The Media Streaming Journal

Covering Audio and Video Internet Broadcasting

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Welcome to The Media Streaming Journal

Welcome to the latest edition of The Media Streaming Journal.

Versatility is an essential feature of software that many developers fail to incorporate. VLC is a gem for both the end user and multimedia content producer. It can indeed be considered the Swiss Army Knife of multimedia. It offers various functions with the ability to utilize a wide range of codecs and transport protocols. The software has also been continuously updated to provide state of the art features and applications. We look at the options and abilities that make VLC a valuable piece of kit in your station's toolbox.

Please feel free to contact either the Publication Director (Derek Bullard) or myself if you have any questions or comments regarding The Media Streaming Journal.

Namaste

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David Childers

The Grand Master of Digital Disaster

<u>Current Member</u>: International Association Of Internet Broadcasters

<u>Current Member</u>: Society of Motion Picture and Television Engineers

Published Author

Introduction To Internet Broadcasting
Amazon Publishing

30 Creative Commons Computer, Technical and Internet Broadcasting Guides

Newspaper Interviews

New York Times

Internet TV: Don't Touch That Mouse!
Tim Gnatek
July 1, 2004

Lagniappe - "Something Extra for Mobile"

Mobile Gets Hoaxed
Rob Holbert
Mar 16, 2016

Cited By

Five Essays on Copyright In the Digital Era
Ville Oksanen
2009

Turre Publishing
Helsinki Finland

Open Source Developer

Developed software architecture to continuously source multimedia content to Youtube Live servers.
Scenic Television – The sights and sounds of nature on the Internet.
http://www.ScenicTelevision.com

Projects

Researched and developed documentation for Peercast P2P multimedia streaming project.
http://en.wikipedia.org/wiki/PeerCast

Researched and developed technical documentation for NSV / Winamp Television.
http://web.archive.org/web/20080601000000*/http://www.scvi.net

MidSummer Eve Webfest

A virtual International festival focusing on Digital art and Free Software that was coordinated by OrganicaDTM Design Studio.

Presentation and discussion regarding Internet multimedia content distribution.
http://web.archive.org/web/20061104230522/http://www.organicadtm.com/index.php?module=articles&func=display&catid=37&aid=61

LinkedIn Contact Information

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The Media Streaming Journal

What is in this edition of the Media Streaming Journal

VLC

Join our technical discussion on Facebook

http://www.facebook.com/groups/internetradiosupport/

Magazine cover:

https://upload.wikimedia.org/wikipedia/commons/9/97/Family_watching_television_1958.jpg

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Radiosolution is a SHOUTcast hosting provider located in Quebec Canada. We also offer Icecast, Wowza and Web Hosting services. Contact us to discuss the best option available as you start internet radio station. Radiosolution can provide personalized service in English, Dutch, and French. Starting an internet radio station can be intimidating, many people want to start one, but have no idea where to start. Radiosolution will be there for you every step of the way. Everyday people are searching the internet for free SHOUTcast servers. With Radiosolution SHOUTcast hosting we will allow you to try our services for FREE. By trying our services, you can be confident that you have chosen the best radio server hosting provider. You have nothing to loose because we offer a 30 day satisfaction guarantee. What are you waiting for? Contact us now! Radiosolution offers everything you need to start internet radio station. You will not need to go anywhere else. We can create your website, market your station and help you submit your station to online directories. We also feature the voice of Derek Bullard aka Dibblebee He can create affordable commercials, DJ intros, sweepers, jingles, ids and so much more.
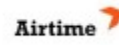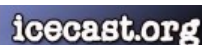
The Order of the Iron Test Pattern is an association of people who have had the opportunity to work in or around the television and broadcast / cable industry. People who have an interest in television broadcasting are also welcome.
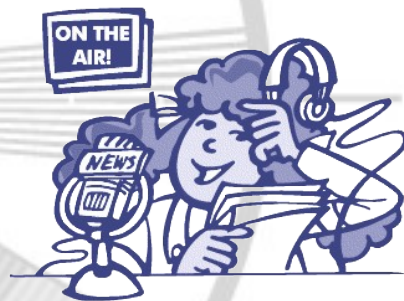
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http://www.ielectrify.com/work-with-me/

I am a professional writer with 15+ years of experience creating high-converting copy, for a variety of radio, broadcasting and marketing applications.

https://www.wpclipart.com/people/professions/professions_3/
radio_announcer.png.html

VLC

VLC is a free, open source, cross-platform media player and streaming media server available for desktop and mobile platforms. VLC supports numerous audio and video compression methods in addition to several file formats. VLC can stream media over computer networks and transcode multimedia files.

VLC
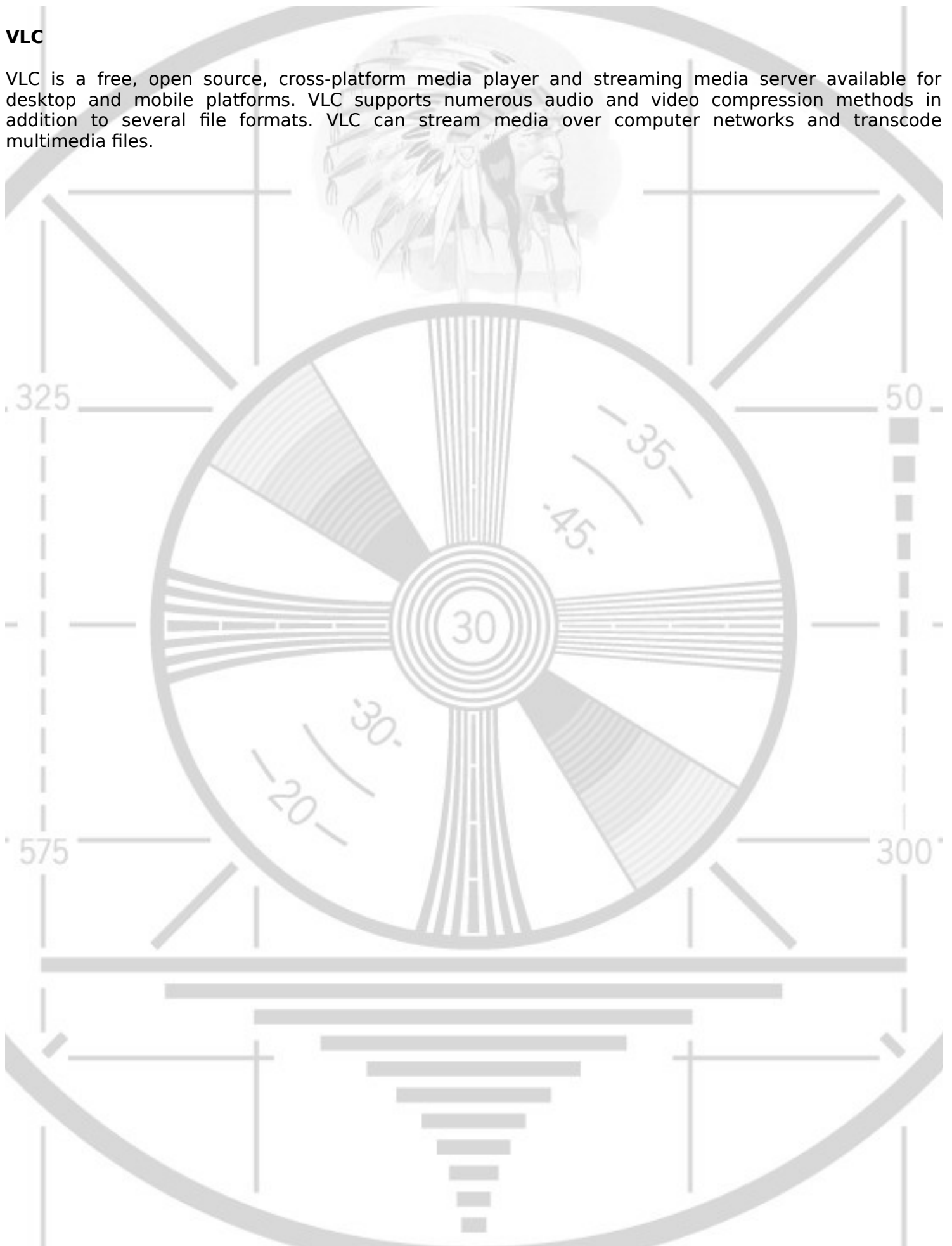
INTRODUCTION

1. VLC - VIDEOLAN CLIENT

1. VLC - VIDEOLAN CLIENT

VLC is a great media player. But saying that **VLC** is just a media player is like saying a Swiss Army knife is just a knife. **VLC** can do much more than play back media, it can also convert audio and video files to different formats (**transcoding**), send live audio or video over the net (**streaming**), rip DVDs and CDs, and much more.

VLC is also great because it's cross platform.

INSTALLING

2. INSTALLING VLC ON MS WINDOWS

Software name: VLC
Homepage: http://www.videolan.org/vlc/
Software version used for this installation: 0.85
Operating System use for this installation: Windows 2000
**Recommended Hardware:** 300MHz processor

Installing VLC on Microsoft Windows is a reasonably straight forward process. First you need to download the installer, at the time of writing the latest VLC version is 0.8.6e. You can download it here. When this is downloaded browse to where you have the installer, in this example the file was downloaded to the desktop:


Now **double-click** on this icon and a language selection box will appear:

Choose the appropriate language from the dropdown box and press **OK**. The following should appear (in this case, in English):
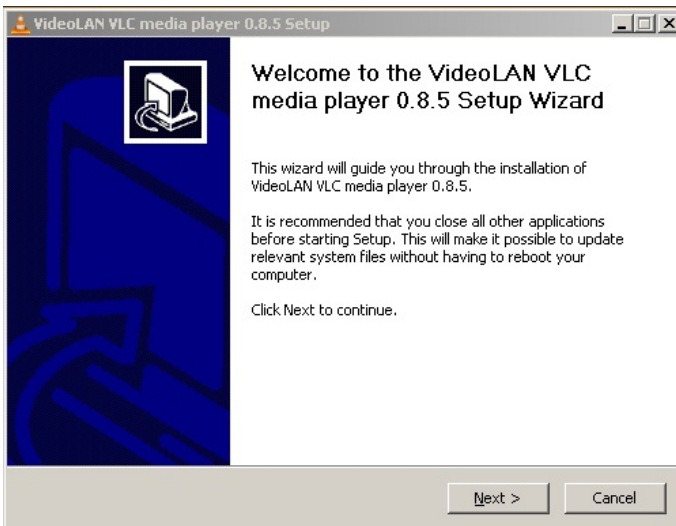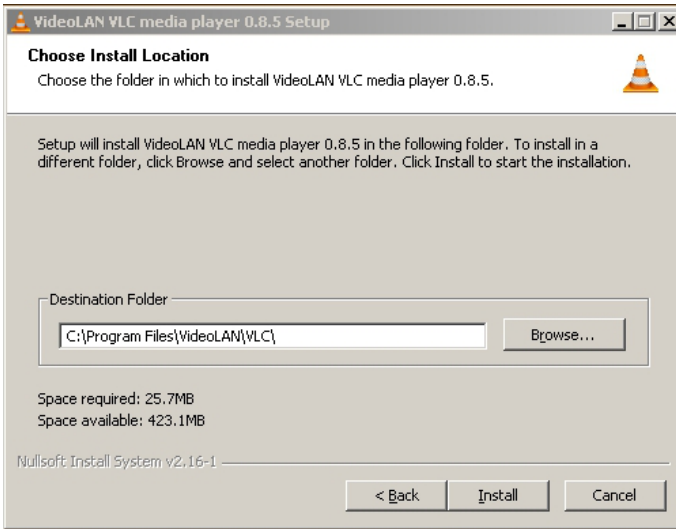

Press **Next >** and the licence box now appears. **VLC** is licenced under the **GPL** which means you can do with it what you want for free, but there are no warranties. For more information on this licence see: http://www.gnu.org/copyleft/gpl.html
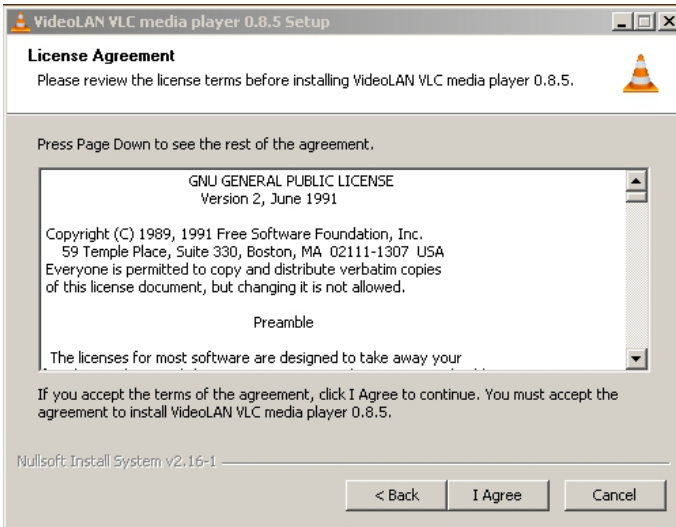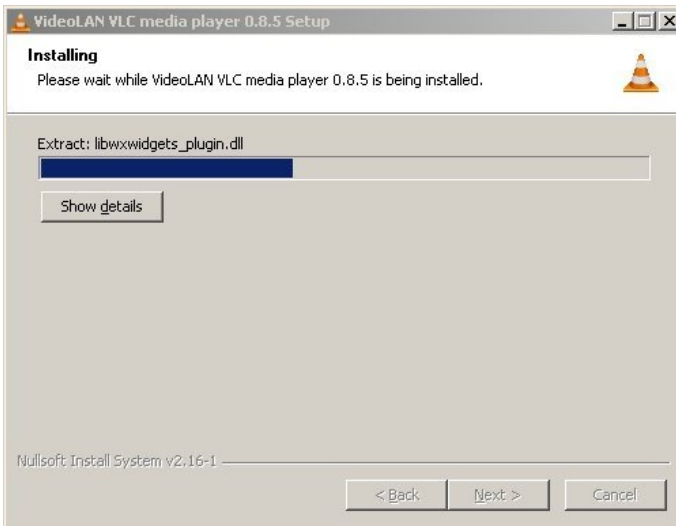
If you do agree with this licence (I hope you do!) then press **I Agree** and you will see the **Choosing Components** Window.
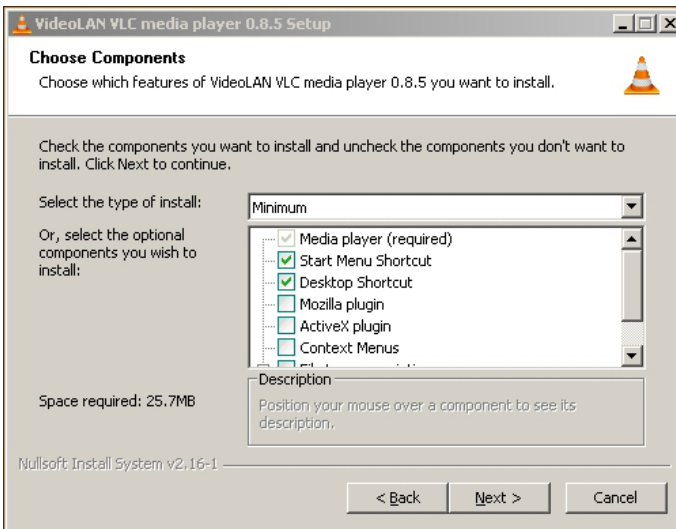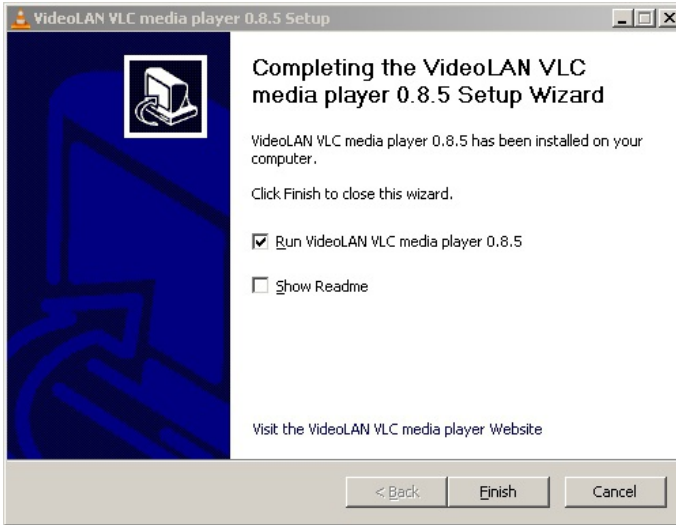

You can just continue without changing the selections on this window. The options won't do anything drastic to your computer and it might be interesting to try some. For basic usage however, just leave the options as is and press **Next >**. You will now be presented with options on where you should install **VLC** on your computer:

VideoLAN VLC media player 0.8.5 Setup

Choose Install Location
Choose the folder in which to install VideoLAN VLC media player 0.8.5.

Setup will install VideoLAN VLC media player 0.8.5 in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.

Destination Folder

C:\Program Files\VideoLAN\VLC\   Browse...

Space required: 25.7MB
Space available: 423.1MB

Nullsoft Install System v2.16-1

< Back   Install   Cancel

You can click on the **Browse** button and look through your files and directories for a suitable place to install **VLC** but for most cases you want to keep this at the default settings and press **Install**. With luck the install process starts:

VideoLAN VLC media player 0.8.5 Setup

Installing
Please wait while VideoLAN VLC media player 0.8.5 is being installed.

Extract: libwxwidgets_plugin.dll

Show details

Nullsoft Install System v2.16-1

< Back   Next >   Cancel

When the install has finished you will see the following screen:

Press **Finish** and hopefully you see the player:
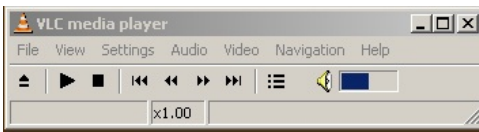
3. INSTALLING VLC ON OS X

Software name: VLC media player
Homepage: http://www.videolan.org/vlc
Software version used for this installation: 0.8.5
Operating System use for this installation: OS X (10.3)
**Recommended Hardware:** G3 minimum

DOWNLOADING VLC

The latest stable version of **VLC** for **OS X** can be downloaded from
http://www.videolan.org/vlc/download-macosx.html. The latest version
at the time of writing this document is **VLC 0.8.6e**.

The download page for **VLC** for **OS X** lists many locations around the
world where the software can be downloaded. The idea is that the
downloads can be faster and more efficient if you choose a location
near to you. There is a separate list for PowerPC? and the newer **Intel**
based Macs so you will need to choose a download from the correct
list for the type of computer that you are installing on. (If you are not
sure which type of processor your Mac has, you can go to the Apple
menu at the top of the screen and select "About this Mac")

Click on the download link of the location nearest you to begin
downloading.

Depending on your web browser and its settings you may see the
following window at the start of the download:
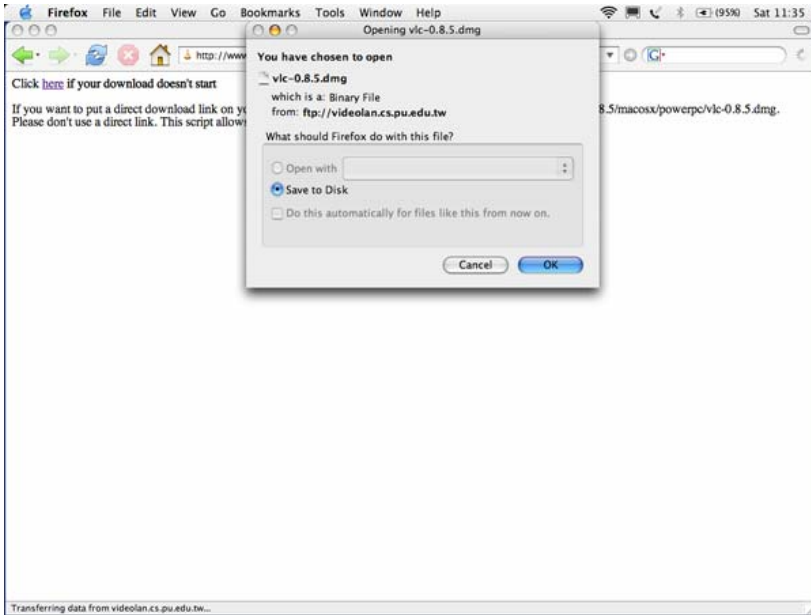
Simply select "Save to Disk" and then click "OK" to proceed with the download.

Once the download is complete you should see something like this in your downloads folder or in the folder that your web browser is set to download into:

Double click on it to begin installing the software.

