transfer information between the Internet and countries that are ruled by an oppressive government. BOINC is a network specialized in scientific computing. By joining this network you can donate your computer’s processing power to solve problems in mathematics, medicine, molecular biology and physics to name a few. Spotify and Skype are specialized networks for transmitting audio and video.

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<sup>5</sup><http://netinfo.jyu.fi/resnet/resnet-netquota.cgi>

Illegal activities in the Internet are illegal despite the network or networking protocol. Distribution and downloading of copyrighted material is forbidden without permission from the copyright owner. This includes copyrighted movies, TV-shows, music, images, software and texts. Finnish law also restricts downloading, distribution and possession of some sexually explicit materials.

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## 3. Network addresses and network settings

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In this section we'll discuss IP- and MAC-addresses in general and give a few illustrating examples. Also you will find instructions on how to find the correct MAC-address and how to check and set the DHCP-settings. We also shortly discuss the proxy server and the impact it has on web browsing and what email settings you should use while using this network.

If you wish you may set up a wireless network for yourself. If you choose to do this, you will be responsible for making sure that the router settings are correct, setting up encryption to the wireless network and making sure that you do not cause interference to the network. Instruction to set up a local area network (wireless or not) can be found in section B.

### 3.1 IP-address

A network card is a communication device such as a telephone. For example, all telephones require an account with a service provider so that the user (you) can place calls. Similarly you will also need an account to access the Internet from this network. After your account is registered, your computer will receive an IP address which corresponds to a phone number in our example. There are two types of IP-address: IPv4 and IPv6. In this guide we will be discussing only IPv4 and call them IP-addresses from now on.

An IP address is a sequence of four numbers separated with dots. These numbers are within 0-255. For example 72.14.207.104. So, there are IP addresses from 0.0.0.0 to 255.255.255.255. There aren't enough of them and there is already a shortage because there are so many devices that are connected to the Internet. This restriction can be circumvented by using public and private IP addresses. An actual fix to this problem is still in the future.

Every computer that is connected to the Internet has an IP address. The IP address is used to contact a computer that the IP address is bound to.

IP addresses can be either public or private. Public addresses correspond in our example to the numbers listed in a phone book and private addresses for example to a certain office's internal phone numbers. In KOAS network there is a public IP address reserved for every single tenant. This address is visible to everyone in the Internet. This is why everyone must take care of the security of their computer. More information on securing your computer properly can be found in the Internet at CERT<sup>1</sup>.

Then why `http://www.google.com/` and not a series of numbers? The simple answer is that this is easier to remember than a series of numbers. There is an IP address behind every WWW-address or URI (Uniform Resource Identifier). You can use them both. For example by typing `http://72.14.207.99/` you will get the same result as by typing `http://www.google.com/`. Which one is easier to remember the next time? It's a similar case with your mobile phone. You rarely dial in your friend's or family members' phone numbers, but select them from the name list. If a web page's IP address changes for some reason (maybe the service provider changes) you do not need to memorize a new address because the URI can be easily changed to point to the new IP address. It is similar situation with your mobile phone. If your friend's number changes you'll only need to change the number once in your phone's number list and you can continue to use the same name that you had there before. So..every computer in the Internet (or any other IP-based network) has an IP address. This is one thing that separates different computers from one another. What if there were two public IP addresses exactly the same?

## 3.2 MAC-address

Every network card has it's own MAC-address. It should be unique and in a perfect world there can not be the same MAC-address anywhere else in the world. A MAC-address is needed to identify the network adapter and the computer the network adapter is installed in. With it the distribution of IP addresses to the proper computers becomes possible and the packages that move in the network can reach their correct destinations. In the area of information technology there usually are many names for a single object. The MAC-address is no different and depending on the language, operating system or source it is called with a different name:

- MAC(-osoite) [Media Access Control]

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<sup>1</sup><http://www.cert.org/homeusers/HomeComputerSecurity/>

- Hardware address
- Physical Address
- HWaddr
- Ethernet address
- Adapter address
- Ethernet ID

All of these mean the same thing, MAC-address. Still, MAC-address is not an Apple Macintosh computer neither is it an IP-address nor the series of numbers and letters on the wall box.

A MAC, just like the IP address, consists of numbers. It is a series of numbers with or without separators (dash, comma, dot, colon or space). In this case there are six pairs of numbers. These numbers are base-16 or hexadecimal (“hex”). A hexadecimal is a number between 0-9 and a-f and it corresponds to decimal numbers (i.e. Base-10) between 0-16. A hexadecimal C corresponds to the decimal number 12.

A MAC-address looks like this: 00-50-B1-58-EE-EF. NOTE! Do NOT give this particular address to the tenant office. Only send a MAC-address that you found out yourself using these instructions. The MAC-address must belong to the computer that is connected (or will be connected) to the KOAS’ network. So: do NOT call to your brother at Mumbai and ask for a MAC-address!

Remember that your MAC-address is unique and personal. If your network card changes, when you for example buy new parts or buy a new computer, make sure that you send your new MAC-address to the network administrator in your site. If you do not do this, you cannot access the Internet. If you move out and give or sell your network card to a friend at the same area, he/she must send the MAC-address to the network administrator. When you move out your account will be deleted.

Almost every piece of hardware that is connecting or connected to a network has a MAC-address. Modern computers, especially laptops, have several network cards and other hardware that have a MAC. KOAS’ sites do not have a wireless network, but a local area network. You will be able to get on-line only after you’ve given your Ethernet-/LAN-adapter’s MAC-address to the tenant office.

### 3.3 Finding the MAC-address

This section describes how you can find your MAC-address. What you need to do depend on your operating system. Find out first what operating system you are using and then follow the instructions for that system. Don't make your life unnecessarily difficult.

*Read the instructions with care, one line at a time, every line from start to finish. It will save your time.*

If you can't find your MAC-address check the alternate way of obtaining your MAC in section (3.4).

#### Windows 7 (all versions)

- Click on the Windows-logo on the lower left hand corner.
- Click on "Search programs and Files" and type "cmd" without the quotation marks("") and press enter. A new window with black background opens.
- Write "ipconfig /all" without quotation marks ("").
- If you see an error message "'ipconf..' is not recognized as an internal or.." you've mistyped the command. Try again.
- If you see the error message "Bad command or file name" you are following the wrong instructions.
- If everything went OK you will see several lines of text. You should see a text similar to the following:

```
Ethernet adapter Local Area Connection: ← This is the title
Connection-specific DNS Suffix . . . :
Description . . . . . : Adapter name
Physical Address. . . . . : 00-00-00-00-00-00 ← MAC-address
```

(Note that there is a scroll bar next to the window. Scroll up to see more text if your network adapter's information is not on the screen.)

- The title should say Ethernet, local Area Connection or LAN.
- If the title reads "Tunnel Adapter", you are looking at the wrong segment.
- If the title reads wireless tai WLAN, you are looking at the wrong segment.
- Physical Address is your MAC-address.

### Windows Vista (all versions)

- Click on the Windows-logo on the lower left hand corner.
- Click on the "Start search" - field.
- Write "ipconfig /all" without quotation marks ("").
- If you see an error message "'ipconf...' is not recognized as an internal or..." you've mistyped the command. Try again.
- If you see the error message "Bad command or file name" you are following the wrong instructions.
- If everything went OK you will see several lines of text. You should see a text similar to the following:

```
Ethernet adapter Local Area Connection: ← This is the title
Connection-specific DNS Suffix . . . :
Description . . . . . : Adapter name
Physical Address. . . . . : 00-00-00-00-00-00 ← MAC-address
```

(Note that there is a scroll bar next to the window. Scroll up to see more text if your network adapter's information is not on the screen.)

- The title should say Ethernet, local Area Connection or LAN.
- If the title reads "Tunnel Adapter", you are looking at the wrong segment.

- If the title reads wireless tai WLAN, you are looking at the wrong segment.
- Physical Address is your MAC-address.

## Windows 2000 and Windows XP

- Click on the "Start" button at the lower left corner.
- Select "Run".
- Write "ipconfig /all" without quotation marks ("").
- If you see an error message "'ipconf...' is not recognized as an internal or..." you've mistyped the command. Try again.
- If you see the error message "Bad command or file name" you are following the wrong instructions.
- If everything went OK you will see several lines of text. You should see a text similar to the following:

```
Ethernet adapter Local Area Connection: ← This is the title
Connection-specific DNS Suffix . . . :
Description . . . . . : Adapter name
Physical Address. . . . . : 00-00-00-00-00-00 ← MAC-address
```

(Note that there is a scroll bar next to the window. Scroll up to see more text if your network adapter's information is not on the screen.)

- The title should say Ethernet, local Area Connection or LAN.
- If the title reads "Tunnel Adapter", you are looking at the wrong segment.
- If the title reads wireless tai WLAN, you are looking at the wrong segment.
- Physical Address is your MAC-address.

## Windows 95/98(SE)/ME

- Click on the "Start" button at the lower left corner.
- Select "Run".
- Write "winipcfg" on the text field WITHOUT the quotation marks ("").
- A window opens with a pull down menu.
- From this menu select your network card (Network Interface Card, LAN card or Ethernet card).
- You can find your MAC-address in the field named "Adapter address"
- A MAC that starts with 44-45-53-... is NOT a correct MAC!
- If the pull down menu contains only PPP-adapter your network card's drivers are not correctly installed or you don't have a network card. Install a network card and/or drivers.