You should now see a "finder window" with a disk image? named "vlc-0.8.5" (the name of the disk image may be different if you are installing a different version than shown here) open:
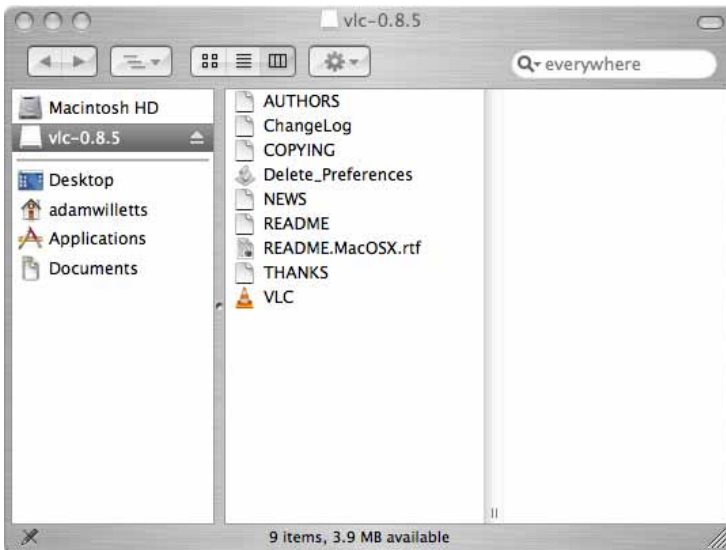
All you need to do now to complete the installation is copy the disk image into your "Applications" folder. To do this click on the disk image to select it then press the *Command* *(⌘)* and *C* keys together to copy it. Now select your "Applications" folder and press the *Command* *(⌘)* and *V* keys together. This will create a VLC folder containing all of the contents of the disk image in your "Applications" folder.

The installation is now complete so you can eject the disk (by clicking the eject icon or dragging it to the trash) and start using VLC.

To open VLC double click on the following icon in the VLC folder:

You should be able to see the VLC - controller interface which looks like this:
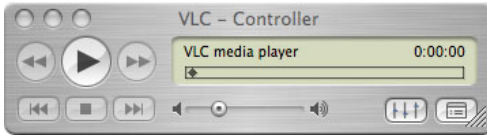
That's it! You now have VLC up and running.

4. INSTALLING VLC ON UBUNTU

Software name : VLC
Homepage : http://www.videolan.org/vlc/
Software version used for this installation : 0.86
Operating System use for this installation : Ubuntu 7.04
Recommended Hardware : 300MHz processor

If you are used to an Operating System like **Windows** or **MacOSX** you may have installed software by downloading it from a website and double clicking on the downloaded file, and clicking through all the licence agreements, configuration options etc. This is the 'old' way of installing software. The 'new' way is much smarter - you choose what you want to install from a list and press 'go'. The rest - finding the files, downloading the files, installing software, is taken care of by Ubuntu itself while you go and get a cup of tea or work on something else. It can't get much easier.

However, new ways take a little getting used to, and so we will first look at the basic tool needed to install software this way, and then how to use it to install VLC.

SYNAPTIC PACKAGE MANAGER

The Synaptic Package Manager (SPM) is used for more than just installing software. It can also upgrade your entire operating system, and manage all software installed on your computer. However most people use SPM for just installing new software. Before you embark on this process there are a few concepts that you may wish to get familiar with. Its not crucial you understand them throughly, so just read the explanations and then let it soak in over time. The ideas behind SPM will become clearer with use.

What is a repository?

SPM can automate the installation of software on your computer because it has a direct connection to one or more online software repositories. These repositories are vast archives of softwares that have been pre-configured for installation on your operating system . When your computer is online SPM can connect to these archives, check what software is available for installation, and present you with a list of installable software. All you have to do is select the software from the list that you want. SPM then downloads the software from the repository and takes care of the installation process.

So SPM is actually a repository manager, it manages which repositories (there are many) you wish to access, and which softwares to download and install from those repositories.

SPM allows you to choose which repositories it accesses through its settings. The default repositories used by Ubuntu can be extended through the SPM settings so you can access a wider range of softwares. Ubuntu calls each repository by a simple name. They are : **Main**, **Universe**, **Multiverse**, **Restricted**. By default Ubuntu only uses the **Main** online repository. If you wish to access you the other repositories you must do this by changing repository settings of SPM.

What is a package?

When SPM downloads a software for installation it is in the form known as a 'package'. This means that it is a compressed archive of the software, pre-configured so that it will install nicely on your computer. If the package has been configured nicely, and Ubuntu spends a lot of time making sure this is the case, then many of the headaches that installing software can bring are taken away - its the panadol of software installation. One of the biggest issues with installing software on any form of Linux (Ubuntu is one of many types of Linux), are **dependencies**. Dependencies are all the other softwares required by a particular software. If, for example, I want to install a audio editor, that audio editor software may use some functionality of other softwares to do its job.

SPM takes the (often) dark art of dependencies away from you, and manages this itself. So if you wish to install a software and it has dependencies (and the list can be long), you don't have to work this out yourself, SPM knows already what is needed, finds it, and installs it along with the software you have chosen.

So, SPM, as well as managing which repositories you access, is also a package management software. Hence the name - Synaptic *Package Manager*.

apt

You don't really need to know about apt, so if you are on the verge of being confused then don't read this short section. If you are a geek wannabe then read on.

Ubuntu is a form of Linux that has derived from another form of Linux - Debian. This family of Linux has in common (amongst other things) the package/repository management system. Both Ubuntu and Debian use the **apt** system for managing packages. APT is actually an acronym short for **Advanced Package Tool**.

SPM is actually a 'front end' (graphical interface) for controlling apt. So SPM is the nice user interface that you see, but the real work is done by apt. There are other ways of managing apt also, such as the command line interface known as **apt-get**. In the world of Linux there are many varieties of Linux users and they have their own ways of doing things. In general its safe to say most Debian users use apt-get, and most Ubuntu users are happier using SPM.

CONFIGURING SYNAPTIC PACKAGE MANAGER FOR INSTALLING VLC

To install VLC on Ubuntu you will need to change the default repository settings of SPM as VLC is not contained in the default repository. To do this you will need to open the Synaptic Package Manager and you can do this via the **System** menu. If you haven't changed the default Desktop of Ubuntu then the System menu can be accessed at the top left of your screen:
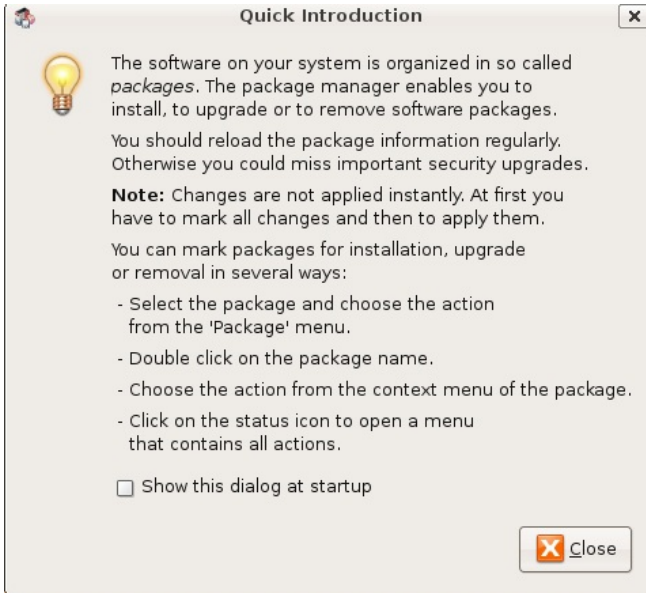
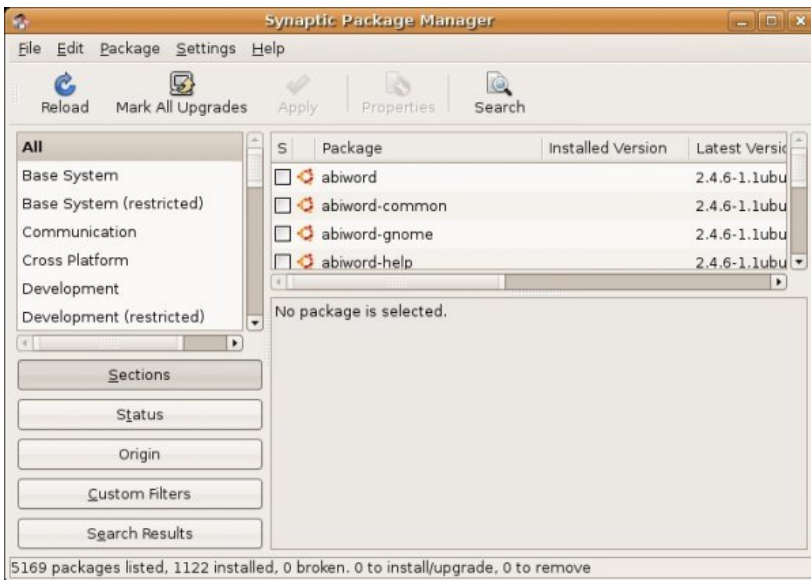If all is good you will be prompted for a **password**.
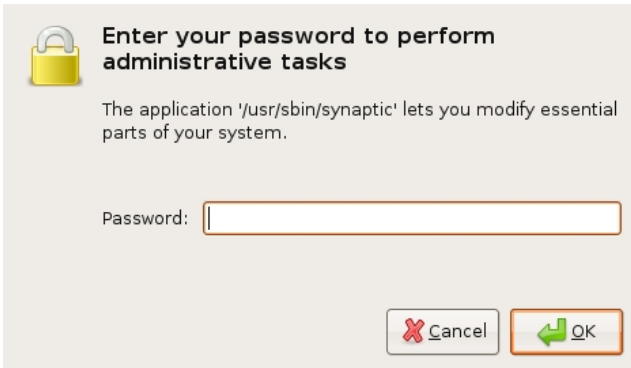
Here you must enter your password (the same one you use to log into the system). If you don't know the password then you have a problem and its probably caused by the fact that the computer you are using is not yours. In this case you have to find the computers owner and ask them for the password (which is usually not polite unless you know them well) or ask them to input the password while you look casually in the other direction.

Assuming the password entered is correct - you will now see the SPM open infront of you. It may be that you first see the following 'Quick Introduction' (this appears if you ahven't used SPM before).

Quick Introduction

The software on your system is organized in so called *packages*. The package manager enables you to install, to upgrade or to remove software packages.

You should reload the package information regularly. Otherwise you could miss important security upgrades.

Note: Changes are not applied instantly. At first you have to mark all changes and then to apply them.

You can mark packages for installation, upgrade or removal in several ways:

- Select the package and choose the action from the 'Package' menu.

- Double click on the package name.

- Choose the action from the context menu of the package.

- Click on the status icon to open a menu that contains all actions.

☐ Show this dialog at startup

✖ Close

Just click **Close** and move on. Lets look at the Synaptic Package Manager interface...

Synaptic Package Manager

File   Edit   Package   Settings   Help

Reload   Mark All Upgrades   Apply   Properties   Search

All
Base System
Base System (restricted)
Communication
Cross Platform
Development
Development (restricted)

Sections
Status
Origin
Custom Filters
Search Results

S	Package	Installed Version	Latest Versi
☐	abiword		2.4.6-1.1ubu
☐	abiword-common		2.4.6-1.1ubu
☐	abiword-gnome		2.4.6-1.1ubu
☐	abiword-help		2.4.6-1.1ubu

No package is selected.

5169 packages listed, 1122 installed, 0 broken, 0 to install/upgrade, 0 to remove

Lets not worry about the details of the interface for now. All we want to do is change the repository settings. To do this click on the **S**ettings and choose **R**epositories
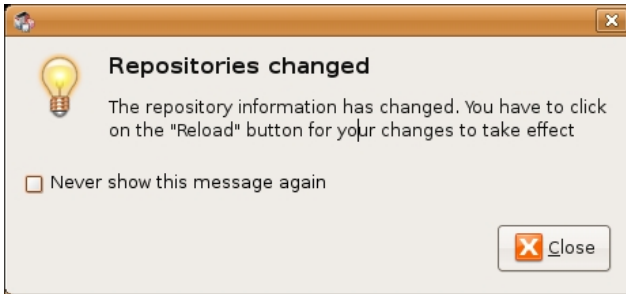
Settings   **H**elp
✖ **P**references
Repositories
✖ **F**ilters

Set Internal Option...

Toolbar   ▸
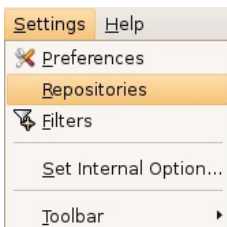
Now we get to where we can do some business. Make sure that **Community-maintained Open Source software (universe)** is checked :

☑ Community-maintained Open Source software (universe)

Now close that window by pressing the big close button at the bottom right.
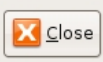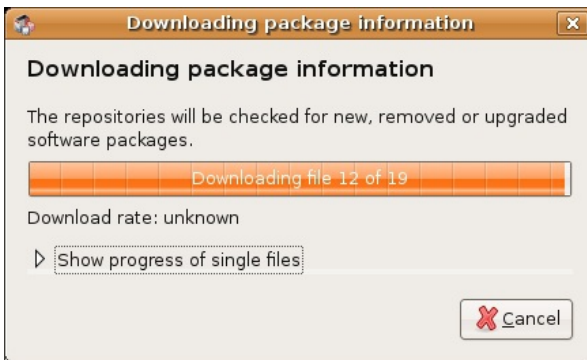
X Close

Next, you will see a warning telling you the repository has changed :

Repositories changed

The repository information has changed. You have to click on the "Reload" button for your changes to take effect

☐ Never show this message again

X Close

Click the **Close** button and move on to SPM so you can refresh the repositories as the warning suggests. To do this, do as the warning says - click on **Reload** :

Reload

You should then get some feedback saying the repositories are being updated and showing the progress.

Downloading package information

Downloading package information

The repositories will be checked for new, removed or upgraded software packages.

Downloading file 12 of 19

Download rate: unknown

▷ Show progress of single files

X Cancel

INSTALLING VLC WITH SYNAPTIC PACKAGE MANAGER

Now the real business. Its pretty easy. Click on the nice big **Search** button:
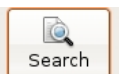
Search

The search window will open and now enter 'vlc' in the field:

Great. Now press **Search** at the bottom right of the above window. The search should not take very long and when it is complete you will get a long list of software that can be installed, scroll down the list until you see **vlc** :

If you highlight **vlc** (by clicking once on the name) you will see some information about vlc displayed :

Now you can read the information if you wish but there is nothing critical i there. Best thing to do is just to double-click on **vlc**. By doing this you are 'marking' (choosing) the software for installation. If you do so then an additional window appears:
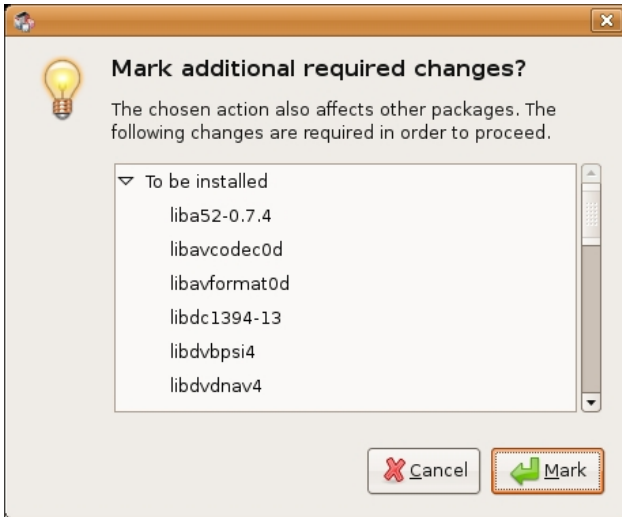
Now click **Mark**:
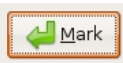
You have now told Synaptic Package Manager that you want to install VLC and all the additionall softwares that it needs to function. If all is well then the package will be highlighted:

You will see that there are two packages highlighted here. Infact if you browse up and down the list you will see other packages highlighted to. These are the softwares that will be installed so that vlc has all the functionality it requires.

Now press the **Apply** button with the nice big tick next to it :

Next SPM informs you of how much space will be taken by the installation :
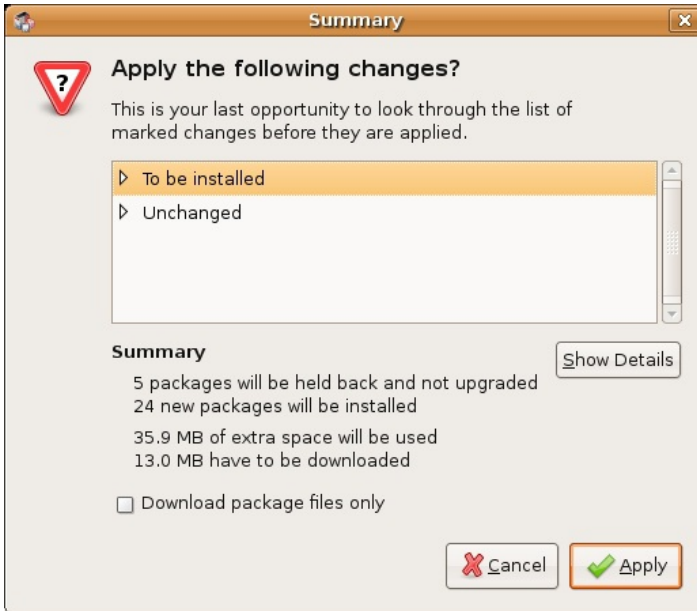
Now you can just click **Apply** at the bottom right of the screen and the installation will start. A progress bar will be shown:

When it is completed (downloading and installing) you will have this screen :

That means all is well. Pat yourself on the back and press **Close**. Synaptic Package Manager will then return to its original state. Close it :
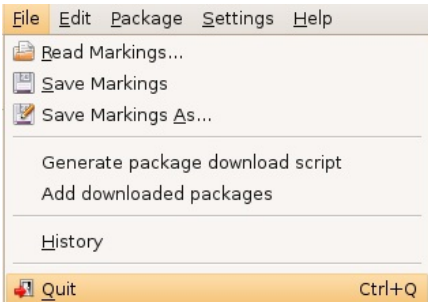
Now you can open vlc...just browse to the **Applications** menu, choose
Sound & Video, select **VLC media player** and release the mouse :
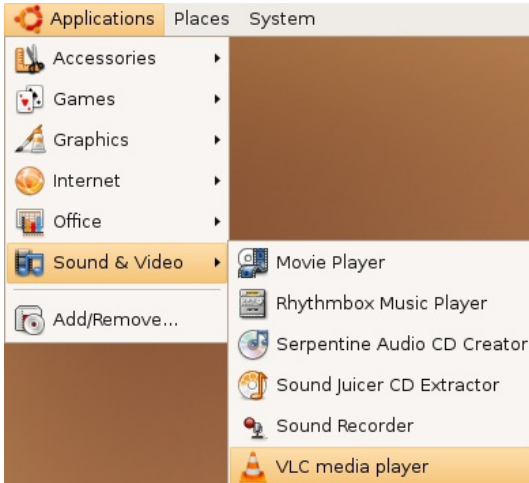
If all is well you will see vlc :

Congrats!

5. INSTALLING FROM SOURCE (LINUX)

Software name : VLC
Homepage : http://www.videolan.org/vlc/
Software version used for this installation : 0.84
Operating System use for this installation : Debian (this process will work on any version of Linux)
Recommended Hardware : 300MHz processor

DOWNLOADING

First, get the sources. To do this you should visit the VideoLan website (http://www.videolan.org) and download the sources from the website. At the time of writing the URL for downloading VLC source is this:

http://www.videolan.org/vlc/download-sources.html

Make sure you download the sources to somewhere you can access using a terminal ('shell'). If you do not know how to use a terminal then please also read up on this otherwise the following is going to be very difficult to follow. If you know how to use the terminal then copy the sources to the directory you are currently in *or* change your current working directory to the directory where the sources are.

The sources, once downloaded, will need to be 'unpacked'. This means that they **source code** has been **compressed** and needs to be **uncompressed**. Most **Linux** applications have their source code compressed in the **tar** and **gzip** formats. You can recognise this type of compression if the file you downloaded ends with the suffix:

.tar.gz

In this case the source code I have downloaded is named **vlc-0.8.4a.tar.gz**

Before I start the installation I need to check the sources are in the same working directory as my terminal. To do this I type **ls** and I shoudl see something like this in my termial:

The above is just an example. The information will vary in your window, but it is critical that you see the sources you downloaded in the list of files.

Now we will decompress the files. To do this we need to use the **tar** application. If your version of Linux doesn't have this then you will need to first download and install it. The best way to find out if it is installed is just to type tar and press return. You should see somehting like this:

```
focus:/data/downloads/vlc# tar
tar: You must specify one of the `-Acdtrux' options
Try `tar --help' or `tar --usage' for more information.
focus:/data/downloads/vlc#
```

The above message is actually an error message, but if you see it ignore the message as we only executed the command to check if **tar** was installed. If **tar** is installed then type the following:

```
tar -zxvf vlc-0.8.4a.tar.gz
```

Make sure you replace **vlc-0.8.4a.tar.gz** with the name of your sources file. If all is well you will see a lot of information shoot through the terminal which is simply a list of all the **uncompressed** files. These files are the source code and you will now need to transform the source code into the **VLC** program. This process is called **compiling**. However before you compile **VLC** from the **source code** you need to configure **VLC**. This might seem strange, software should be configured after it has been installed right? Well, yes, but also in **Linux** you can enable or disable many options to be included into the program when you compile it. This process actually changes the software so that it includes or excludes different functional components. This process is *also* called **configuring**.

CONFIGURE

The way you install software on **Linux** is dependanton the type of **Linux** you may have. There are many types of **Linux** and each has its own way of installing software using what is known as a **Package Manager**. A **Package Manager** is a system dedicated to downloading and installing software on your computer, usually in an semi-automatic way.

This can be really good if you don't care about the way a software is configured. However in **Linux** you can change the configuration of a software dramatically in the install process. It is possible, for example, to enable and disable many options in **VLC** when you prepare the software for installation. Generally speaking, automatic install processes don't always give you so much control over the install options. Notably the **Gentoo** version of **Linux** gives you a lot of control. However with **Debian**, **Ubuntu** and **Redhat** you will have a default install with default options turned on and off. Most of the time this will probably be ok. However if you need a 'special' function enabled in a software it is often only available if you enable it during installation, otherwise the functionality you require just simply won't exist.

VLC has a lot of options you can include or exclude when you go through the pre-compiling **configure** process. The **configure** process is triggered by the **configure** command. However this command can also give you feedback so you know what the options are *before* you actually configure the application. To check the **configure** options of (almost) any source type the following from within the uncompressed source directory:

./configure --help

This will give you an enormous amount of information in the terminal. Probably the information will flow by faster than you can read it and you will be left with the tail of the data. To control this better, try the following command :

./configure --help | less

This command is actually two commands combined. The **less** command allows you to control the information flowing past on the screen by the use of the **page up** and **page down** buttons on your keyboard. The character in between the two commands is called the **pipe** and it allows commands to be combined. It might be that you do not have **less** installed which means that the above is quite useless to you. In this case you can try the following:

./configure --help | more

The **more** command displays a page of text and then waits for you to press the **space bar** before showing you the next page. If you don't have any luck with the above two suggestions it might be that you don't have either installed, in which case it is a good idea to install them.

The options displayed, should look (it total) something like this:

```
Optional Features:
  --disable-FEATURE       do not include FEATURE (same as --enable-
FEATURE=no)
  --enable-FEATURE[=ARG]  include FEATURE [ARG=yes]
  --enable-maintainer-mode  enable make rules and dependencies not
useful
                          (and sometimes confusing) to the casual
installer
  --disable-dependency-tracking  speeds up one-time build
  --enable-dependency-tracking   do not reject slow dependency
extractors
  --disable-rpath         do not hardcode runtime library paths
  --disable-nls           do not use Native Language Support
  --enable-pth            GNU Pth support (default disabled)
  --enable-st             State Threads (default disabled)
  --enable-hal            Linux HAL services discovery (default
enabled)
  --enable-gprof          gprof profiling (default disabled)
  --enable-cprof          cprof profiling (default disabled)
  --enable-mostly-builtin most modules will be built-in (default
disabled)
  --enable-optimize-memory     optimize memory usage over performance
  --disable-optimizations disable compiler optimizations (default
enabled)
  --disable-altivec       disable AltiVec optimizations (default
```

```
enabled on PPC)
  --enable-debug         debug mode (default disabled)
  --enable-release       activate extra optimizations (default
disabled)
  --enable-sout          Stream output modules (default enabled)
  --enable-shout         libshout output plugin (default disabled)
  --enable-httpd         HTTP daemon (default enabled)
  --enable-vlm           VideoLAN manager (default enabled)
  --enable-gnutls        gnutls TLS/SSL support (default enabled)
  --enable-livedotcom    live.com RTSP input plugin (default
disabled)
  --enable-dvdread       dvdread input module (default disabled)
  --enable-dvdnav        dvdnav input module (default enabled)
  --enable-dshow         Win32 DirectShow support (default enabled on
Win32)
  --enable-smb           smb input module (default enabled)
  --enable-dvbpsi        dvbpsi ts mux and demux module (default
enabled)
  --enable-v4l           Video4Linux input support (default disabled)
  --enable-pvr           PVR cards access module (default disabled)
  --enable-gnomevfs      GnomeVFS access module (default enabled)
  --enable-libcdio       CD input and control library support
(default enabled)
  --enable-cddax         audio CD plugin with CD Text and CD paranoia
via libcd
  --enable-libcddb       CDDB support for libcdio audio CD (default
enabled)
  --enable-vcdx          VCD with navigation via libvcdinfo (default
disabled)
  --enable-cdda          audio CD via built-in VCD (default enabled)
  --enable-vcd           built-in VCD (default enabled)
  --enable-dvb           DVB-S/T/C card support (default disabled)
  --enable-screen        Screen capture support (default enabled)
  --enable-ogg           Ogg demux support (default enabled)
  --enable-mkv           Matroska demux support (default enabled)
  --enable-mod           Mod demux support (default enabled)
  --enable-mpc           Mpc demux support (default enabled)
  --enable-mad           libmad module (default enabled)
  --enable-ffmpeg        ffmpeg codec (default enabled)
  --enable-ffmpegaltivec ffmpegaltivec codec (DO NOT USE)
  --enable-faad          faad codec (default disabled)
  --enable-twolame       twolame codec (default disabled)
  --enable-quicktime     QuickTime module (default enabled on MacOS
X)
  --enable-real          Real audio module (default disabled)
  --enable-realrtsp      Real RTSP module (default disabled)
  --enable-a52           A/52 support with liba52 (default enabled)
--enable-dts             DTS Coherent Acoustics support with libdts
(default enabled)
  --enable-flac          flac decoder support (default disabled)
  --enable-libmpeg2      libmpeg2 decoder support (default enabled)
  --enable-vorbis        Vorbis decoder support (default enabled)
  --enable-tremor        Tremor decoder support (default disabled)
  --enable-speex         Speex decoder support (default enabled)
  --enable-tarkin        experimental tarkin codec (default disabled)
  --enable-theora        experimental theora codec (default disabled)
  --enable-dirac         experimental dirac codec (default disabled)
  --enable-png           PNG support (default enabled)
  --enable-x264          H264 encoding support with libx264 (default
enabled)
  --enable-cmml          CMML support (default enabled)
  --enable-x11           X11 support (default enabled)
  --enable-xvideo        XVideo support (default enabled)
  --enable-glx           X11 OpenGL (GLX) support (default enabled)
  --enable-opengl        OpenGL support (default enabled)
  --enable-sdl           SDL support (default enabled)
  --enable-freetype      freetype support (default enabled)
  --enable-fribidi       fribidi support (default enabled)
  --enable-libxml2       libxml2 support (default enabled)
  --enable-svg           SVG support (default disabled)
  --enable-qte           QT Embedded support (default disabled)
  --enable-hd1000v       HD1000 Video Output module (default enabled
on HD1000)
  --enable-directx       Win32 DirectX support (default enabled on
Win32)
  --enable-fb            Linux framebuffer support (default enabled
on Linux)
  --enable-mga           Linux kernel Matrox support (default
disabled)
  --enable-svgalib       SVGAlib support (default disabled)
  --enable-ggi           GGI support (default disabled)
  --enable-glide         Glide (3dfx) support (default disabled)
  --enable-aa            aalib output (default disabled)
  --enable-caca          libcaca output (default disabled)
  --enable-wingdi        Win32 GDI module (default enabled on Win32)
  --enable-oss           Linux OSS /dev/dsp support (enabled on
Linux)
  --enable-esd           Esound library support (default disabled)
  --enable-portaudio     Portaudio library support (default disabled)
  --enable-arts          aRts sound server (default disabled)
  --enable-alsa          ALSA sound support for Linux (default
enabled)
```

24

```
  --enable-waveout        Win32 waveOut module (default enabled on
Win32)
  --enable-macosx-audio   Mac OS X audio module (default enabled on
MacOS X)
  --enable-hd1000a        HD1000 audio module (default enabled on
HD1000)
  --enable-cyberlink      CyberLink for C++ UPnP stack (default
disabled)
  --enable-skins2         Skins2 interface module (experimental)
  --enable-pda            PDA interface needs Gtk2 support (default
disabled)
  --enable-wxwidgets      wxWidgets support (default enabled)
  --enable-opie           Qt embedded interface support (default
disabled)
  --enable-macosx         MacOS X support (default enabled on MacOS
X)
  --enable-qnx            QNX RTOS support (default enabled on QNX
RTOS)
  --enable-ncurses        ncurses interface support (default disabled)
  --enable-xosd           xosd interface support (default disabled)
  --enable-visual         visualisation plugin (default enabled)
  --enable-galaktos       OpenGL visualisation plugin (default
disabled)
  --enable-goom           goom visualisation plugin (default disabled)
  --enable-slp            SLP service discovery support (default
disabled)
  --enable-daap           DAAP shares services discovery support
(default enabled)
  --enable-bonjour        Bonjour services discovery (default enabled)
  --enable-lirc           lirc support (default disabled)
  --enable-joystick       joystick control (default enabled)
  --enable-corba          corba interface support (default disabled)
  --enable-loader         build DLL loader for ELF i386 platforms
(default disabled)
  --enable-activex        build a vlc-based ActiveX control (default
enabled on Win32)
  --enable-mozilla        build a vlc-based Mozilla plugin (default
disabled)
  --enable-testsuite      build test modules (default disabled)
  --disable-plugins       make all plugins built-in (default plugins
enabled)
  --enable-shared-libvlc  shared libvlc (default disabled
EXPERIMENTAL)
```

These options are very many and very confusing. You will see that many are enabled by default. The main ones to know about are:

```
--enable-theora       experimental theora codec (default disabled)
--enable-ncurses      ncurses interface support (default disabled)
--enable-mozilla      build a vlc-based Mozilla plugin (default disabled
--enable-v4l          Video4Linux input support (default disabled)
--enable-shout        libshout output plugin (default disabled)
```

The process of installing from source can be a little experimental. You may find that certain libraries are required that you don't have installed on your computer. For example, the following command will disable **ffmpeg**, **libmpeg2**, and **skins2**.

```
 ./configure --disable-ffmpeg --disable-libmpeg2 --disable-skins2
```

The above command should then return alot of information in the terminal and finish with some lines looking like this:

```
config.status: creating modules/visualization/Makefile
config.status: creating modules/visualization/visual/Makefile
config.status: creating modules/visualization/galaktos/Makefile
config.status: creating config.h
config.status: config.h is unchanged
config.status: executing depfiles commands
config.status: executing default-1 commands
config.status: creating po/POTFILES
config.status: creating po/Makefile
config.status: creating vlc-config

vlc configuration
--------------------
vlc version         : 0.8.4a
system              : linux
architecture        : i686 mmx
build flavour       : optim devel
vlc aliases         :

You can tune the compiler flags in vlc-config.
To build vlc and its plugins, type `make'.

eset@focus:~/vlc-0.8.4a$
```

MAKE

If all is ok then you will need to run the **make** command and **make
install**. You can do this on one command line in conjunction with the
sudo command. **sudo** gives you the permissions to install software. If
you don't have the rights to do this (you get an error or message
when using **sudo**) then you will need to contact your system
adminsitrator. If you the system administrator and don't know how to
do this then you may need to read up on how to set up **sudo** or **su**
commands. The following command will compile and install your newly
configured **VLC**:

```
sudo make;makeinstall;
```

If, however when you get some errors when installing **VLC** it is
probably due to missing libraries. For example, if the **./configure**
command gives an error like this:

```
configure: error: Missing header file ffmpeg/avcodec.h
```

This means that a **header** file is missing. Usually this means you need
to install the **header files**, each version of **Linux** deals with these
seperately and you will need to search online to find the right solution.
The best method I have found is to copy the error message into a
web search and see what postings exist online which discuss the same
error.

GETTING STARTED

6. INTERFACE BASICS

6. INTERFACE BASICS

Software name : VLC
Software version : 0.8.6

The nice thing about **VLC** is that it looks the same and functions the same across **Linux** and **Microsoft Windows** and looks similar in **MacOSX**.

Linux Interface
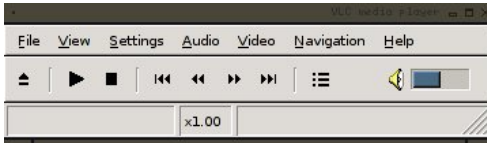
Windows Interface
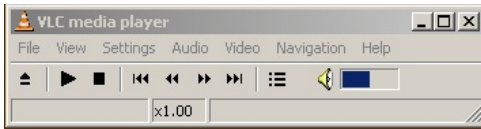
OSX Interface
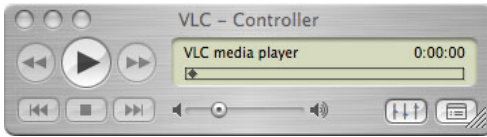
In the case of OSX the menu items are located not on the software itself but in the general OSX 'finder'.

INTERFACE ELEMENTS

The main elements are :

- File
- View
- Settings
- Audio
- Video
- Navigation
- Help

Lets look at them briefly, one at a time.

File Menu

You use the **File** menu for opening files and media.

option	action
Quick Open File	Open a file quickly from your computer
Open File	This gives a much more complicated menu than the above. This option essentially gives you the opportunity to open any kind of media from a disc, across the net, or from you computer.
Open Directory	This will open a directory and play each file one after the other.
Open Disc	Open a disc. This can be a DVD, audio CD, VCD etc
Open network Stream	Open a file on the internet (usually a live stream).
Open Capture Device	If you have a webcam or other camera/sound device, connected to your computer then you can see/hear it via this option in VLC.
Wizard	This is used for creating streams, or converting media formats (transcoding). This is really for the more advanced user.
Exit	quit VLC

View Menu

The View menu allows you to see various VLC information windows.

option	action
Playlist	If you have loaded many items to play in VLC then you can see and manage the playlist here.
Messages	Messages on the operations of VLC are displayed here including useful error messages.
Stream and Media Info	Information about the media playing now.
VLM Control	*VideoLAN Manager* - allows you to send several streams at once through vlc. This is really an advanced function and shouldn't be attempted by those with weak hearts.

Settings Menu

All the settings and preferences are set here.

option	action
Switch Interface	VLC has more than one graphic user interface type and you can choose your favourite from this list.
Add Interface	Apart from the graphical interface, VLC can be controlled through many other methods including through its very own webpage, and through the command line. To use these features you'll need to be a bit of an 'advanced' user.
Extended GUI	Beyond the default interface you see when you open VLC there is an extended interface available with more options. These options allow you to control the color (brightness, hue, contrast etc) of the video played, as well as the quality and volume of the audio.
Bookmarks	Bookmark your media like you would bookmark a webpage with a webbrowser.
Preferences	All the preferences for every function.

Audio Menu

This allows you to control the audio played back when listening to a media file. Nothing will appear in this menu unless something is being played back.

Video Menu

This allows you to control the video played back when watching to a media file - the most interesting feature is the fullscreen video mode. Nothing will appear in this menu unless something is being played back.

Navigation

Usually empty.

Help

Basic information about VLC.

PLAYING CONTENT

7. PLAYING AUDIO AND VIDEO
8. USING VLC TO PLAY STREAMS
9. PLAYING A VIDEO_TS FILE
10. PLAYING MULTILINGUAL VIDEO

7. PLAYING AUDIO AND VIDEO

Software name : VLC
Software version : 1.0.3

VLC supports a wide range of audio and video file formats including: MP3, WAV, AAC, MPEG, WMV, H.264, and Real Video, making it one of the most versatile media players available. VLC can also play CDs, DVDs, and even network streams with ease.

This chapter focuses on two common tasks: playing audio and video files, and playing discs.

Let's take a look at the user interface in Windows 7:
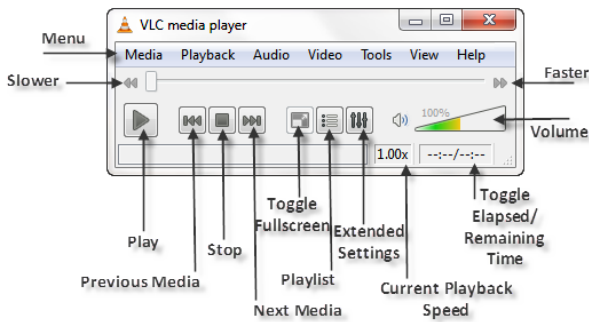
VLC includes most standard playback options and more. For instance, VLC has the ability to slow or speed up playing using the **Slower** and **Faster** buttons. You can add a directory or individual files into the **Playlist** with various playing options using the **Playlist** menu. You can even adjust audio and video settings, such as using the graphic equalizer to filter music, or changing the brightness and contrast levels of video in the **Adjustments and Effects** menu.

Playing audio and video files

The easiest way to open audio and video files is the method of drag-and-drop directly into VLC.

In this example, we're opening a sample video of "Flowers." Both the video file and the icon to launch VLC are on the desktop. This particular video is a .MOV file type, which is supported by VLC.

To drag-and-drop a file into VLC:

1. Hover the mouse pointer over the file.

2. Click and hold the left mouse button.

3. Still holding the left mouse button, move the pointer to the VLC icon and release the left mouse button.

32

The file begins playback.

Another method of opening an audio or video file is through the menu.

To open an audio or video file using the menu:

1. On the menu, click **Media** > **Open File....**
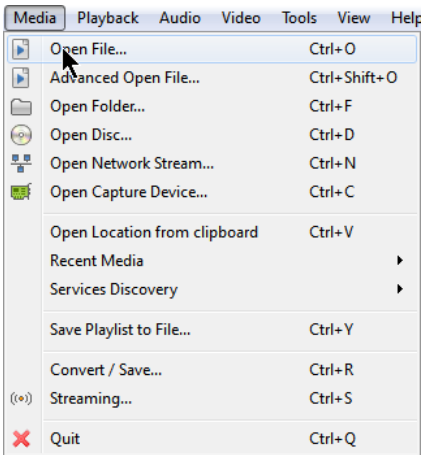
2. Browse to the directory of your desired file.
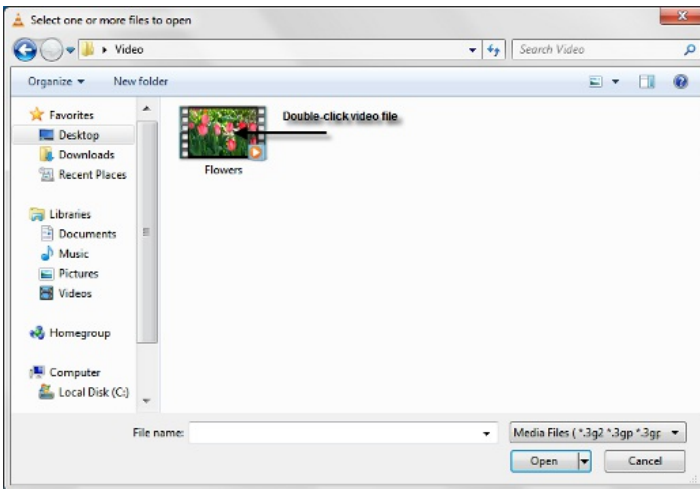
3. Double-click the file.

The file begins playback.
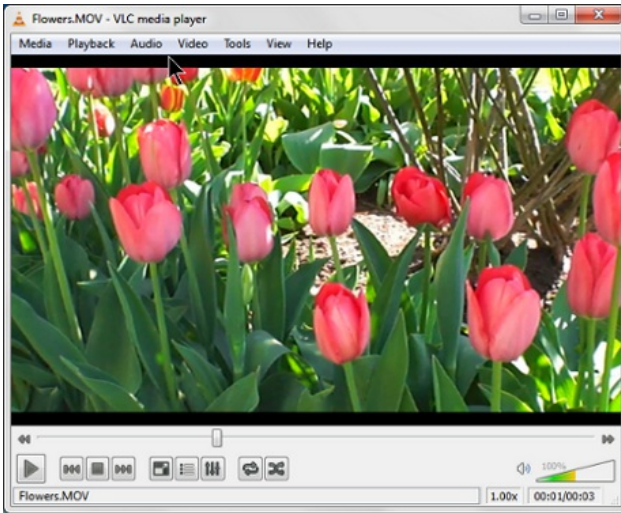
Similarly, a folder of multiple files can be opened for playback, such as a music album.