## Apple OS (7.6.1+)

- Click on the Apple menu at the upper left corner on your screen.
- Select "Control Panels".
- Open "TCP/IP" tab.
- Select "Edit"
- Click on "User mode"
- Select "Advanced" and click "OK"
- Click on "info".
- MAC-address is "Hardware address"

## Apple OS X

- Click on the Apple menu at the upper left corner on your screen.
- Select “System Preferences”
- Select “Network”
- Select Ethernet-tab.
- Click on “Advanced...” - button
- “Ethernet ID” is your MAC-address.

## Linux

- Start the console or terminal session .
- If you are using [K/X]Ubuntu command “sudo ifconfig -a”.
- For other distributions type ”ifconfig -a” or you may need to command “/sbin/ifconfig -a” Depending on your settings you may need to log on as root or use sudo to do this.

The first network card is labelled ”eth0”. The MAC-address is after HWaddr. If you have several network cards select the “ethN” that you wish to connect to the Internet.

## 3.4 Alternate way of finding MAC-address

This appendix lists alternate method of finding MAC-address for Windows XP/Vista/7. These instructions are for Windows systems only. Find out which operating system you have on your computer and follow the correct instructions.

### Windows 7 (all versions)

- Click on the “Start” - button (the one with the Windows logo).
- Click on the “Control Panel” - button.
- Click on the “Network and Internet” link.

- Click on the “Network and Sharing Centre.”
- Click on the “Change adapter settings” - link at the upper left part of the window.
- Right click on the “Local Area Connection” - icon and select properties.
- Local Area Connection Properties – window opens.
- Move the mouse pointer on the text field labeled “Connect using” (see picture).
- Your MAC-address appears next to the mouse pointer.(figure 3.1) .

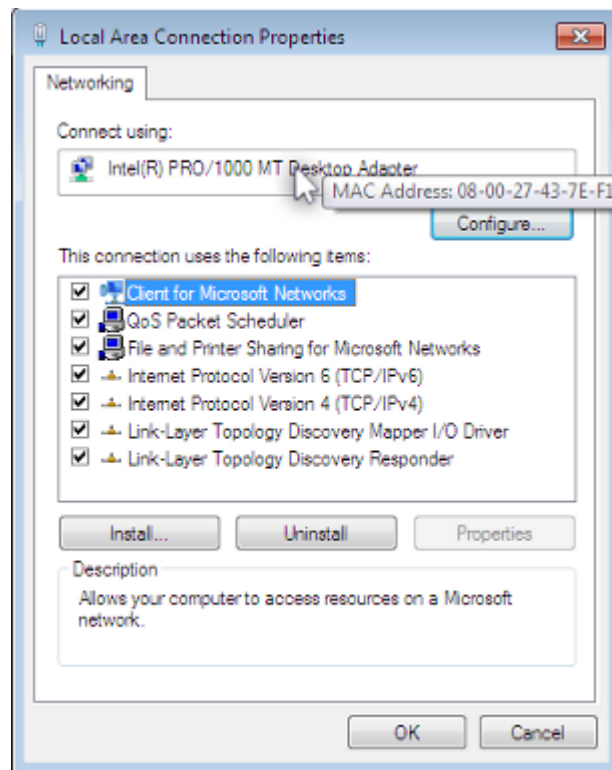


Figure 3.1: Windows 7, alternate way of finding MAC-address

## Windows Vista (all versions)

- Click on the “Start” - button (the one with the Windows logo).
- Click on the “Control Panel” - button.
- Start the “Network and Sharing Centre” OR “Network and Internet”.
- On the left margin of the window click “Manage Network Connections.”
- *Right* click on the “Local Area Connection” - icon.
- Select “Properties”.
- Move the mouse pointer on the text field labeled “Connect using” (see picture).
- Your MAC-address appears next to the mouse pointer (figure 3.2) .

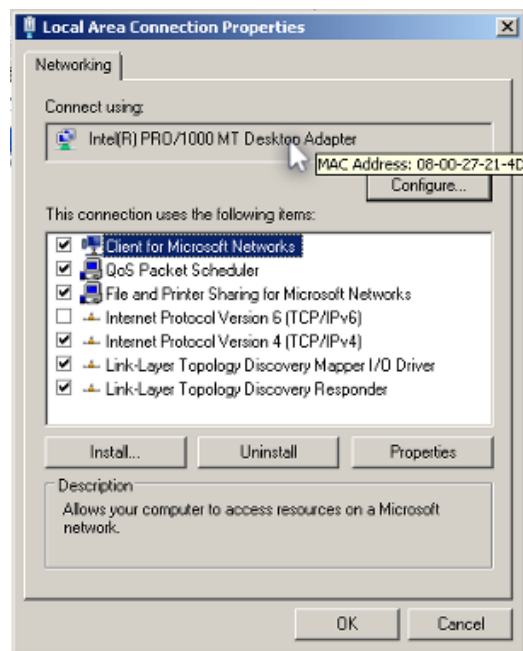


Figure 3.2: Windows Vista, alternate way of finding MAC-address

## Windows XP

- Click on the "Start"-button.
- Select "Control Panel".
- If possible select the "Network and Internet Connections", if not skip to next step
- Select "Network Connections"
- Right click on the "Local Area Connection" - icon and select "properties".
- Move the mouse pointer on the text field labeled "Connect using" (see picture).
- Your MAC-address appears next to the mouse pointer (figure 3.3) .