To open a folder:

1. On the menu, click **Media** > **Open Folder…**.
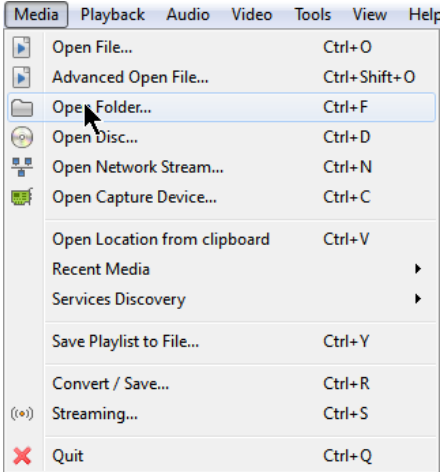
2. Browse to the directory of your desired folder.
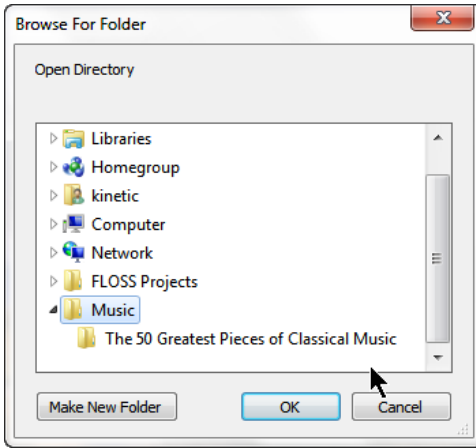
3. Click on the folder, and then click **OK**.
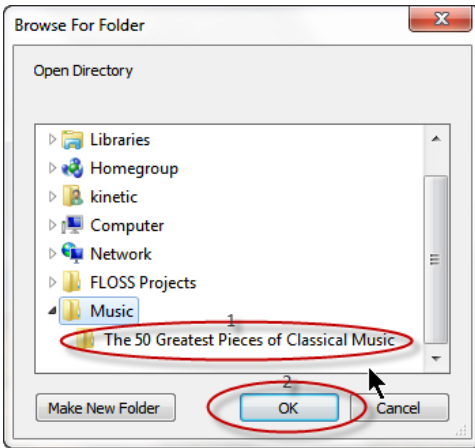
The folder begins playback.
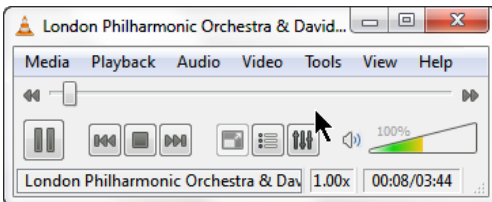
Playing a CD or DVD with VLC is nearly the same process. While drag-and-drop can be used, the easiest method is using the menu.

Before you begin, make sure your computer is capable of playing your specific disc. For example, playing a DVD requires at minimum a DVD-ROM drive installed on your computer.

To play a CD or DVD:

1. With a disc inserted into the drive, click **Media** > **Open Disc....**
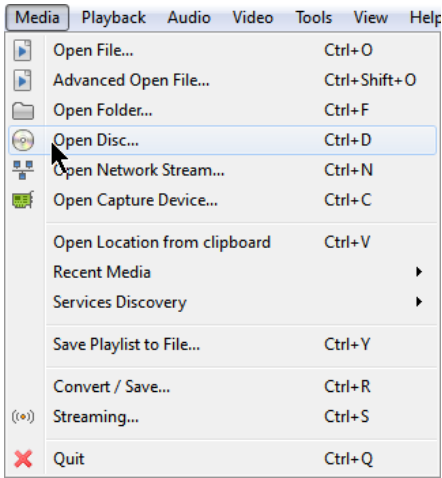
The **Disc** tab is now selected from the **Open Media** window.
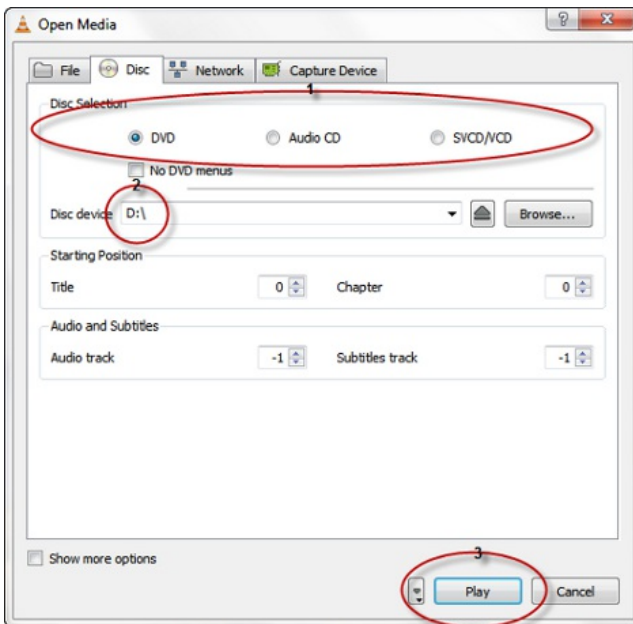
2. Select your disc type from the **Disc Selection** menu.

3. In the **Disc device** box, make sure the correct drive is selected (the drive reading the disc). By default, VLC selects the most common location, but you may need to browse and select it.

4. Click the **Play** button.

The CD or DVD opens and begins playback.

8. USING VLC TO PLAY STREAMS

Software name: VLC
Software version: 0.8.6

VLC can play just about every format out there. Notably, it is one of the few players across platforms that plays back Ogg streams. Ogg is a free software video format.

Streaming is a way of broadcasting audio and video online, a bit like an online TV or radio. To play streams, follow these quick steps:

With VLC installed, launch the application. You should have something that looks like this on all platforms:
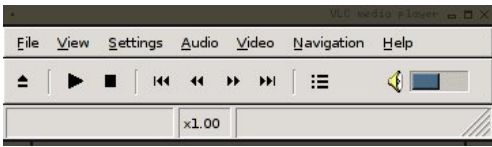
Next, select the **Open Network Stream** from the **File** menu:

Now you should see a window that looks something like this:
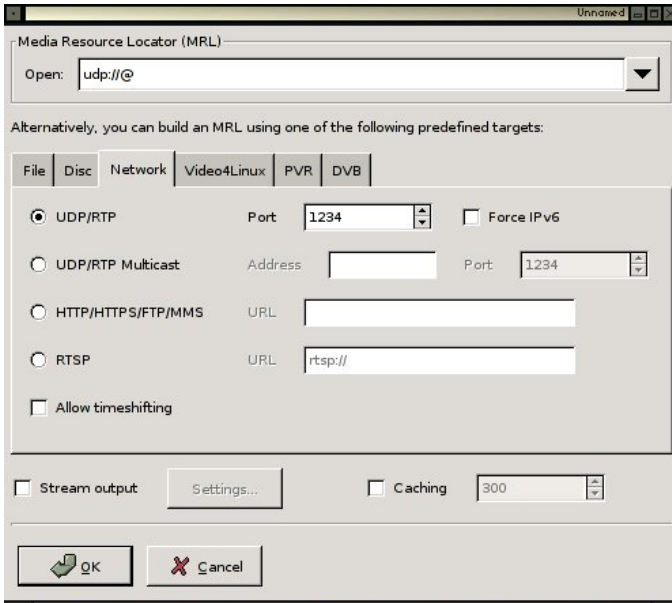
Let's assume you are going to open an Ogg Theora live stream with an address like:

```
http://24.72.34.35:8000/theora.ogg
```

If this is the case, then you need to enter this information (the stream location) into the interface.

First, select the **HTTP/HTTPS/FTP/MMS** checkbox:
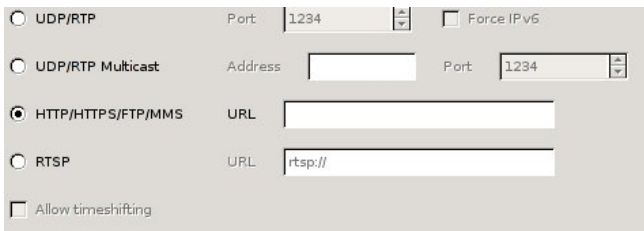
Then enter the stream address into the **Open** field:
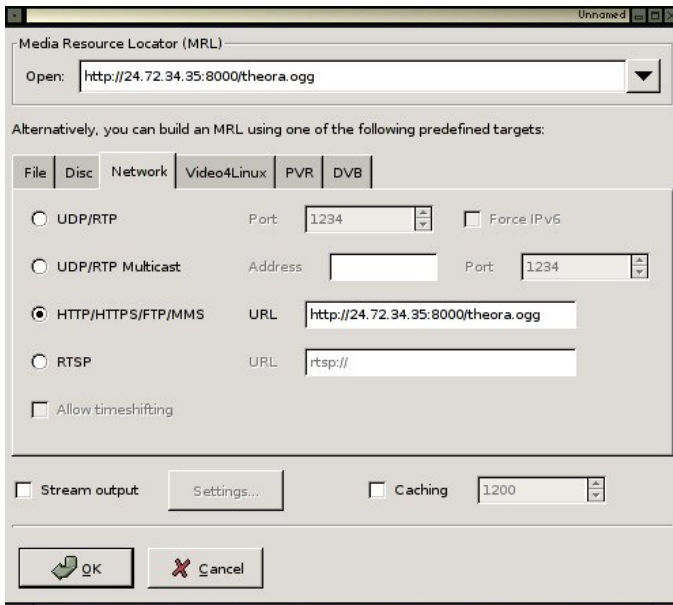
Finally, press **OK,** and the stream should begin playback.

9. PLAYING A VIDEO_TS FILE

Software name : VLC
Software version : 0.8.6

This is especially useful if you are testing DVD's that you have created, or if you save your DVD's on your harddrive for safekeeping or if you need the subtitle options that are given you to you by the DVD format and menus.

The process is slightly different for Mac and Window / Linux.

MAC

Select Open > Disk from the top menu
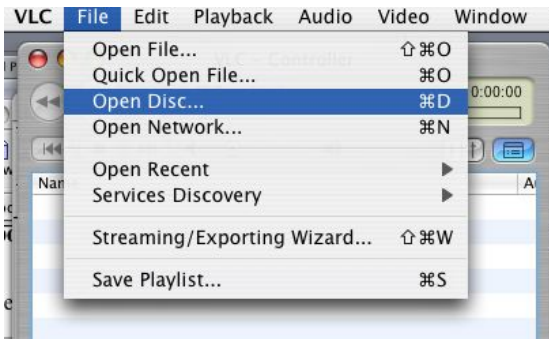
Then click in the VIDEO_TS entry and browse for that DVD data specifically the VIDEO_TS directory.
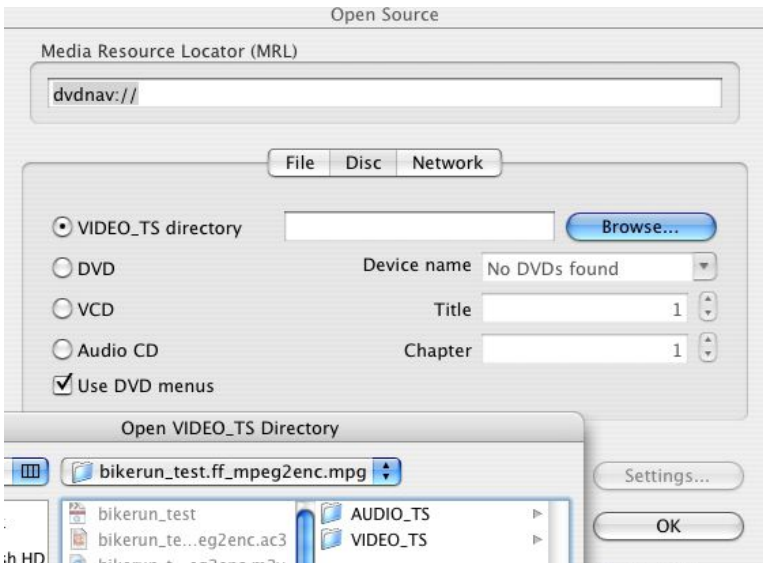
WINDOWS / LINUX

Select File > Open Directory and browse for the VIDEO_TS folder of the DVD you want to play.

10. PLAYING MULTILINGUAL VIDEO

Software name : VLC
Software version : 0.8.6

I assume you have VLC player installed and you have a file or DVD with subtitles which you want to display when you are playing the Video.

There are three ways you may want to use VLC to display subtitles.

1) From a DVD
2) From a Multilingual file (ie Matroska)
3) From a separate subtitle file which is distributed with the Video file.

PLAY SUBTITLES ON A DVD DISK

To do this put the DVD disk into your DVD drive. Open up VLC player and select File > Open Disk.

Enter the DVD Drive letter. It may appear automatically. Mine is drive D:
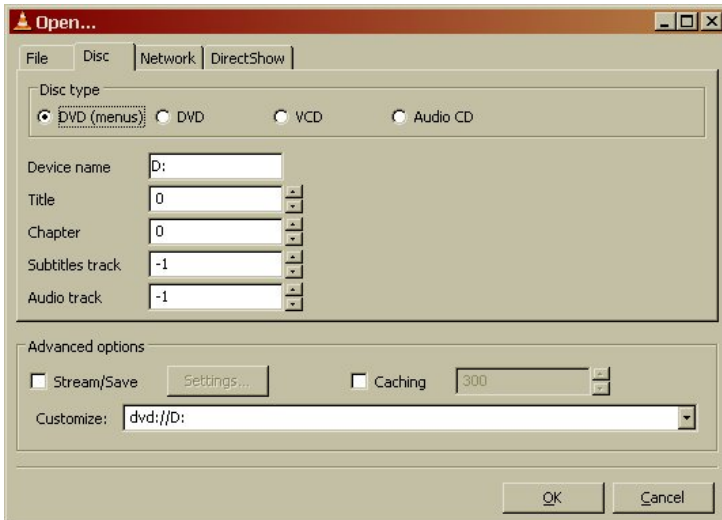
Then click OK.

The menu page of your DVD should appear.

Click on the video you want to watch. Then when the video starts

quickly right hand click the mouse on the Video image. Select the
Subtitle track you wish to view.
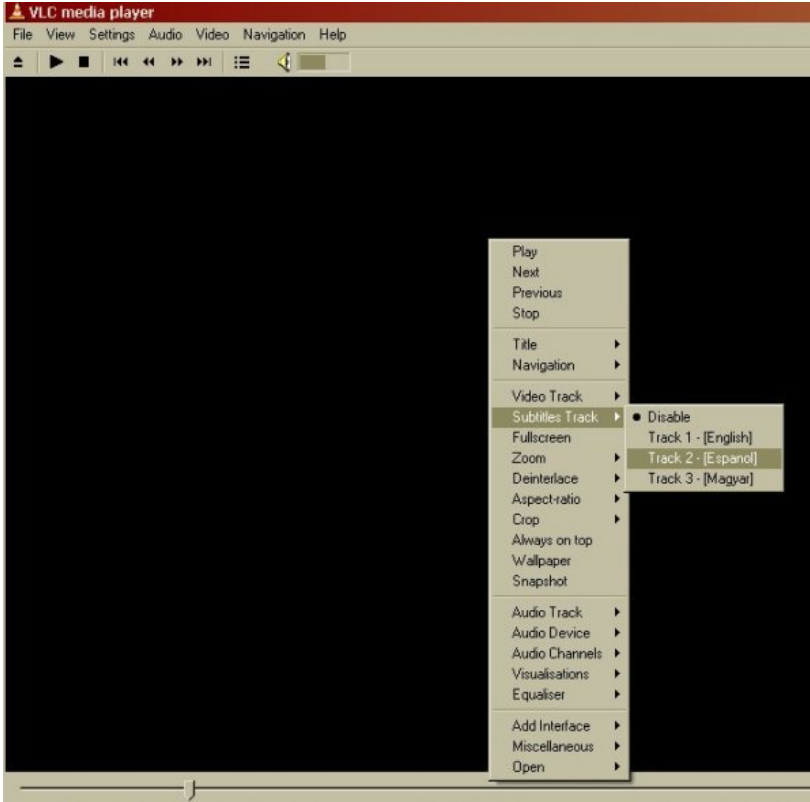
The subtitles should then appear on screen.

PLAY SUBTITLES IN MATROSKA FILES

The process for this is exactly the same as above except when
starting the process you select File > Open File

You then see this screen.
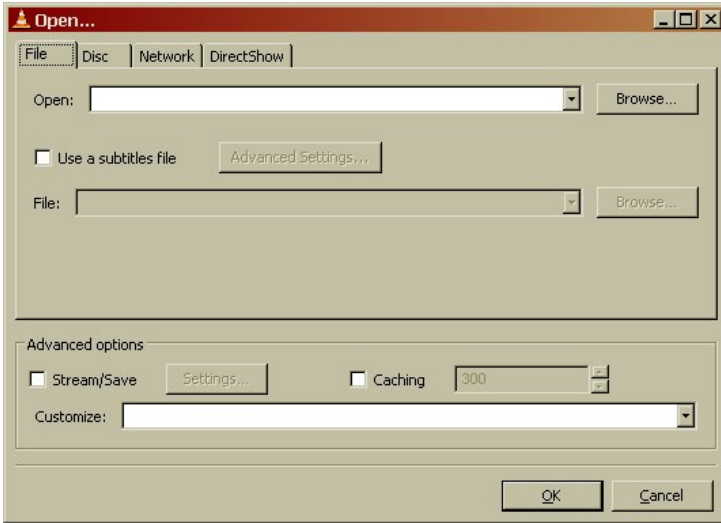
You should then click on the Browse button to select the video file you
want to play. If this file is a matroska file with an *.mkv extension then
you can click OK after browsing for the file as the file already has the
subtitle infomation.

Then Select the subtitle language stream by right clicking the video
screen and selecting Subtitle Track > and choose the language
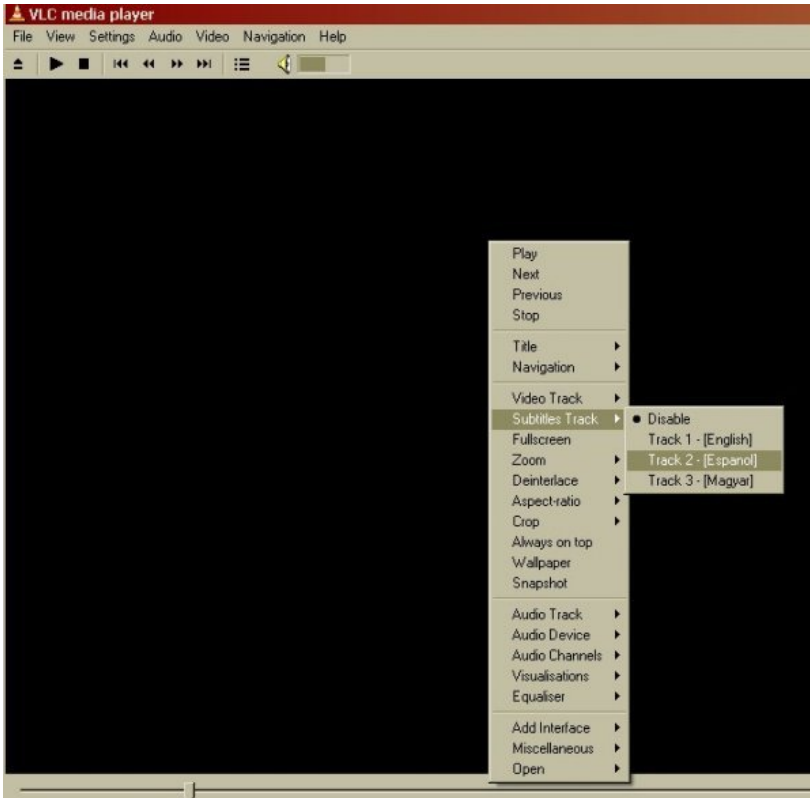
PLAY VIDEO FILES WITH EXTERNAL SUBTITLES

Using VLC to play Video file with external subtitle files.

If you want to play an external subtitle file for example a srt file.

 Select File > Open File
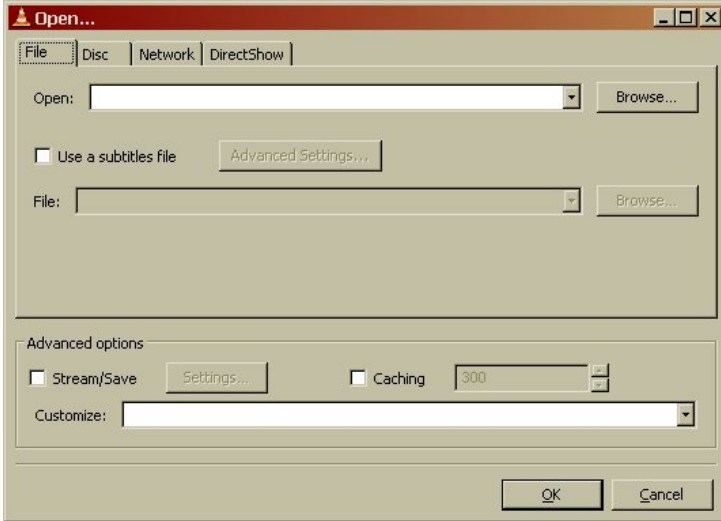
In the **Open** box click the **Browse** button and choose your video file.

Then put a tick in the box **Use a subtitle file,** and click Browse to locate your external subtitle file.
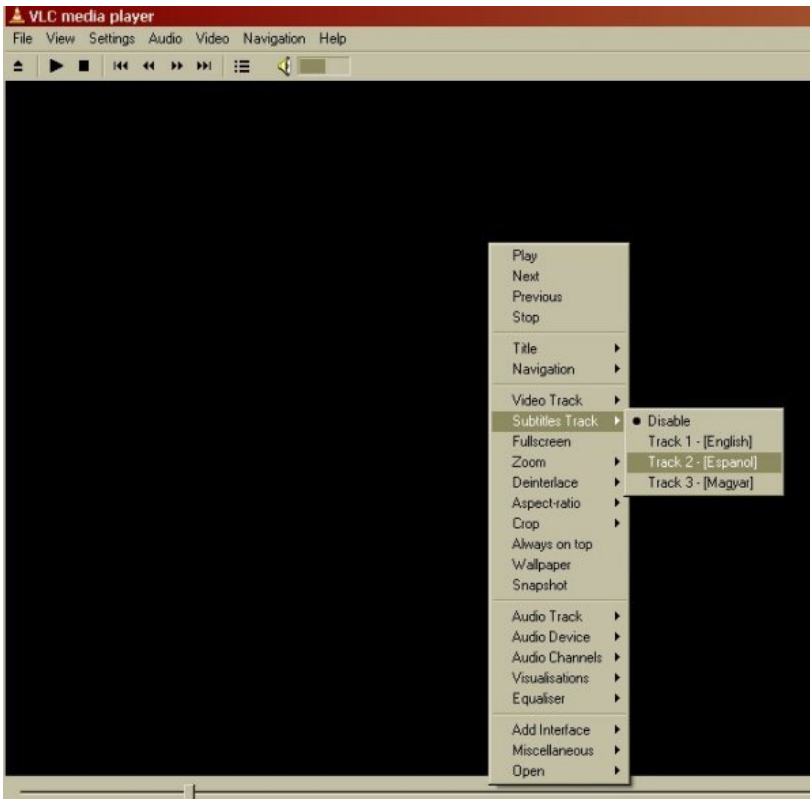
Then Select the subtitle language stream by right clicking the video screen and selecting Subtitle Track > and select the track of subtitles (for an external file like an srt file there will normally only be one track).

STREAMING

11. WHAT IS STREAMING?

Streaming Media is the term used to describe the *real-time delivery* of audio and video over the internet. Streaming Media allows for *live transmission* of audio or video over the internet, transforming the internet into a broadcasting medium. Content can also be archived in streaming file formats<u>?</u> , allowing internet users to experience recordings of events after they happen.

VARIETIES OF STREAMING

There are three types of delivery of audio and video data over the internet: Download and Play, <u>Progressive Download</u>, and <u>True Streaming</u>.

Download and play

To experience Download and Play media you must first download the entire media file to your hard disk before you can play it. For this reason Download and Play media cannot be used for live broadcasts, however it is often a good way to deliver high quality media content over any <u>bandwidth</u>. A high quality movie, for example, can be downloaded over any internet connection. However because you cannot play the movie until you have downloaded the entire file, download time becomes a factor. To download a DVD movie (usually about 4.6 GB in size) over a dial-up modem (56kbps) it would take over 8 days! Most people would find this quite tedious!

Download and Play media is *not* streaming media (more on this later) but it is a lot more popular than streaming. File sharing networks are Download and Play mechanisms, and this is an extremely popular activity on the internet. As many countries make high bandwidth connections more accesible there is an increasing popularity of trading Download and Play movies on these networks.

Progressive download

This enables you to experience media as it downloads to your <u>harddrive</u>. Progressive Download is useful but is less efficient than True Streaming and cannot provide some functionality such as <u>multiple bitrate encoding</u>. However this method has an advantage over Download and Play as you do not have to wait for the file to finish downloading before you can start playing it. There are some constraints - for example, if the file does not download as fast as you are playing it, then you will find that playback will stop while you wait for more of the file to download. This can be annoying and it is often the reason why some choose True Streaming as a preferred method of delivery.

<u>Quicktime</u> (Apple's suite of streaming technologies) calls Progressive Download "Fast Start". This highlights one of the difficulties of learning streaming - in the effort to differentiate technologies, each technology provider has made up their own jargon. However throughout this manual I will stick to the more generic terminologies wherever possible.

True streaming

This enables the user to view or listen to the media as it is delivered over the internet in real-time. True Streaming is the only variety of streaming that allows for live broadcasting, and it also supports more advanced functionality than Progressive Download, enabling the user to control the media experience by pausing, skipping forward, or rewinding. Although different terms have been used to describe True Streaming, including webcasting, livecasting, web tv, or net.radio, the term that has prevailed is "streaming media" (more often it is just refered to as "streaming").

The difference between Progressive Download and True Streaming is not always obvious. If, for example, a user has a very fast connection to the internet then Progressive Download may appear to behave in exactly the same way as True Streaming.

Within Download and Play, Progressive Download, and True Streaming there are two distinct varieties : static file streaming and live streaming.

Static file streaming

The delivery of pre-recorded media files over the internet in real time. Typically when we refer to archives of online media we are discussing static file streaming. A large archive of video art encoded into streaming files is an example of a collection of static file streaming files. This content is also known as on-demand or archived content. This content can be delivered by Download and Play, Progressive Download, or True Streaming processes.

Live streaming

The delivery of live audio and/or video over the internet. This allows the user to experience an event as it occurs in realtime. There are many examples of this such as online radio or viewing live performances. Only True Streaming supports live streaming.

This manual will mainly deal with True Streaming of both live and archived content.

ENCODING

To stream static files over the internet the files must be compressed and encoded into a 'streaming format'. Ripping CDs into MP3 is doing just this and is done using encoding softwares. In this process a CD audio recording is converted by the encoding software from a CD (Compact Disc) audio format into a 'streaming audio format' (MP3). This will involve compressing the data, which reduces its quality and file size, and converting the data into a 'streaming format' (for example MP3).

Compression

There are two forms of compression - lossy, and lossless compression.

When the encoding process compresses the source file so that it can be delivered over internet connections in real-time this process degrades the quality of the audio and video. The more a file is compressed, the lower bandwidth required to be able to play the file, but the more the quality is reduced. A compromise has to be achieved whereby the level of compression achieves an acceptable audio and video experience, while reducing the amount of data enough to enable delivery over the internet.

Live encoding is similar except that an audio or video (or both) input is encoded instead of a file. With this process the encoding software delivers the encoded data in a continuous stream to the streaming server.

Lossless compression

This is the process of compressing data information into a smaller size without removing data. To visualise this process imagine a paper bag with an object in it. When you remove the air in the bag by creating a vacuum the object in the bag is not affected even tough the total size of the bag is reduced

Lossy compression

Sometimes called 'Perceptual Encoding', this is the process of 'throwing away' data to reduce the file size. The compression algorithms used are complex and try to preserve the qualitative perceptual experience as much as possible while discarding as much data as necessary.

Lossy compression is a very fine art. The algorithms that enable this take into account how the brain precieves sounds and images and then discards information from the audio or video file while maintaining an aural and visual experience resembling the original source material. To do this the process follows Psychoacoustic and Psychovisual modelling principles.

Codecs

The algorithms used to compress and encode audio and video and create the file format are known as "codecs". The word is made from two common terms <u>compress</u> and <u>decompress</u>. The encoding software uses a codec to 'compress' the streaming content for delivery over the net, and the player softwares use a codec to 'decompress' the content for replay.

The codec is mathematical wizardry and is the heart and soul of streaming. It is on this ground that we have the various technology providers battling it out for dominance. Each codec has its own unique way of doing things depending on what the developer believes is best, and some come with their own minefield of licencing issues too.

Bitrate

Compression is the process of reducing the amount of data

Multiple bitrate encoding allows the server and player to negotiate the best quality (highest bandwidth) stream to be delivered from a single static file or live stream. Hence the player is delivered the best quality stream possible over the user's internet connection. Multiple bitrate? encoding produces only one encoded stream.

Choosing the bitrate(s) will require the consideration of several factors, including: The target audience's connectivity; The desirable frame size of the video (if including video); The amount of movement in the frame (if including video); The level of video contrast (if including video); The type of audio encoded (e.g. ambient noise/voice/stereo music);The amount of camera movement (if including video); The quality of the camera and camera lens (if including video).

DELIVERY

Streaming static ("archived") files can be achieved using a normal web server. This is often the cheapest way to deliver content on a small scale. This method cannot be used for live streaming and does not allow for the advanced features of True Streaming such as multiple bitrate encoding. This method will also enhance the likelihood for time-outs ('buffering') and cannot deliver the same amount of simultaneous player connections as True Streaming.

To enable live streaming and to gain full functionality and efficiency a streaming media server is required. This server is usually standard server hardware but with the necessary streaming server softwares installed. It is quite normal to install a streaming server on the same machine as an existing web server.

Streaming servers

Perhaps a good way to understand what a streaming server does is to imagine a radio station. A radio station comprises of three components - a *studio*, a *transmitter*, and the *receivers* that your audience has.
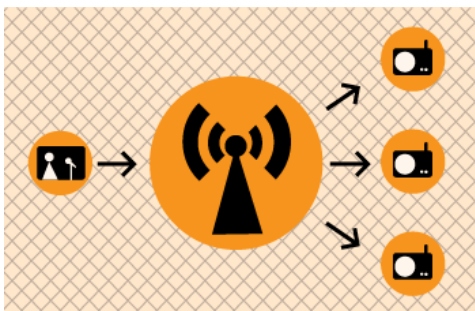
Above is a basic diagram showing how a transmitting radio station works. The radio studio is the source of the audio. In this space there are usually mixing desks, cd-players, minidisc players, turntables etc. Then from the studio an audio signal is sent to the transmitter. This can be sent from the studio to the transmitter by either a cable (sometimes called a "landline") or by a microwave link. Then the transmitter sends the audio via FM so that radio receivers (tuners) can pick it up and play it.

Radio works this way because it is trying to distribute the studio audio to as many people as possible. If you imagine the radio studio without the transmitter then the station would have have a fairly reduced audience! Essentially only people that could fit into the studio would be able to listen. So the transmitter works as a distributer, allowing more people to connect via their radio receivers and hence the potential audience is enlarged.

This is a close analogy to why streaming exists and how it works. If you were just playing audio on a computer in your room then the audience isn't going to be so big... so, we utilise streaming to distribute this audio to more people.
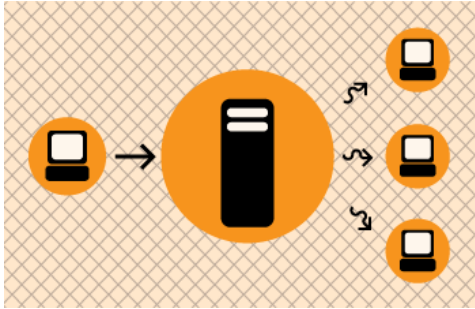
The analogy is obvious....the computer replaces the radio studio, the streaming server replaces the transmitter, and your listeners connect by computers to the server rather than with radio receivers to the broadcast signal. The analog can be taken quite a long way. Having a bigger radio transmitter is like having more bandwidth available at the streaming server - both allow more people to connect.

12. STREAMING WITH THE WIZARD

Software name : VLC
Software version : 0.8.6

VLC makes the process of streaming quite easy by supplying a wizard. This particular method means that **VLC** itself is the streaming encoder and server. Hence you can encode and deliver the content from one machine. This can be very useful for streaming within a **Local Area Network** (LAN), however it is not very effective for streaming on the internet unless you have a **Dedicated IP**. This is because other machines will not be able to 'find' your stream from outside the local network unless your computer has a **Dedicated IP Number**.

Streaming with **VLC** in this way however does allow for interesting options for streaming material from cameras, pre-recorded files, or even DVDs. You can also relay other live streams and converting them to another format as you do it.

OPENING THE WIZARD

First thing you need to do is open the wizard from the **VLC** interface:
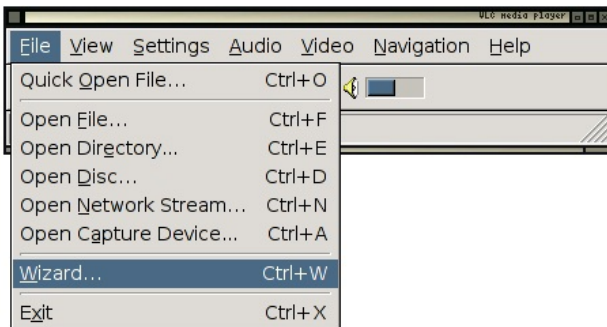
This will open the Wizard interface. If all is well it should appear and look somehting like this:
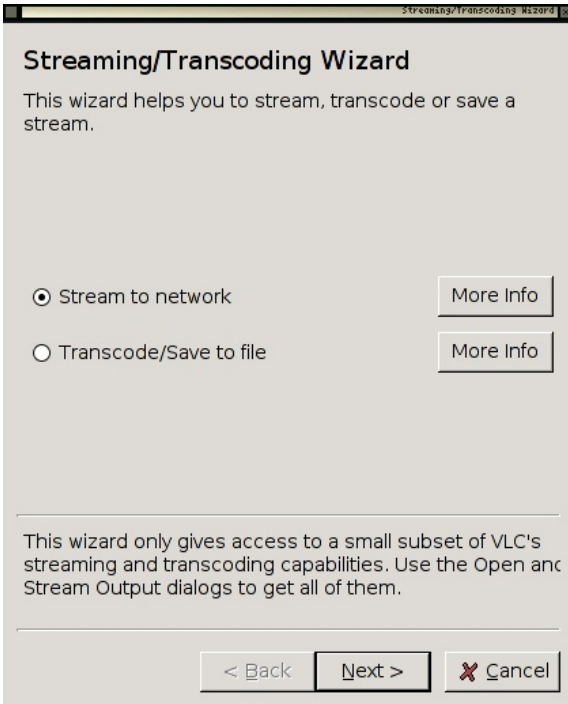
You will now need to choose the **Stream to netowrk** option:

Now press **Next >**

CHOOSE INPUT

If all is well the following dialog will have appeared:
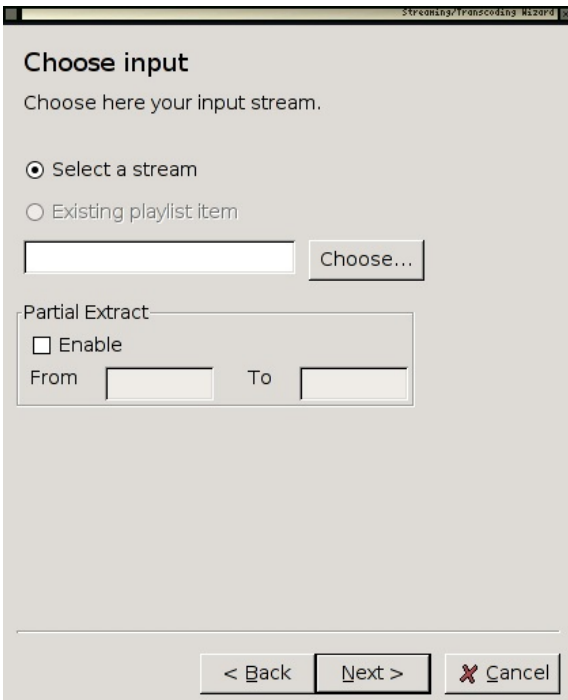
Now click on **Choose** and you will see a dialog that will show you options for choosing the input.
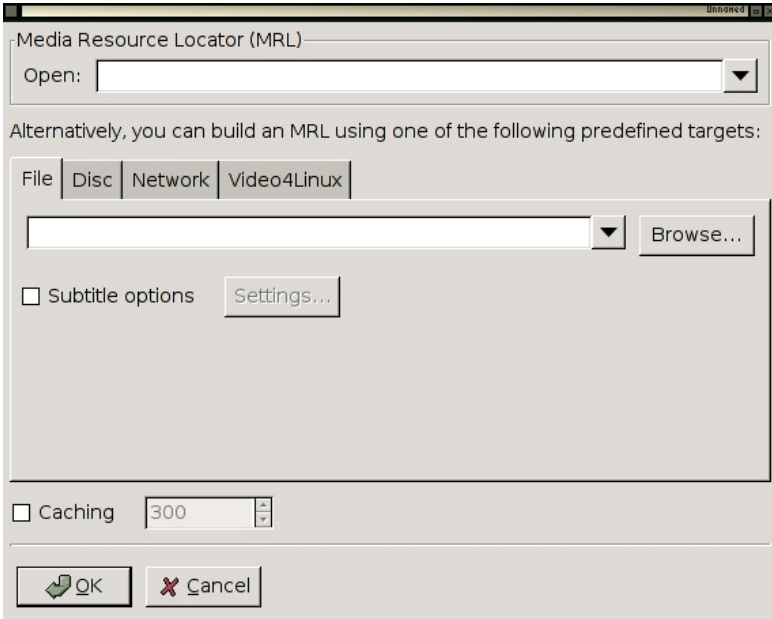
You can choose many options for stream inputs. In the following we will choose a file from our harddisk to stream. To choose a file you will need to first press **Browse**. A file browser will appear and you can use this to browse your harddisk and choose the file you wish to stream. In the following example the file we will use is called **gaialive050318_tennis-live.mov.ogg**

The location of this example file is displayed in the wizard when I have chosen it:
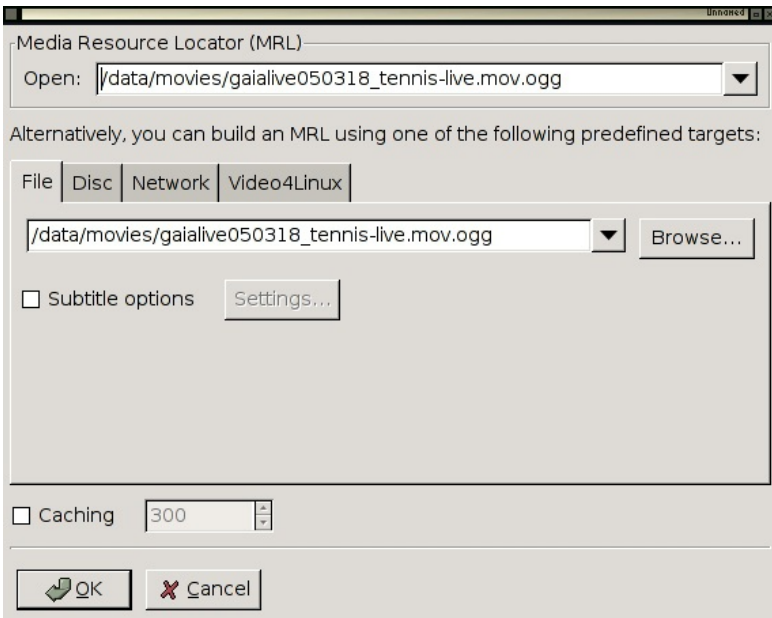
Note : it is a good idea to have first played the media you wish to stream to make sure VLC can actually play it.