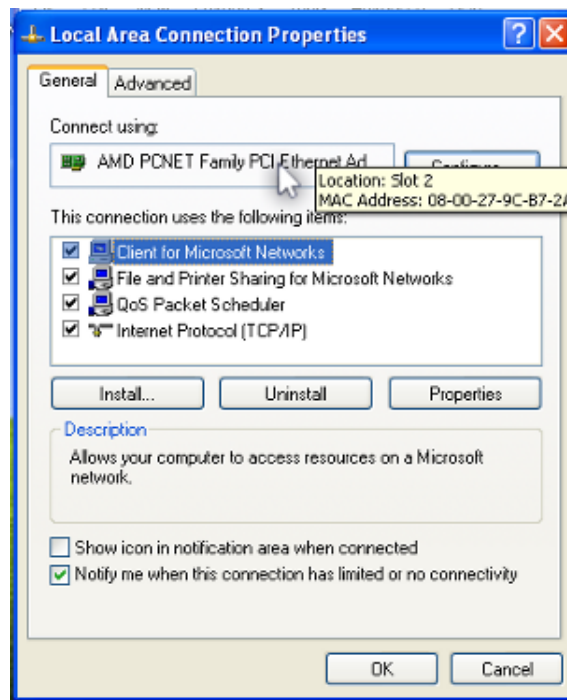


Figure 3.3: Windows XP, alternate way of finding MAC-address

## 3.5 Network settings

If your network settings are correct, your Internet connection will work after the registration is complete. You'll just need to plug in your cable. Next we will discuss why you'll need to register and how you can check whether your settings are correct.

Computers will receive an IP address and all the other network settings automatically. This is called using DHCP [Dynamic Host Configuration Protocol]. The registration process is closely related to the application of this protocol. When you've registered (i.e. Sent your information to the tenant office and got a confirmation email), your computer will receive the network settings from the DHCP server. If there are any changes to the network, your computer will receive the new settings automatically. It is your responsibility to make sure that your network settings are correct. The problems caused by duplicate IP addresses will be avoided when everyone has their computer's set up correctly.

It is forbidden to set up your IP address manually, even if you know how to do it and know which IP address you would get from the DHCP server.

Below you will find instructions on how to check your TCP/IP settings. Follow the instructions under your operating system's name.

### 3.5.1 Windows 7 (all versions)

- Click on the “Start” - button (the one with the Windows logo).
- Click on the “Control Panel” - button.
- Click on the “Network and Internet” link.
- Click on the “Network and Sharing Centre.”
- Click on the “Change adapter settings” - link at the upper left part of the window.
- Right click on the “Local Area Connection” - icon and select properties.
- Double click on the “Internet Protocol v4” and check that “Obtain IP address automatically” is checked.

- Close all open windows.

### **3.5.2 Windows Vista (all versions)**

- Click on the “Start” - button (the one with the Windows logo).
- Click on the “Control Panel” - button.
- Click on the “Network and Internet” link.
- Click on the “Network and Sharing Centre.”
- Click on the “Change adapter settings” - link at the upper left part of the window.
- Right click on the “Local Area Connection” - icon and select properties.
- Double click on the “Internet Protocol v4” and check that “Obtain IP address automatically” is checked.
- Close all open windows.

### **3.5.3 Windows 2000/XP**

- Click on the ”Start”-button.
- Select ”Control Panel”.
- If possible select the ”Network and Internet Connections”, if not skip to the next step
- Select ”Network Connections”
- Right click on the ”Local Area Connection” - icon and select ”properties”.
- Select ”Internet Protocol (TCP/IP)” and click on the ”properties” - button.
- Check (and change if necessary) that “Obtain IP address automatically” and “Obtain DNS server address automatically” are checked.
- Click on “OK” until all windows are closed.

### 3.5.4 Windows 95/98(SE)/ME

- Click on the "Start"-button
- Choose "Settings".
- Click on "Control Panel".
- Choose "Network".
- A window opens that contains the Network card's name and an icon that has TCP/IP written next to it.
- Select TCP/IP and click on the "Properties".
- From the IP address tab make sure that "Obtain IP address automatically" is checked.
- Click on "OK" and restart your computer if needed.

### 3.5.5 Apple OS X

- Click on the Apple at the upper left corner.
- Select "System Preferences".
- From the window that opens select "Network".
- Choose the "TCP/IP" - tab.
- From "Configure IPv4" - pull down menu select "Using DHCP".
- Click on "Apply Now" - button.

### 3.5.6 Linux

The network settings in Linux environment depend mostly on distribution. From the network settings enable DHCP. Note that running a DHCP-server is strictly forbidden. If you are unsure, open the console and run the command `ps aux |grep dhcpcd`. If this command shows any processes running, kill them and check your settings before connecting to the network. DHCP-server is not usually installed by default.

Usually linux is configured to use DHCP by default. If not, there is a graphical settings applet called “Network settings or internet settings or Network Manager applet” or you can edit `/etc/network/interfaces` if you are not fond of GUIs.

## 3.6 Proxy

A proxy is a server between the Internet and your computer. It saves web-pages and files that users have downloaded and shares them with other users. If a page that is requested from the Internet is found on the proxy and it is not too old it will be sent to the user. If not then the request will be forwarded to the Internet. The most popular web-pages are usually available from the proxy and if there is a lot of traffic in the Internet or on that specific page that page will be available for you faster than when not using a proxy.

A proxy also hides your IP address. Anyone who is interested in your IP address and what pages you are browsing only sees the IP of the proxy. You can keep your identity to yourself. Be also aware of the fact that a proxy server does not replace a firewall, an anti-virus software nor an updated system.

The easiest way to set up your browser to use a proxy is to check the “Automatic proxy configuration”-check box. All modern browsers support this feature. You can find more information at your browsers help.

If your browser or other software does not support the automatic proxy configuration you can use these settings:

```
host:port -- proxy.jyu.fi:8080
```

If browsing is slow it may be because there is a lot of traffic at the proxy server. To check if the sluggish browsing is caused by the proxy, disable proxy from the browsers settings. Peak hours of traffic are usually from late afternoon till 2-3 am.

## 3.7 Email settings

You may use the University of Jyväskylä outgoing email server for sending email while using this network. Set your email client to use outgoing server `smtp.jyu.fi`.

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## 4. Problems and solutions

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Typically for a tenant network outages have a single symptom: you can't access the Internet. Still there may be various reasons for network outages. If the outage is caused by a scheduled maintenance, the University of Jyväskylä Information Management Centre<sup>1</sup> will have maintenance notices on their web-page. The problem might also be further down, outside the university network. In this case local services may work but those beyond the cut-off point do not. CSC — IT Center for Science Ltd, an organization that manages Finnish University and Research Network (FUNET), provides tools for monitoring the state of the network<sup>2</sup>.

If you have just sent your registration information to the tenant office, please, be patient. It will usually take up to two working days to register your account. If you gave out a wrong MAC-address your network connection will not function even if it is registered.

### 4.1 Windows-woes

If you receive an error message: “Duplicate name” do not worry. This error message means that Windows has given your computer a name and it detected the same name near you in the network. If you want, you can change the name. Instructions can be found in Windows' Help-file.

If you are using Windows Vista and you receive an error message “There is an IP address conflict with another system” this may be a symptom of incompatible way Vista handles IPv4 and IPv6 addresses or truly an IP-address conflict. For Windows Vista you may try the instruction below and see if that helps. If not or you are using any other operating system, you should contact the KOAS helpdesk by phone or email [helpdesk@koas.fi](mailto:helpdesk@koas.fi).

- Click on the “Start” - button (the one with the Windows logo).
- Click on the “Control Panel” - button.
- Start the “Network and Sharing Centre” OR “Network and Internet”.

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<sup>1</sup><http://www.jyu.fi/thk/en>

<sup>2</sup><http://www.csc.fi/english/institutions/funet/status>

- Click on the “View Status” - link at the “Local Area Connection” - group box.
- A new window opens.
- Click on the “Properties” - button.
- Remove ✓left of ”Internet protocol v6” .
- Click OK.

## 4.2 Network outlet / Wallbox

In family apartments there is usually only one active network outlet. If after registering your internet account you can't access the internet from this particular outlet, try the others in your flat. If none of them are active or the one active is at an inconvenient place, you may request a transfer or activation of an outlet. Use the Janitor in the Net - service<sup>3</sup> and remember to give out the code on the currently active outlet and the code on the one that you need connected.

## 4.3 Routers

Network problems caused only by a router you've installed are rare but not unheard-of. Usually these are caused by an error in configuration or cabling. So, if you changed cabling or settings on your router and the network stopped working it is usually a good idea to check your changes again.

Connecting ADSL- or cablemodem to the network or connecting a router to the wall box from a wrong (this means all LAN-ports) port may cause widespread disruptions. This will result in you being banned from the network. Make sure you don't cause more problems while solving others.

Routers are switched on for long periods of time. Their software may have errors and after a while these errors may cause trouble. If you experience network problems, you might want to try resetting your router by unplugging the power cord for a minute and plugging it back in.