Now press **OK** and proceed with configuring your stream.
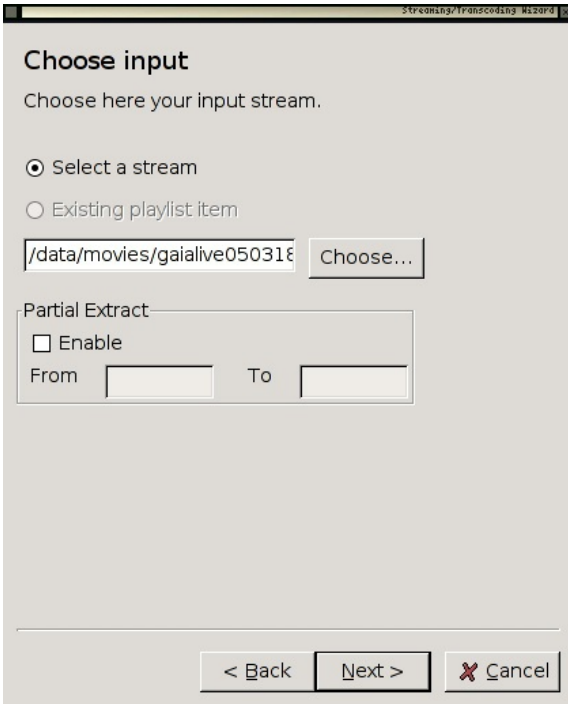
Now press **Next >**

CHOOSE STREAMING METHOD
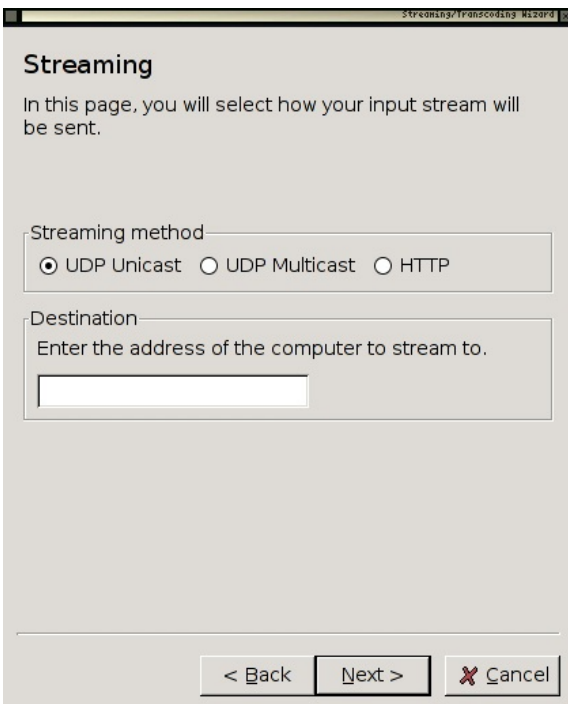
We will choose **http** as the streaming method. This means that the VLC application will act as a server as well as a media player. Other players can then connect to your computer and also watch the stream.
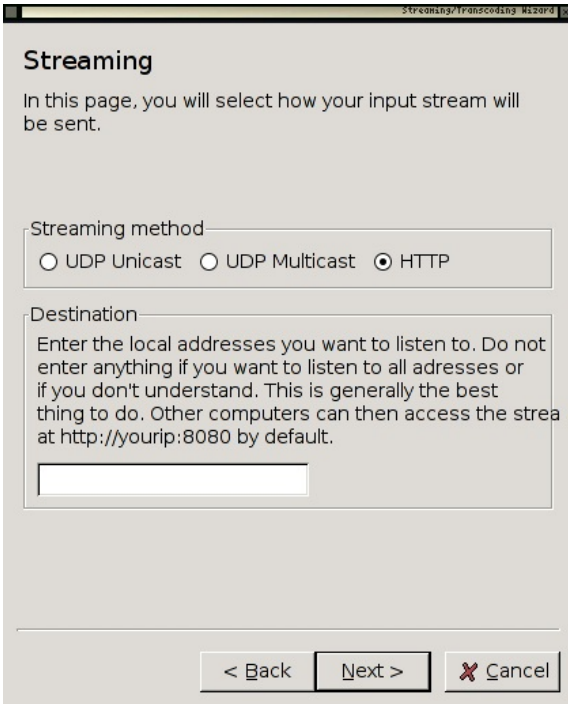
Now you need to just press **Next >**

ENCAPSULATE METHOD

Now you need to choose what type of stream (format) you will send.
The choices presented to you in this window will be formed from the
modules you have installed so they may appear different from the
following:
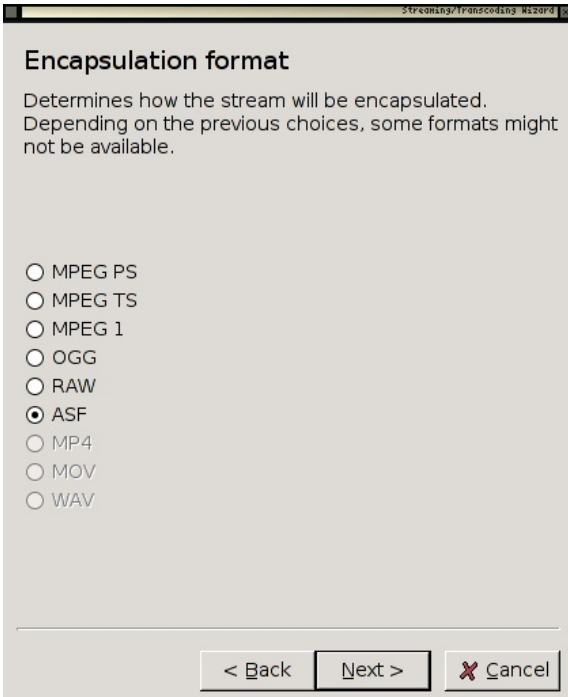
I am going to choose **OGG** as the encapsulation method, this means my video for the stream will be **OGG THEORA** and the audio will be **OGG VORBIS**. The encapsulation method (stream format) does not have to be the same as the file that you have loaded to stream. So, I choose **OGG** with the select button:

⊙ OGG

ADDITIONAL OPTIONS
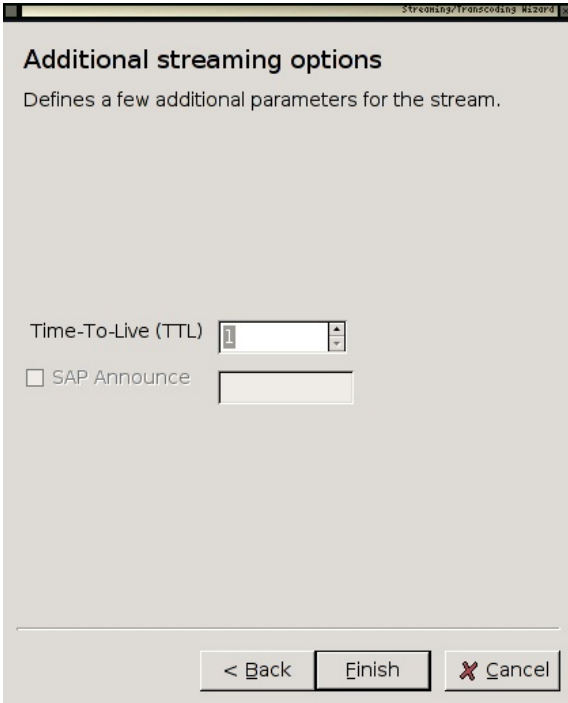
There is nothing you need to worry about on this screen. Just hit **Finish** and you will start streaming.

CHECKING THE STREAM IS WORKING

If all is well **VLC** will give you some feedback to say it is streaming. You won't actually be able to see the content played back as it is streamed unless you do it through another player. However **VLC** itself should look somehting like this if all is well:
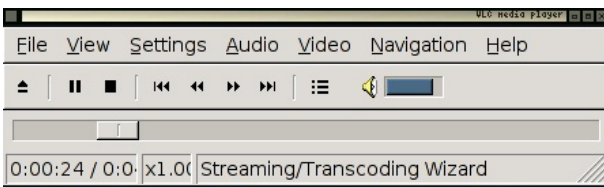
You can there is a timeline at the bottom of the player which should be moving, and there will be feedback in the bottom 'status' bar of the player saying **Streaming/Transcoding**. If you see neither of these then all is not well. To get more feedback choose the **Messages** dialog from the **View** menu:
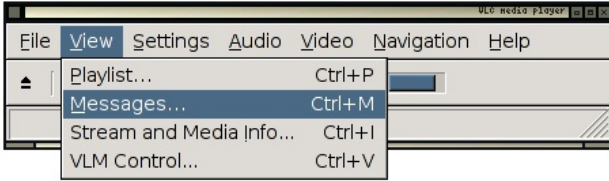
Now you should see a window with better feedback:

You can use this infomration to help trouble shoot. I recommend first using a search engine to copy and paste the error message (error messages will be highlighted in red in the message window). If you can't find anything through a search engine then try the **VLC** forums (http://forum.videolan.org/). You can also try the **irc** (chat) room where a lot of the developers hang out. If you know how to use **irc** they can be located at :

- IRC network: `irc.freenode.net`
- Channel: `#videolan`

If you done know how to use **irc** then try this web based version:

http://krishna.videolan.org/cgi-bin/irc/irc.cgi

PLAYING YOUR STREAMS

If you have followed everything above and you seem to be streaming now is the time to try and playback the material. You can do this with a player the supports the **Encapsulation Format** that you chose. In the above example **OGG** was the chosen format, so I will need to play back the content in a player that supports **OGG Theora** and **OGG Vorbis**. I also need to know the location (**URL**) of my stream. The URL will be in the format:

```
http://yourip:8080/
```

Where **yourip** is the **IP Number** of your computer. If you don't know
this then you need to find it out by reading about how to read the
network settings on your operating system. If you don't know your **IP
Number** then you can possibly test your stream by opening a player
on the same machine as the one you are using to send the stream and
using this URL:

```
http://localhost:8080/
```

You need to use your favourite player, open it and enter the above in
the **Open Location** (or other) field. If all is well the stream will play
back.
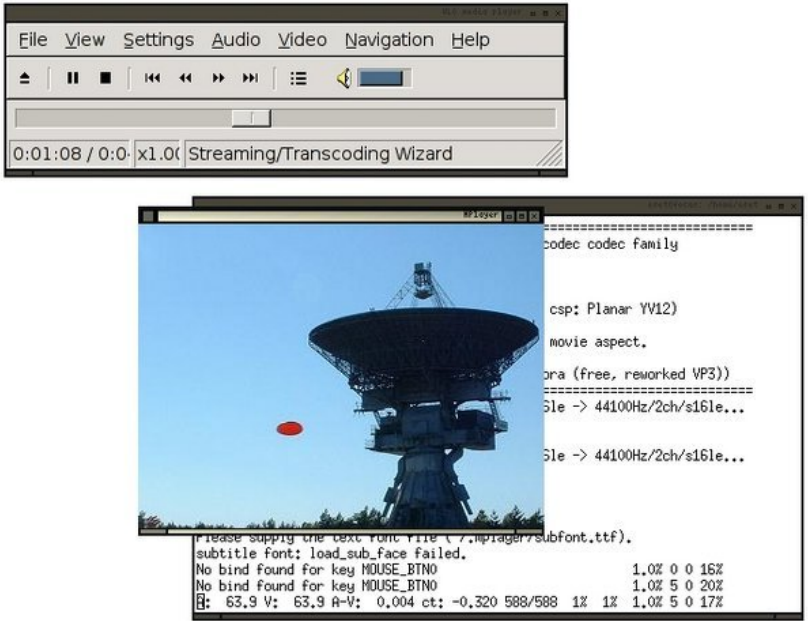
The above image shows **VLC** streaming and the playback of the video
in **mplayer** on the same machine.

13. ICECAST STREAMING (A/V)

Software name : VLC
Software version : 0.8.6

To stream audio or video to **Icecast** using **VLC** you need to first ensure you have the right module installed. If you are using **Linux** you will need to download the latest source code and install **VLC** with the **shout module**. To install this module in Linux you will need to configure VLC with the --**enable**--**shout** parameter.

LINUX :: CHECK SHOUT MODULE IS INSTALLED

If you are using **Linux** you will need to double check the **shout module** is installed before you progress. To do this type the following into a terminal:

```
vlc -l | grep shout
```

If all is well you will see something like the following in the terminal window:

```
VLC media player 0.8.5 Janus
  access_output_shout   IceCAST output
  playlist              New winamp 5.2 shoutcast import
  shout                 Shoutcast radio listings
```

The important part of the above output is the **access_output_shout IceCAST output**. This means you have the right module available for streaming to an **Icecast Server**. If you don't have this module you are going to have to read up on how to install it. **Note :** It might be that the **Shout** libraries store the **shout.h** file in the wrong place, this is a bug in the latest versions of **Shout**. To work around this, you may need to re-compile **VLC** but before doing so edit the file **shout.c** file in the **VLC** sources. This file is located here:

```
modules/access_output
```

you will need to edit this line:

```
#include <shout/shout.h>
```

to this:

```
#include <shout.h>
```

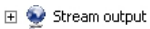## WINDOWS :: CHECK SHOUT MODULE IS INSTALLED

To check if the **Shout Module** is installed on Microsoft Windows you will need to open the **Preferences** window from the **Settings** menu:
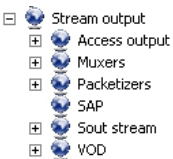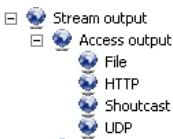

The preferences interface will open:
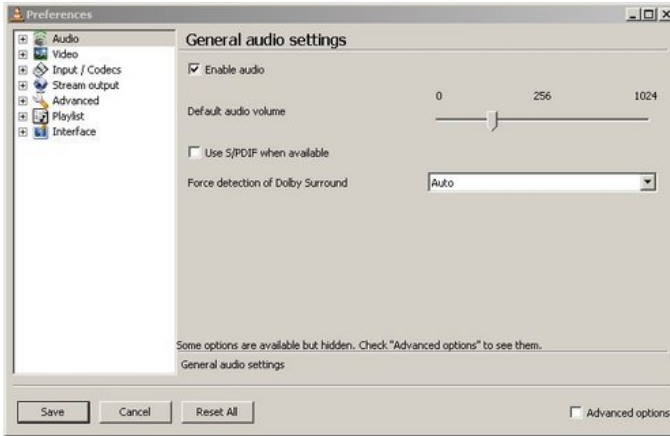
Now click on the tiny "+" next to **Stream Output** :

You will get a drop down menu:

Click on the "+" next to **Access output** and with luck you will see something like this:

Notably, there will be an item labled **Shoutcast**. If you don't see this then the **Shoutcast module** is not installed. If it is not installed then try downloading the latest installer and install **VLC** again. If you do see it then you should be able to stream to **Icecast**. Clicking on the **Shoutcast** icon should show you something like this:
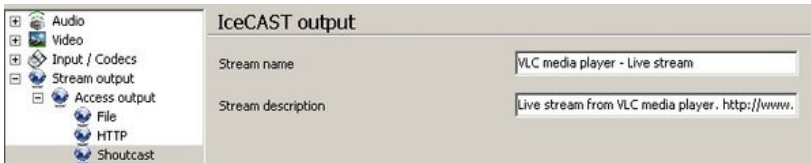
STREAMING SERVER REQUIREMENTS

We will look at streaming archived files to an **Icecast Server**. To do this you need access to an Icecast Server or someone needs to create you an account and give you the access details. You need to know the following details about the Icecast Server :

- **Hostname** or **IP Number** of the **Icecast Server**
- **Port** (default is **8000**)
- **Password**
- **Username** (this may not be necessary depending on how **Icecast** is configured)
- **Mountpoint** (this may not be necessary depending on how **Icecast** is configured)

CHOOSING AUDIO FILE TO STREAM

You can stream audio or video with **VLC** to **Icecast**. However this has variable results depending on what operating system you are using. For now we will look at streaming an audio file. The first thing you need to do of course is open **VLC**. Now from the **File** menu choose **Open File**
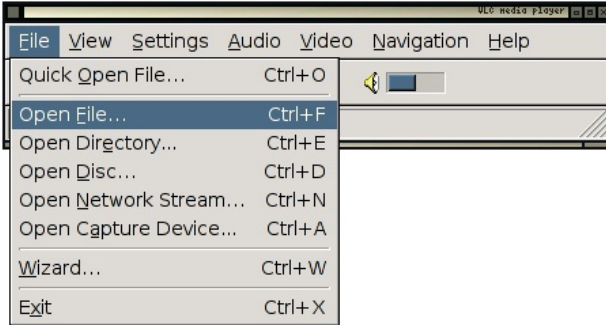
This will open a file browser so you can browse (click the **Browse** button) through your harddisk and choose an audio file to stream.
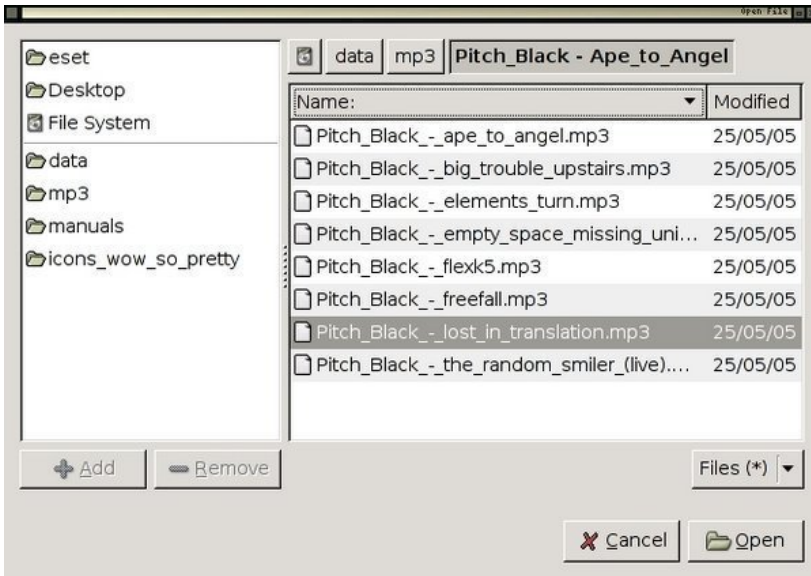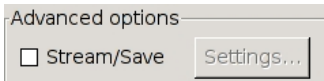

For the purpose of this excercise choose an **MP3** audo file, and then press the **Open** button at the bottom right. When you have done this there should be the title and location of your chosen file displayed in the interface:
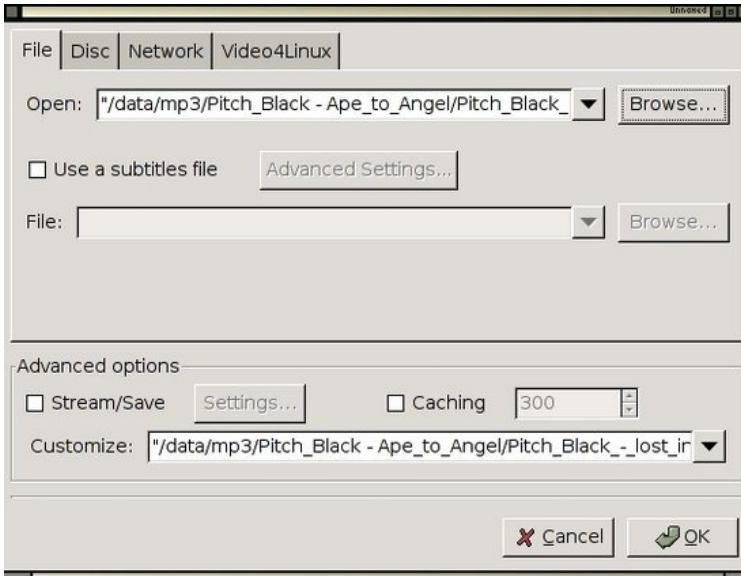
STREAM SETTINGS

Now click on the **Stream/Save** check box:

This should then make the **Settings...** button clickable:

Now click the **Settings...** button and you should see somehting like this:

This is the configuration window for your stream. It might look complicated, and truth be told, it is! However we can go through this process quickly to configure and outgoing audio stream to an **Icecast Server**. The way that **VLC** works with outgoing streams is by creating what the good people at Videolan call an **output chain**. An **output chain** is a rather complicated way of refering to the the process of configuring **VLC** so that it streams. Unfortunately **VLC** doesn't (yet) incorporate a handy **GUI** (Graphical User Interface) for doing this. GUIs are much easier if you aren't used to configuring software using command line interfaces (**CLI**). We can get some of the way to configuring our stream settings through the interface but the rest will have to be typed into the **Stream Output MRL** at the top of the above dialog.

First of all, click on the **HTTP** check box in the **Outputs** section of the window:

When checked you will see two things happen, firstly the information to the right of the check box will allow you to input data:

The other thing you will see is that the **Stream output MRL** box will display some information:

The above information is what we need to tweak to make **VLC** stream and to do this you will need to alter the information in this text box using the **Icecast Server** details you should have.

ENTERING SERVER INFORMATION

In the above example the following information is shown in the **Stream output MRL**:

`:sout=#duplicate{dst=std{access=http,mux=ts,dst=:1234}}`

We need to alter this information to refect the details you have of your streaming server (**Icecast**). You shoudl have the following details:

- **Hostname** or **IP Number** of the **Icecast Server**
- **Port** (default is **8000**)
- **Password**
- **Username** (this may not be necessary depending on how **Icecast** is configured)
- **Mountpoint** (this may not be necessary depending on how **Icecast** is configured)

These need to be incorporated in the **Stream output MRL** box as follows:

:sout=#duplicate{dst=std{access=**shout**,mux=**ogg**,dst=**username:pass@hostname:port/mountpoint**}}

Notice that the two following chains were also important:

`access=shout`

`mux=ogg`

For example, lets say I had the following details:

- **Hostname** : icey.me.net
- **Port** : 8000
- **Password** : floss
- **Username** : streamer
- **Mountpoint** : live

Then the **Stream output MRL** would read as follows:

`:sout=#duplicate{dst=std{access=shout,mux=ogg,dst=streamer:floss@icy.me`

There are a couple of things to note here. First, with **Icecast** you don't always need a **username** to stream. If you are in this situation then use "source" in the text above where the **password** should be. For example, the text in the **Stream output MRL** would be something like:

`:sout=#duplicate{dst=std{access=shout,mux=ogg,dst=source:floss@icy.me.n`

Also, if you haven't been given a **mountpoint** you can usually make one up but don't use any special characters in the text, and if you haven't been given a **port** then try the default **8000**.