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<sup>3</sup>[http://koas.fi/en/asukkaille/talonmies\\_verkossa.php](http://koas.fi/en/asukkaille/talonmies_verkossa.php)

## 4.4 Helpdesk

KOAS offers a helpdesk that helps, guides and instructs in matters of networking and network devices. If you are facing a problem that you cannot solve with the help of this document, contact helpdesk. Please, contact helpdesk also if you are unsure of settings, cabling or if you are building a LAN and are unsure what to do.

Before contacting us please consider the following to speed up the troubleshooting process:

- Please, call from your apartment. Sometimes we receive calls from people who are at a store, at work or even at another city. In these cases finding out what causes the network problem (or even if there is a problem anymore) may be difficult or even impossible.
- Turn your computer on. If your computer is on when you call, we can begin solving the problem with your help immediately.
- Please, call us when you have time to answer our questions. If you run out of time, we will do our best, but we may not be able to help you without enough information.

Helpdesk is available on weekdays 16:00-18:00 (4 pm - 6 pm) tel. 06000-3645. Cost 0.75 €/ min + local fees. During these hours we answer your emails: [helpdesk@koas.fi](mailto:helpdesk@koas.fi).

## 4.5 Network problem solving tree

Using this problem solving tree you can yourself diagnose and correct many of the most common problems. Follow the arrows and answer yes or no.