START STREAMING

All that is left to do is to press the **OK** button at the bottom of the window, you will be returned to the previous window:
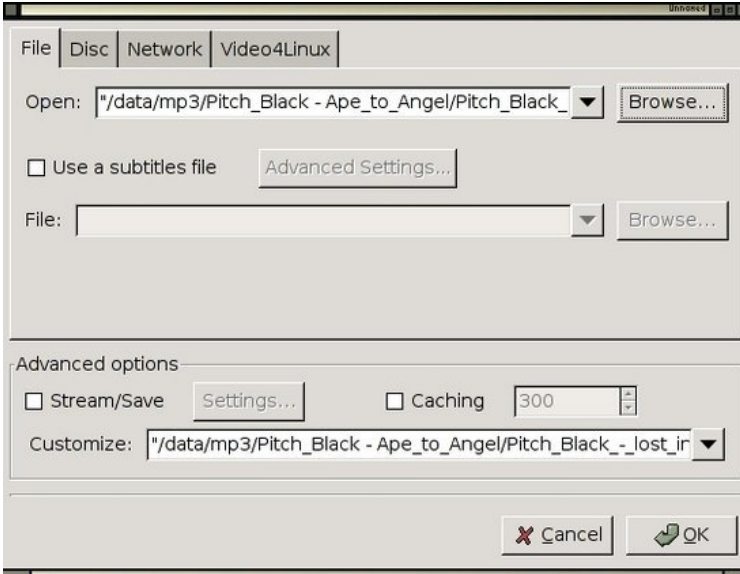
Now you are almost ready to stream. Press **OK** again, and you should start streaming. **VLC** provides minimal feedback to let you know how things are going, but if all is ok, you should check your streaming server status page, or try and connect to your stream.

STREAMING VIDEO WITH VLC

The same process will work for streaming video to **Icecast**. However, at the time of writing the **Linux** version of **VLC** (8.5) does not seem to support this. However you can try it with the **Microsoft Windows** version. Just follow the same steps as above, except that you will choose a video file instad of an audio file. The out going live stream will be **Ogg Theora** and can be played in many players includign **VLC**, **MPlayer**, and even the latest **RealPlayer**.

ENCODING AUDIO

14. USING VLC TO RIP A CD

14. USING VLC TO RIP A CD

Software name : VLC
**Software version** : 0.8.6

VLC can copy audio tracks from a CD into other audio file types
through a process called 'ripping'. For example, a CD audio track can
be ripped to your hard drive as an MP3 file. VLC has several output file
types to select from depending on your desired quality or file size.
The only downside is that VLC cannot handle an entire CD at once,
files must be converted one at a time.

To begin, you will need to have a CD to 'rip' and know which particular
track you want to copy. Next, insert the CD into your computer's CD
drive.

USING THE WIZARD

We will use the VLC Wizard to rip the track from the CD.

To open the wizard, select **File** > **Wizard**.
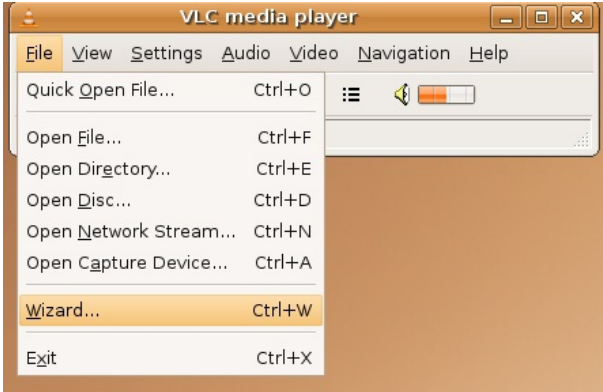
This opens the following window:
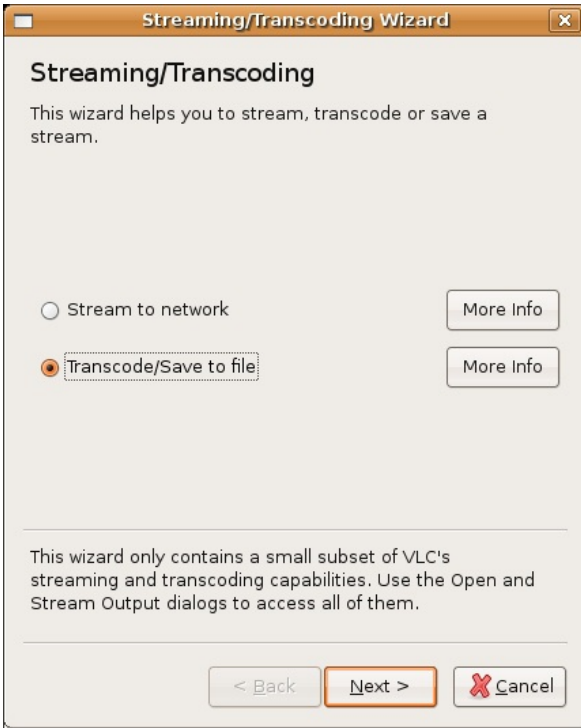
We want to Transcode the file. Transcoding is a fancy name for converting the file from one type to another. In this example, we are converting the CD audio to Ogg Vorbis (you could also choose MP3 or another type of audio file). Make sure **Transcode** is selected:
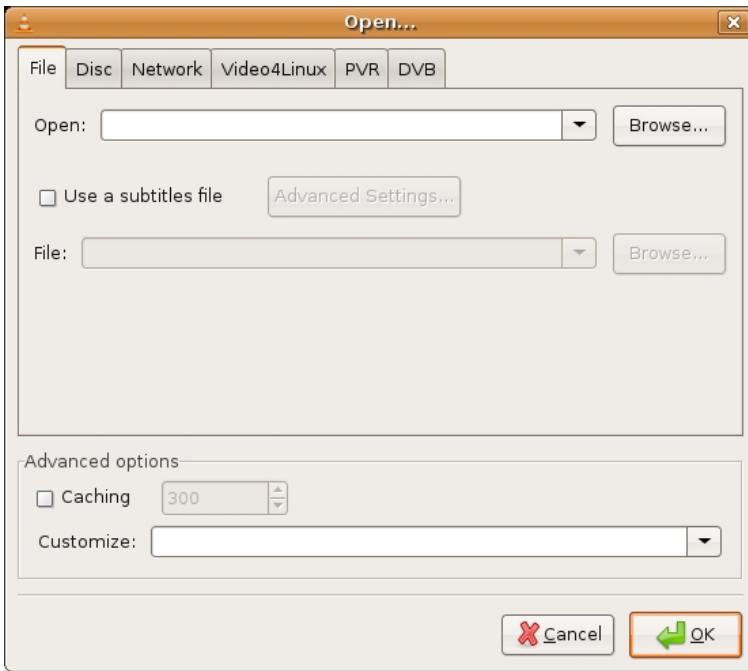

Then press **Next,** and the following window appears:
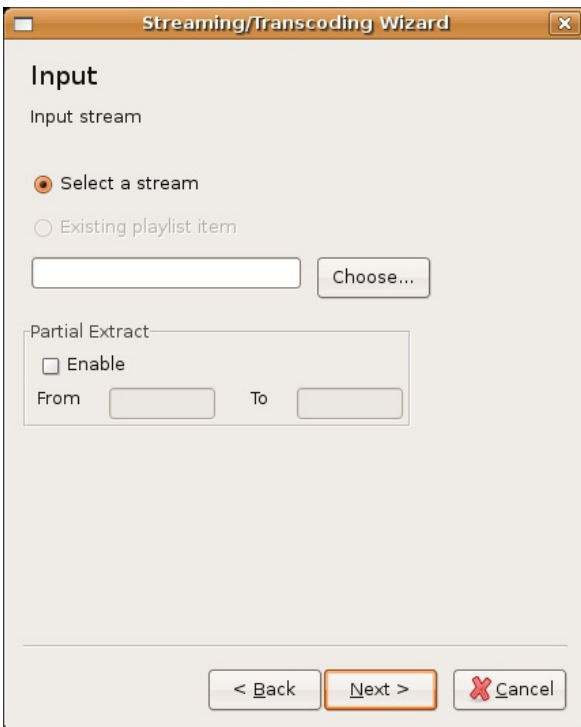
Here is where we select the CD and the particular track for ripping.
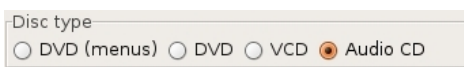
Press the **Choose** button, and this window appears:

Here you can select from any number of sources to copy. We are going to choose a disc (CD) so we choose **Disc**. You could also copy DVDs following a similar process, but for now we will just look at audio. When you click on the **Disc** tab, the following options appear:
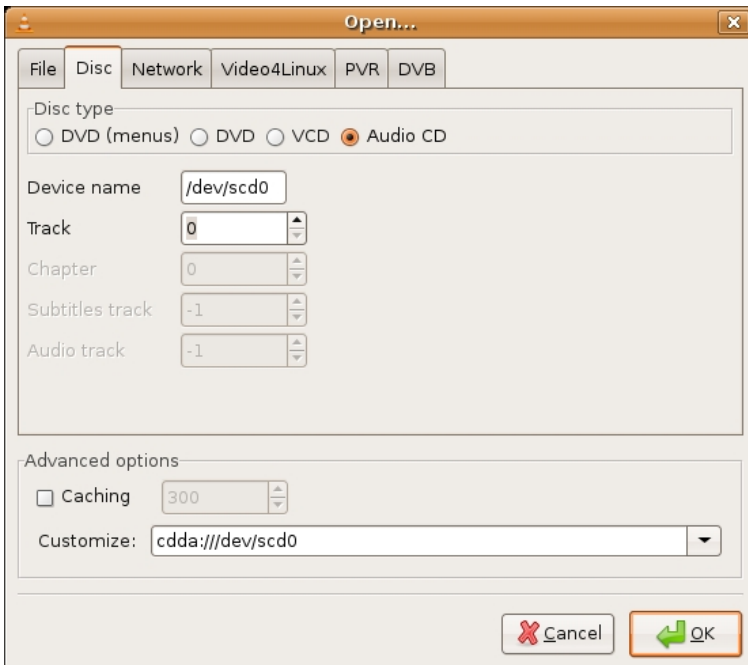
Select **Audio CD**:

Now select which track number to rip. In this example, we are using the first track, so press the up arrow and change it from '0' to '1':

Track   1

Press **OK,** and you return to the same screen of the Wizard. Press **OK** again, and we move forward to the next screen:
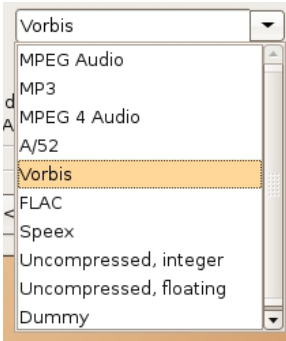
Here is where we select your desired file format to convert the audio to. We don't need to worry about video options.

Check the **Transcode audio** box:

Options in the audio box are now highlighted, which means you can change them. We want to convert the CD audio to a OGG Vorbis audio file, so we select **Vorbis** from the drop down menu :

Leave the bitrate option as is and then press **Next**:
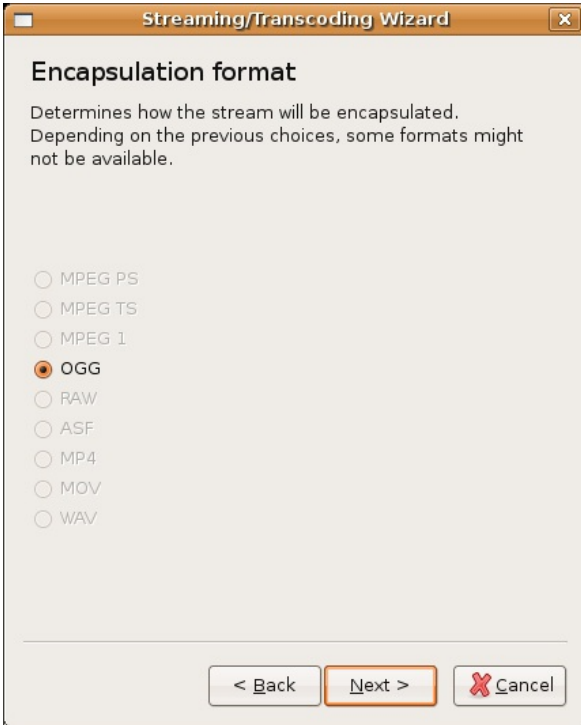
We have no choices here so press **Next**.
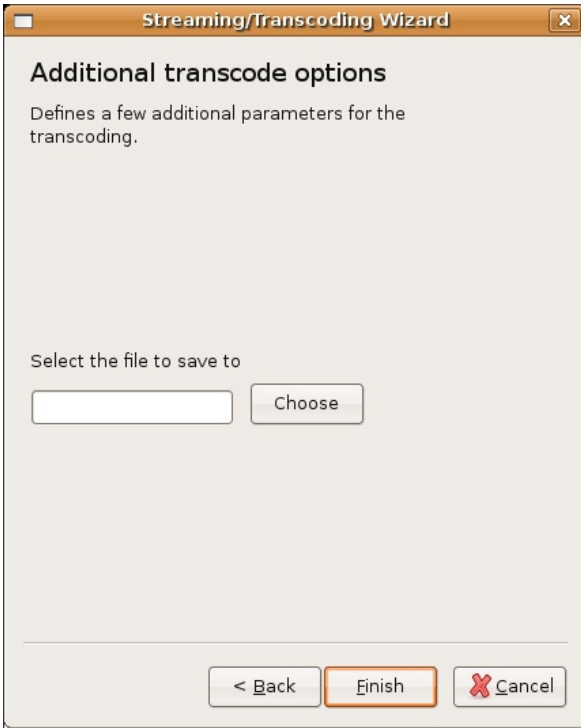
The above window asks us to choose where on our computer we wish
to save the file. Press **Choose** and the **Save to file** window appears:
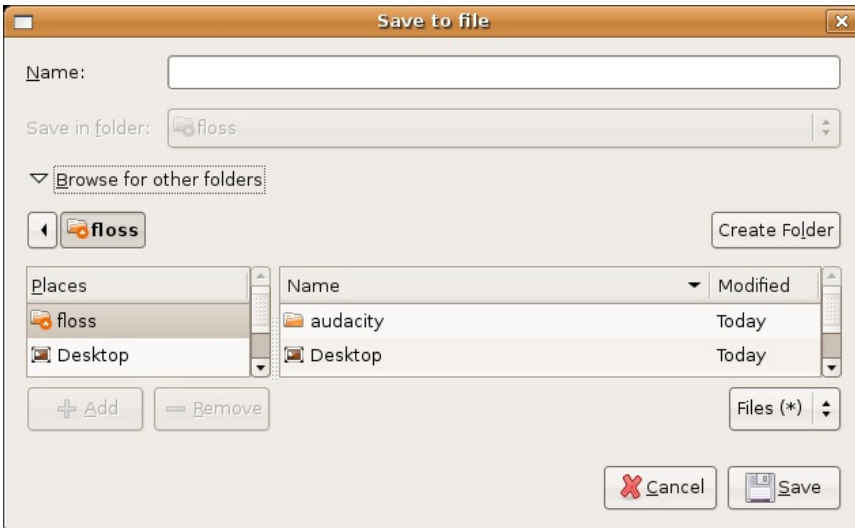
Browse to the directory you wish to save the new audio file, and then
enter the name of the file in the **Name** box. We must also include the
correct file extension in the name. We will call the file 'myfile' and the
extension for OGG Vorbis files is '.ogg' (MP3 files use '.mp3'), so the
complete name is 'myfile.ogg' :
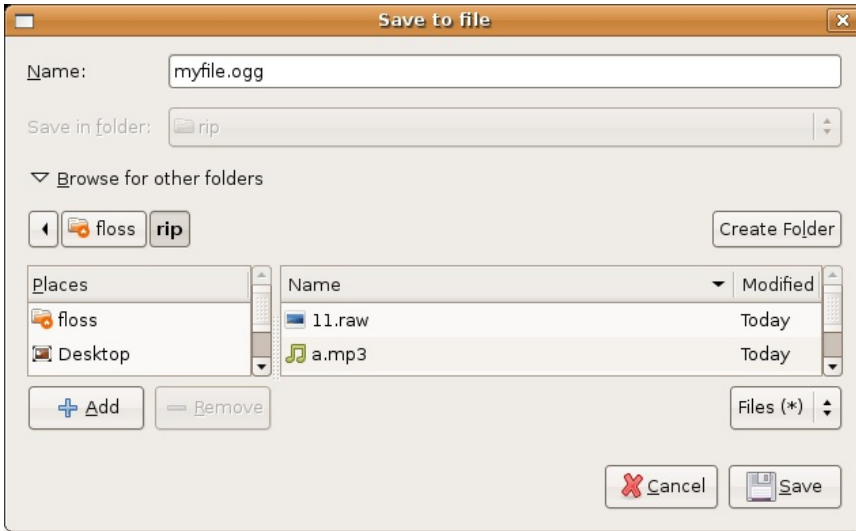
When you have chosen your desired directory and given your file a
name, press **Save**.

ENCODING VIDEO

15. ENCODING VIDEO

Software name : VLC
Software version : 0.8.6

It is a good idea to get as good a quality a file as you can before you start encoding. If you can get a DV file if exported from a video editing application or captured from tape or an MPEG-2 or VOB file if taken from a DVD.

However this method will work with all video files that VLC will play, which is an impressive amount!
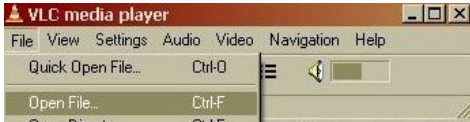
Choose the file you want to encode to another format.

Select Stream/Save by ticking the box in the lower, Advanced Options part of the Open File box.
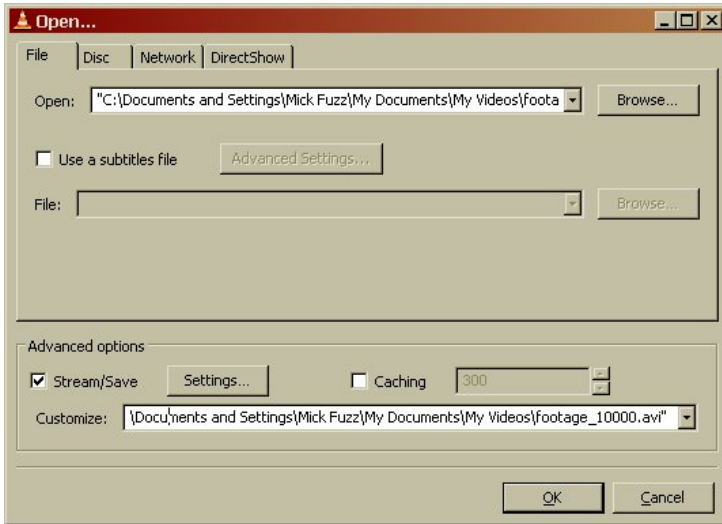
Then click on Settings again in Advanced Options

In the Outputs Section click File. Then click on the Browse button next to it an select where you woud like your target file to be saved.
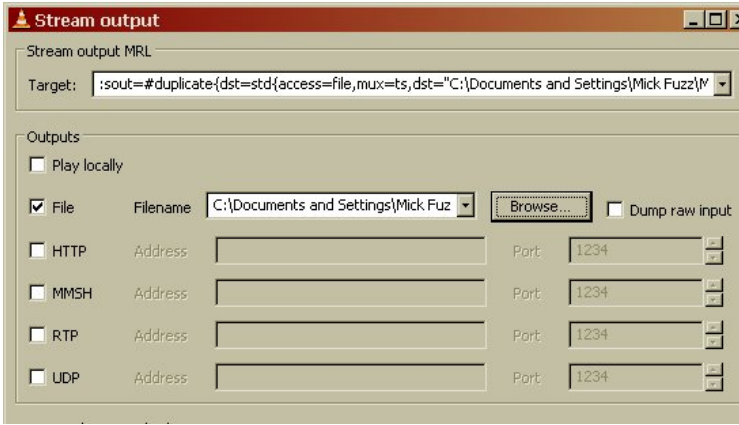
CREATING AN MP4 FILE

Make sure the filename you created in the above step ends *.mp4

In the Encapsulation part of the Stream output box select MP4
Video codec : h264 Bitrate 1024
Audio codec: mp4a Bitrate 128
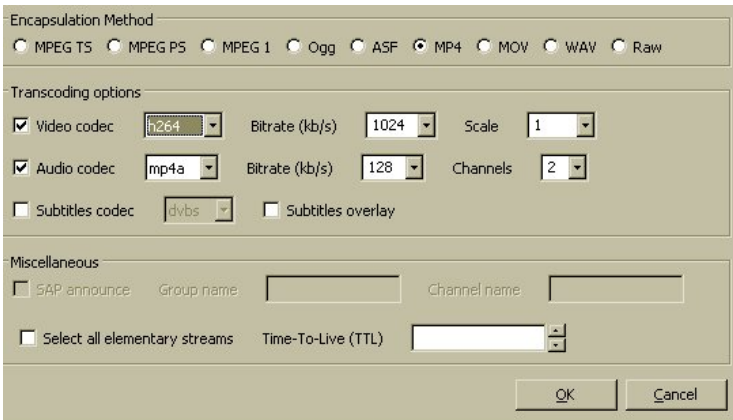
The next bit is a bit tricky part. Go back up to the "Stream output MRL Target:" box. Notice that the box is full of text. Look for the part that has :

```
#transcode{ }, and type width=352,canvas-height=288
```

this will be somewhere inside the { }. Do not add extra spaces. You might need to add a comma, as you'll notice all the values are seperated by a comma.