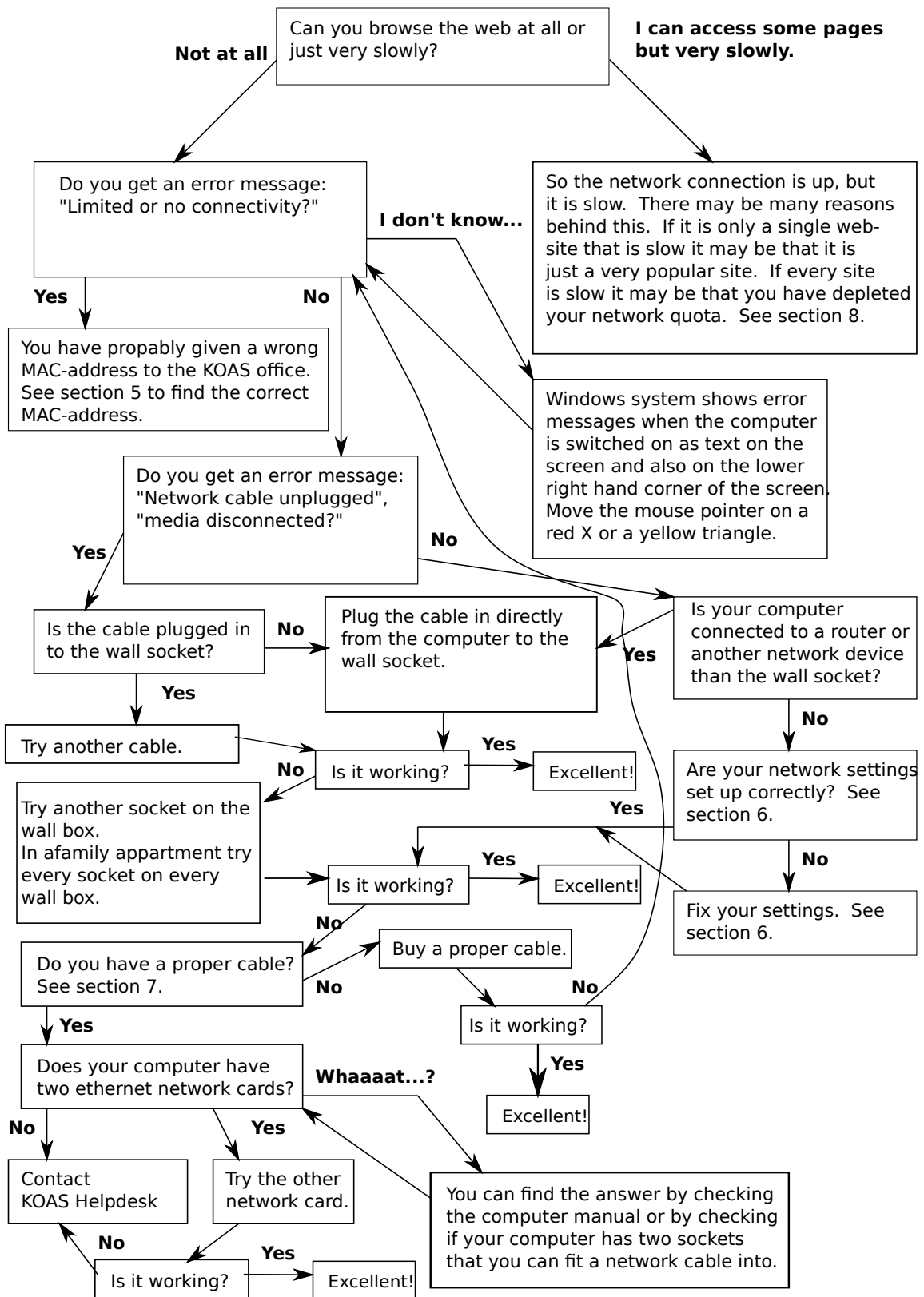


Figure 4.1: Problem solving tree

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## A. Phonetic alphabet

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When contacting the tenant office or the help desk by phone, it is often required to receive or give information that is not familiar to yourself or the recipient. It is common to use spelling in such cases to avoid misspelled names and MAC-addresses. Phonetic alphabet has been developed to relay information over poor radio or telephone connections. These are NATO phonetic alphabet and they are in use all over the world.

Example: My name is Karl Gauss and a person at the tenant office I'm calling wants me to spell my name for her. There are a lot of static on my phone (may be it's a windy day or a bad connection) so I say the following: "Kilo, Alpha, Romeo, Lima, <pause>, Golf, Alpha, Uniform, Sierra, Sierra."

Table A.1: Phonetic alphabet and rough pronunciation guide

A	Alfa	AL FAH	P	Papa	PAH PAH
B	Bravo	BRAH VOH	Q	Quebec	KEH BECK
C	Charlie	SHAR LEE	R	Romeo	ROW ME OH
D	Delta	DELL TAH	S	Sierra	SEE AIR RAH
E	Echo	ECK OH	T	Tango	TANG GO
F	Foxtrot	FOKS TROT	U	Uniform	YOU NEE FORM
G	Golf	GOLF	V	Victor	VIK TAH
H	Hotel	HO TELL	W	Whiskey	WISS KEY
I	India	IN DEE AH	X	X-Ray	ECKS RAY
J	Juliatt	JEW LEE ETT	Y	Yankee	YANG KEY
K	Kilo	KEY LOH	Z	Zulu	ZOO LOO
L	Lima	LEE MAH	Å	Oscar Oscar	OSS CAH-OSS CAH
M	Mike	MIKE	Ä	Alfa echo	ALFA-ECK OH
N	November	NO VEM BER	Ö	Oscar echo	OSS CAH-ECK OH
O	Oscar	OSS CAH			

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## B. Home network

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You may want to connect more than one device to the network at some point and because there is only one IP address and a single outlet reserved for every tenant it is not possible to just plug them in and get Internet connectivity to all of them. To circumvent these restrictions you may set up a Local Area Network (LAN) with a router that can do Network Address Translation (NAT).

Please note that you must not use an ADSL-modem/router or a cable-modem/-router. *Only* an ethernet router will do. If you are unsure about what kind of device you have, contact KOAS helpdesk.

### B.1 Description

The network usually built at home with a router is fairly simple. It contains the router and those devices you want to have access to the Internet or LAN. Router will have dedicated ports that connect to the Internet or LAN. In another words you will connect your router to the network outlet of the wall box only from the router's WAN/Internet - port. Wired devices are connected to the LAN-ports and wireless devices connect through WLAN.

The "idea" (see fig. B.1) of the home network is this: the router receives public a IP-address and other information from university's DHCP-server through WAN / Internet-port. Devices connected to LAN-ports of the router will receive private IP-addresses and other network information from the DHCP-server running on the router.

When a device connected to the LAN accesses the Internet it sends packets through the router. Router catches these packages and performs Network Address Translation (NAT) on them. When viewed from the Internet, all packages seem to originate from the public IP-address of the router instead of the private address of the device on LAN. This public IP-address is the same address that is reserved to you after your account has been registered.