Be careful here. If you change any of the settings below this box, you will have to re-enter the width and height settings.

You may wish to use other width and height settings or user a lower video or audio bitrate if you want to make the file size smaller. This setting will create files that are about 10Mb per minute. This file should be iPod compatible.

Click OK to close the Stream ouput dialog, then click OK to close the File open dialog. The movie should now start playing without showing the picture on the screen.

When it has finished, you can check to see if your file works by playing it in VLC. Don't forget to take the tick out of the Stream / Save box when you open the file.

CREATING AN OGG THEORA FILE

Make sure the filename you created in the Outputs section ends *.ogg

Choose

Encapsulation Method: Ogg
Video codec : theo Bitrate 1024
Audio codec: vorb Bitrate 128

The next bit is a bit tricky part. Go back up to the "Stream output MRL Target:" box. Notice that the box is full of text. Look for the part that has :

`#transcode{ }, and type ` **`width=352,canvas-height=288`**

the above appears somewhere inside the { }. Do not add extra spaces. You might need to add a comma, as you'll notice all the values are seperated by a comma.

Be careful here. If you change any of the settings below this box, you will have to re-enter the width and height settings.

Click OK to close the Stream ouput dialog, then click OK to close the File open dialog. The movie should now start playing without showing the picture on the screen.

When it has finished, you can check to see if your file works by playing it in VLC. Don't forget to take the tick out of the Stream / Save box when you open the file.

CREATING AN MPEG-1 FILE

The MPEG-1 container and video encoding method is so old now that all computers support it in their default video player with no extra downloads. Also older and cheaper computers can play these files without problems. This can be especially useful if you are creating a CDrom that you want to be universally compatible.

Follow the process opening a file in VLC to encode to another file format to open your file and get it ready to re-encode to another format.

Make sure the file name you choose ends with *.mpg

Choose

Encapsulation Method: Mpeg1
Video codec : mp1v Bitrate 1024
Audio codec: mp2a Bitrate 192

The next bit is a bit tricky part. Go back up to the "Stream output MRL Target:" box. Notice that the box is full of text. Look for the part that has :

`#transcode{ },` and type **`width=352,canvas-height=288`**

somewhere inside the { }. Do not add extra spaces. You might need to add a comma, as you'll notice all the values are seperated by a comma.

Be careful here. If you change any of the settings below this box, you will have to re-enter the width and height settings.
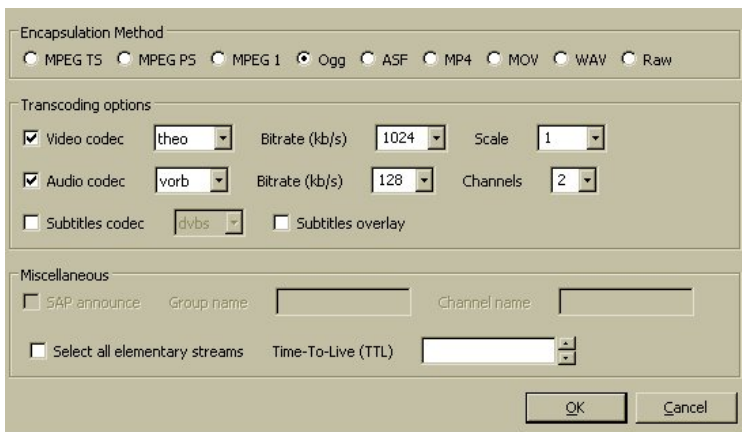
Click OK to close the Stream ouput dialog, then click OK to close the File open dialog. The movie should now start playing without showing the picture on the screen.

When it has finished, you can check to see if your file works by playing it in hopefully any Media player on any system.

16. GRABBING STILLS OF VIDEO FILES

Software name : VLC
Software version : 0.8.6

An interesting screenshot of your video is easy to make.

First play the video/dvd till it get to the bit you want and pause it.
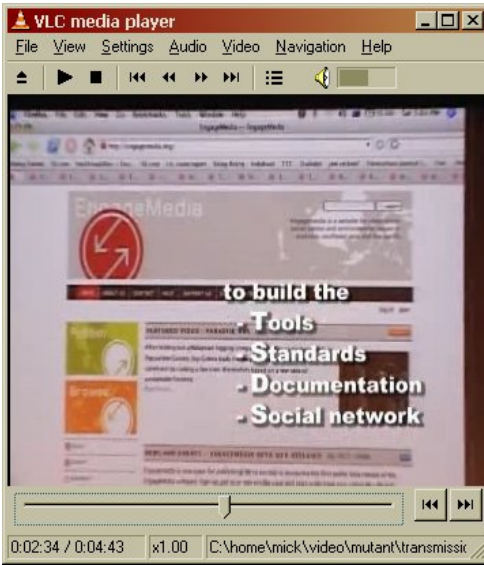
On the top toolbar choose VIDEO and then SNAPSHOT
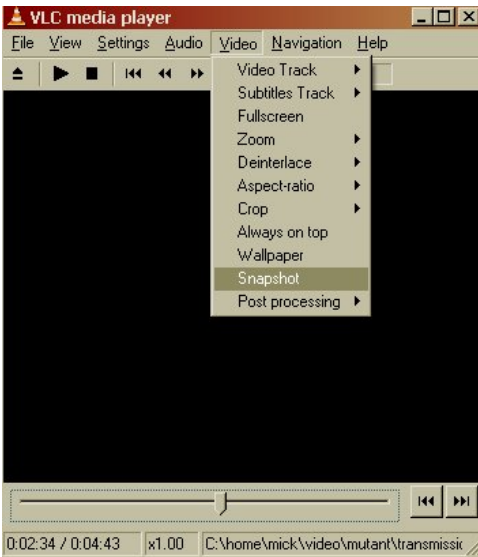
By default this copies an image file of the screen shot to "my Pictures" folder as a png file on Windows, and similar directories on Mac and Linux.

If you look under settings you can choose what file type you want to output and where to put the file and name it.
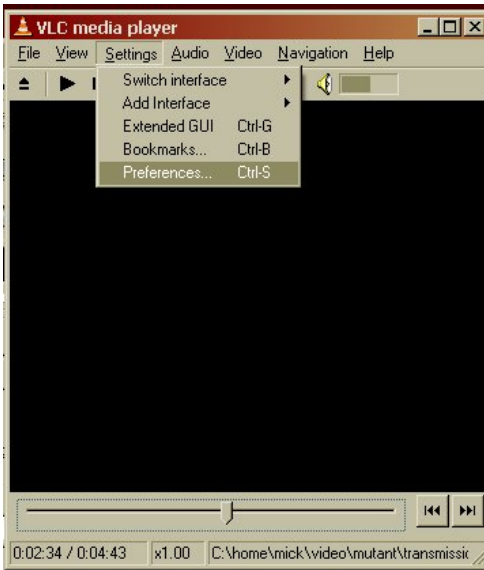
Select Settings > Preferences from the top VLC menu.

Ã,Â
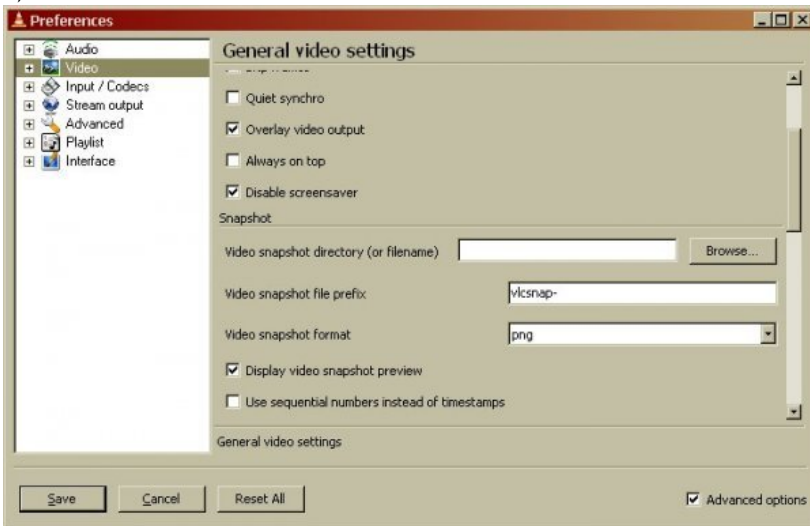
Then Click on the Video entry on the left menu of the Preference box.
Scroll down to the Snapshot section. YOu wil see you can change the
directory where images are saved, the first part of the file name, and
how to number the shots you create.

Below is as screenshot of how I would change the settings to suit me.

Â
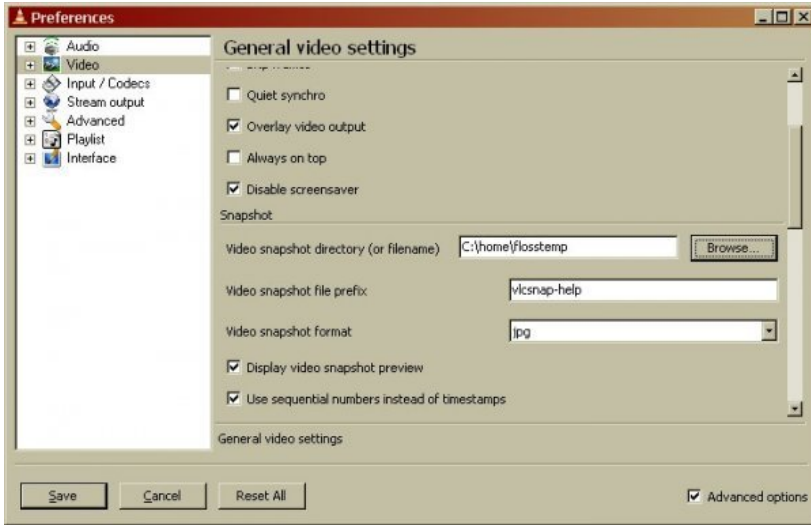
You may want / need to resize the screenshot of your video. I would suggest using the GIMP image programme.

APPENDICES

17. STREAMING

18. RELATED LINKS

MANUALS

Center for Independent Journalism

Some great manuals on Sound Editing, Sound Effects,
Turning Sound Online, Sound Editing (advanced), Setting Up
a Station and a Studio, Designing a Website
http://www.cijmalaysia.org/resources.htm

Spot

Good site for some tips and tricks, especially if you use
Dyne::bolic
http://spot.river-styx.com/linkage.php

ENCODERS

MuSE.MuSE (Linux / OSX)

The best audio encoder for Linux.
http://muse.dyne.org/

Oddcast (Windows)

Great plugin for encoding Ogg and MP3 using Winamp.
http://www.oddsock.org/tools/oddcastv3/

ostream (Windows / Linux)

A cool ogg encoder that runs on Linux, Microsoft Windows,
and MacOSX.
http://radiostudio.org/ostream

oggment (Linux)

 An interesting tool which can encode a single audio source
into a real stream and a ogg stream simultaneously... made
by August Black (radio/software/media artist)... there are
some other interesting tools on this site too
http://oggment.sourceforge.net/ogg-real.php

oggcaster (Linux)

 A plug-in for xmms to stream ogg files to icecast2...
looked interesting but i couldn't get it to compile... I think
there was quite some activity on the development side, so
it might be fixed soon... if doing encoding this way is your
thing then don't forget the excellent xmms-oddcast plug-in
(for icecast2) and the liveice plug-in (for icecast1 only) -
both of which are available from the xmms
(http://www.xmms.org) website in the plug-ins directories

http://xmms-oggcaster.sourceforge.net/

Soma (Linux)

A *very* interesting set of tools... sound daemon, player,
encoder and scheduler... ate a whole lot of my cpu and

wasn't so nice with the crossfades, otherwise i might have used it...

http://www.somasuite.org/

darkice (Linux)

A very light weight, easy to deploy command line live mp3 streamer. You may also wish to look at the GUI interface, which you need to install seperately, it's called darksnow.
http://darkice.sourceforge.net/

liveice (Linux)

Encoder for icecast1. Command line
http://star.arm.ac.uk/~spm/software/liveice.html

MuSE.IceS (Linux)

Command line encoder for icecast1 and icecast2
http://svn.xiph.org/releases/ices/

Oddcast (Windows)

A great plugin for XMMS that allows you to stream MP3 or Ogg. It can be tricky to install as it requires WXWindows.
http://www.oddsock.org

MuSE.MPEG4IP (Linux)

A great how to for mpeg4ip streaming to a Darwin Server
http://www.linuxjournal.com/node/6720/print

PLAYERS

VLC (Windows / Linux / OSX)

The all purpose cross-platform media player. Does much more too...
http://www.videolan.org/vlc/

zinf (Windows / Linux)

A many featured player but couldn't see the advantage over xmms (my preferred gui player) except that it has a built in streaming encoder/server.
http://www.zinf.org/

soundplay (beOS)

This is good if you have beOS (i thought it was for linux at first)... comes with a built in streaming server....
http://www.xs4all.nl/~marcone/soundplay.html

snackAmp (Linux/ Windows)

A hugely featured gui player... almost too many features... has a built in web-server for remote control, and a built in streaming server... I would have used it for the project I was researching if it could work as a command line interface.
http://snackamp.sourceforge.net/

sonic-rainbow (Linux)

This looks nice and simple but i havenever tried it... it plays video too
http://sonic-rainbow.sourceforge.net/

impish (Linux)

This looked like a very sophisticated command line player but alas it has no crossfade and I couldn't get it to compile.
http://www.geocities.com/kman_can/

xmms (Linux)

This is my favorite player if only because it does so much
http://www.xmms.org

mplayer (Linux / Windows / OSX)

This is more a video player but also support audio. You can run it with or without a gui
http://www.mplayerhq.hu/

EMBEDDED PLAYERS

Flam

Flash Mp3player
http://www.flamplayer.com/

Make your own flash mp3 player

http://web.uvic.ca/hrd/halfbaked/howto/audio.htm
http://www.sonify.org/home/feature/remixology/026_mp3player/

Flow

Flash Video Player (open source)
http://flowplayer.sourceforge.net/

STREAMING SERVERS

Icecast

The best audio server on the net.
http://www.icecast.org/

An excellent Icecast Howto from Kerry Cox
http://www.gnuware.com/icecast/

Quicktime / Darwin Streaming Server

An **excellent** how-to for Quicktime Streaming Server, it also covers embedding Quicktime, compression, relaying streams etc

http://www.soundscreen.com/

A great quick how-to for Darwin and VLC (as a server) on Linux http://viz.aset.psu.edu/ga5in/StreamingMedia.html

gini

Looks good... haven't tried it
http://gini.sourceforge.net/

Oyez

Python streaming server
http://ubertechnique.com/seth/oyez/doc/Oyez.html

oggserv

A php based daemon
http://oggserv.sourceforge.net/

litestream

An excellent streaming server with source clients and re-streamer... ultra stable
http://www.litestream.org

ample

A small streaming server
http://ample.sf.net

edna

This allows streaming of files stored on your 'server'
http://edna.sf.net

gnump3d

Another streaming server, also supports ogg
http://www.gnump3d.org

SOFTWARE REPOSITORIES

Dyne

The home of really good streaming software for Linux.
http://www.dyne.org/

Oddsock

A great home for streaming tools for Windows and Linux.
http://www.oddsock.org/

Freshmeat

If you don't know it you are guaranteed to spend the next x hours browsing it.
http://freshmeat.net/

MuSE.SourceForge

Repository for many softwares.
http://www.sf.net

Version Tracker

Good for MacHeads.
http://www.versiontracker.com/

Tucows

Who said I don't look after newbies...an oldie but still useful, especially for Windows users.
http://www.tucows.com/

GNU

Good old GNU roll your own software repository for GPL software.
http://savannah.gnu.org/

OPEN CONTENT REPOSITORIES

Archive.org

Archive.org, otherwise known as the 'Internet Archive' is a place where you can store all your archived streaming files for free. The material must be licenced under Creative Commons or released to the public domain.
http://www.archive.org

ourmedia.org

Free hosting of media content for 'grass roots' media. Also for creative commons or public domain content
http://www.ourmedia.org/

v2v

Independent and activist media content storage (in ogg theora)
http://www.v2v.cc/

cc mixer

Sharing of audio samples licenced under creative commons
http://ccmixter.org/

DIGITAL AUDIO AND CODECS

Information on Formats

Good article on codec comparisons
http://www.cdburner.ca/digital-audio-formats-article/

ARS Technica Codecs

Good article on the difference between average, constant and variable bitrate codec settings

http://arstechnica.com/guides/tweaks/encoding.ars

FREE CODECS

xiph

The home of free codecs.
http://www.xiph.org/

ogg vorbis and theora

Information about free audio codecs and third party applications.

http://www.vorbis.com/

Very good posting on OGG
http://forum.doom9.org/showthread.php?
s=&threadid=77314

An embeded ogg java player
http://www.flumotion.net/cortado/

Good Howto for streaming Theora to Icecast2
http://www.oddsock.org/guides/video.php

XVID

Open Source codec mostly used for ripping and playing
DVDs. http://www.xvid.org/

Dirac

Upcoming free video codec developed by the BBC
http://dirac.sourceforge.net/

MP3 Patents

Good detailed information on MPEG related patents
http://swpat.ffii.org/patents/effects/mpeg/index.en.html

LICENCING CONTENT

Creative Commons

Alternative content licencing models.
http://creativecommons.org/

LICENCING SOFTWARE

Free Software Foundation

http://www.fsf.org/

What is FLOSS?

http://en.wikibooks.org/wiki/FLOSS_Concept_Booklet

PD STREAMING EXTERNALS

A complete list:
http://pd.iem.at/pdb/query.html?
ext=y&alb=y&qry=complete

MuSE.Peer2Peer Streaming

If you want a peer2peer Ogg streamer (ogglive~) for
Windows and Mac OSX versions of PD then go here:
http://www.nullmedium.de/dev/ogglive~/

Speex, MP3, MuSE.P2P

Speex Codex external (Speex~) for Linux and MP3
streaming externals (Mp3cast~) for Windows and Linux
(includes a MP3 peer2peer external - mp3live~) versions of
PD available here:
http://ydegoyon.free.fr/software.html

OGG

If you want Ogg streaming for PD then you can get the pdogg~ externals in an installed version of pd-extended or by installing the pd-externals package, both are available from here:
http://pure-data.sourceforge.net/download.php

MAX/MSP STREAMING EXTERNALS

MP3

Shoutcast external for streaming MP3 from MAX/MSP:
http://www.akustische-kunst.org/maxmsp/

OGG

If you want Ogg streaming for MAX then check here:
http://www.nullmedium.de/dev/oggpro/

TRANSCODING AND RIPPING

Mencoder

A good guide to transcoding using Linux and Mencoder
http://gentoo-
wiki.com/HOWTO_Mencoder_Introduction_Guide

Ripping Guides

A good DVD ripping guide for Linux
http://www.bunkus.org/dvdripping4linux/ a good how to for creating MP3s (for the slightly geeky)
http://howtos.linux.com/howtos/MP3-HOWTO-10.shtml

VIDEO EDITORS (GPL)

Jahshaka

The best I've seen for Linux
http://www.jahshaka.org/

There is also a very good beginners tutorial for Jahshaka here:
http://users.pandora.be/acp/jah/

Pitivi

Under Development
http://www.pitivi.org/

Cinelerra

Good but you need lots of screen space
http://heroinewarrior.com/cinelerra.php3

Cinelerra Tutorials

http://www.ftconsult.com/twiki/bin/view/Cinelerra/CinelerraManualTOC
http://supreetsethi.net/drupal/?q=node/20

Kino

Great editor
http://www.kinodv.org/

General

Some good notes on editing video on Linux
http://users.dslextreme.com/~craig.lawson/linux_notes/video.html
The same site has a great section on CD and DVD
authoring under Linux
http://users.dslextreme.com/~craig.lawson/linux_notes/cds.html

MISCELLANEOUS

History of MP3

A brief overview of the most popular audio format on the
net.
http://www.mp3-mac.com/Pages/History_of_MP3.html

Low Tech

Great spot to learn more about software and hardware if
you are in the UK. http://lowtech.org

Your Machines

Cultural event and ongoing research/writings about free
software.
http://www.yourmachines.org/

MuSE.OggPlay

Play Ogg on your mobile phone
http://symbianoggplay.sourceforge.net/

Googles beta video search

Using the VLC plugin for replay of content....
http://video.google.com/

swf.open4all

Experiment with collecting and transcoding (to flash) most
commonly linked video content
http://swf.open4all.info/

WORKSHOPS

The Streaming Suitcase does various workshops including
streaming, PureData, open source audio, linux etc.
Workshops and resources by these people are also highly
recommended:

Julian Oliver

Blender and gaming workshops (etc)
http://selectparks.net/
http://selectparks.net/~julian
http://selectparks.net/modules.php?
name=News&file=article&sid=395

Derek Holzer

MuSE.PureData and open source audio workshops (etc)
http://www.umatic.nl/info_derek.html

Tetsuo Kogawa

MuSE.MiniFM
http://anarchy.translocal.jp/MiniTV
http://www.silenttv.net

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