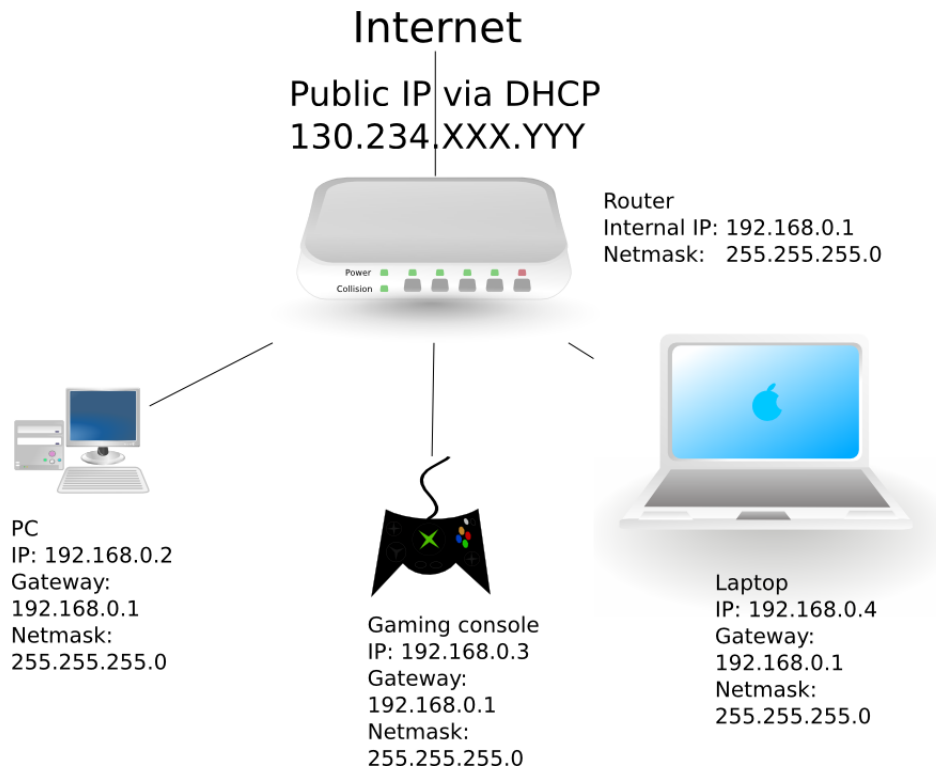


Figure B.1: Local Area Connection example structure

## B.2 Setting up your LAN

This section describes the steps required to setup your home network. Do not connect the router to the wall box before you've checked the settings and made sure that you do not cause disruption to the network. Do NOT connect the router to the wall box from a LAN-port. Only WAN/Internet-port may be used to connect to the Internet.

### Registration

In order to have an IP-address assigned to you, you need to register the MAC-address of the device you will be using to access the Internet. In this case you are required to provide the WAN/Internet-port's MAC-address of the router. If you already have sent us your computer's MAC-address, you can contact the helpdesk and ask us to change the registered MAC.

*NOTE: Cloning or changing the MAC-address on your router or any other device on the network is strictly forbidden.*

A MAC-address may be printed on the bottom of the router. *Do NOT send us this MAC.* Always check the MAC-address from the router's control panel. See router manual for details.

### B.2.1 Router settings with DHCP-server

This section describes *what* you will set up on your router not *how* you set up. To learn *how* consult your router's manual.

- Set your router to fetch public (WAN/Internet - side) IP-address via DHCP.
- Set your router to distribute private (LAN-side) IP-addresses automatically (enable DHCP server).
- You must set WLAN encryption (WPA(2)) and password if you have a WLAN router.
- Change router administrator/root password.
- Connect router to the wall box *ONLY* from WAN/Internet - port. If this is not possible, do NOT connect the router to the wall box.

### Client settings

Devices connected to LAN are called clients.

- Set computer clients to fetch IP-address automatically. See section (3.5).
- Set other clients to fetch IP-address automatically. See device manual on how to do this.

### B.2.2 Router settings without DHCP-server

If your router does not have a DHCP-server or you do not wish to use it set up your router to use these LAN-settings:

- Set your router to fetch public (WAN/Internet - side) IP-address via DHCP.

- IP-address: 192.168.0.1
- Netmask: 255.255.255.0
- Other settings, see router manual.

## Client Settings

- IP-address: 192.168.0.N, where N is between (2..254). Every client must be set up with a different IP-address.
- Netmask: 255.255.255.0
- Gateway: 192.168.0.1
- DNS: 130.234.4.30 and 130.234.5.30

*NOTE:* Setup the router according to these instructions. DO NOT connect ADSL- or Cable-modems to the network. Connect the router to the wall box ONLY from the WAN/Internet - port. *Read the router manual.*

If you are unsure of anything you are about to do, contact help desk. You yourself are responsible for obtaining the equipment, maintaining it and making sure you do not disrupt the network.

## B.3 General matters

Because NAT was developed to share an IPv4 address for several clients, it breaks the 'end-to-end' – connection philosophy. This may cause services that rely on 'end-to-end' connectivity to function erratically or fail altogether. Such services may include instant messaging services (MS Messenger, ICQ, yahoo, Skype, etc.), file sharing services, games and others. Usually these services work adequately, but when several clients from the internal network use these services difficulties may arise. These difficulties are usually low performance, disconnections or inability to connect to a server or another client.

The advantages of this setup is that it hides the physical topology of the internal network. All network traffic from the clients of the internal network seem to originate from the router. Although this does not prevent worms or

viruses from spreading it adds a measure of security for the clients. Internal file shares and clients cannot be seen from the Internet side unless it is allowed on the router. Many routers have built-in firewall and it is a good practice to enable it. You will still be needing anti virus software on the clients. Viruses spread 20 years ago on diskettes, before the emergence of WWW or public Internet access.

Quota is IP address-specific and since all your traffic is originating from a single IP address to the Jyväskylä University network, all client devices' traffic will drain the same quota. More on quota, proxy and settings can be found earlier in this manual.