VideoLAN HOWTO

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This document describes how to use the complete VideoLAN streaming solution.

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Chapter 1. Introduction

1.1. What is the VideoLAN project ?

1.1.1. Overview

VideoLAN is a complete software solution for video streaming, developed by students of the Ecole Centrale Paris and developers from all over the world, under the GNU General Public License (GPL). VideoLAN is designed to stream MPEG videos on high bandwidth networks.

The VideoLAN solution includes :

- VLS (VideoLAN Server), which can stream MPEG−1, MPEG−2 and MPEG−4 files, DVDs, digital satellite channels, digital terrestial television channels and live videos on the network in unicast or multicast,
- VLC (initially VideoLAN Client), which can be used as a server to stream MPEG−1, MPEG−2 and MPEG−4 files, DVDs and live videos on the network in unicast or multicast ; or used as a client to receive, decode and display MPEG streams under multiple operating systems.

Here is an illustration of the complete VideoLAN solution :

Figure 1−1. Global VideoLAN solution La solution VideoLAN globale
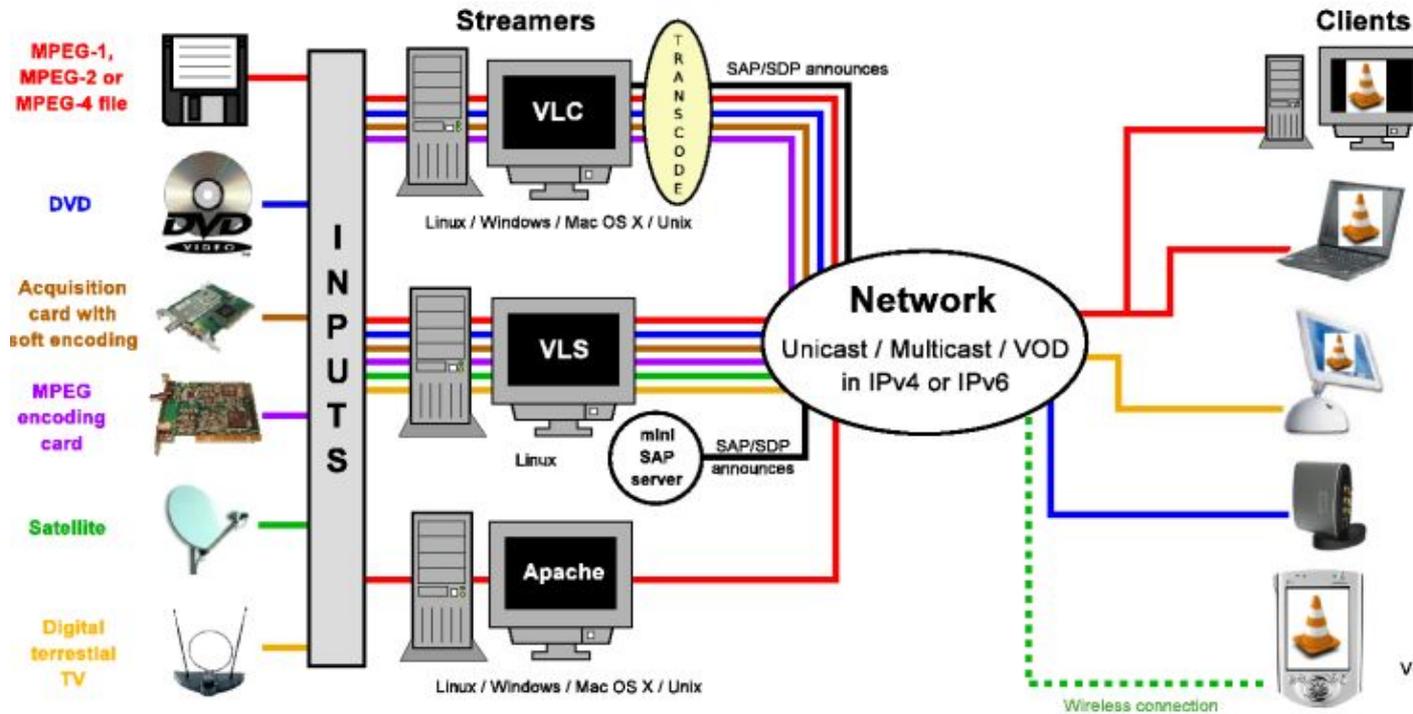
More details about the project can be found on the VideoLAN Web site.

1.1.2. VideoLAN software

1.1.2.1. VLC

VLC works on many platforms : Linux, Windows, Mac OS X, BeOS, *BSD, Solaris, Familiar Linux, Yopy/Linupy and QNX. It can read :

- MPEG−1, MPEG−2 and MPEG−4 / DivX files from a hard disk, a CD−ROM drive, ...
- DVDs and VCDs,
- from a satellite card (DVB−S),
- MPEG−1, MPEG−2 and MPEG−4 streams from the network sent by VLS or VLC's stream output.

VLC can also be used as a server to stream :

- MPEG−1, MPEG−2 and MPEG−4 / DivX files,
- DVDs,
- from an MPEG encoding card,

to :

- one machine (i.e. to one IP address) : this is called *unicast*,
- a dynamic group of machines that the clients can join or leave (i.e. to a multicast IP address) : this is called *multicast*,

in IPv4 or IPv6 .

To get the complete list of VLC's possibilities on each plateform supported, see the VLC features page.

☞ VLC doesn't work on Mac OS 9, and will probably never do.

1.1.2.2. VLS

VLS can stream :

- an MPEG−1, MPEG−2 or MPEG−4 files stored on a hard drive or on a CD,
- a DVD located in a local DVD drive or copied on a hard disk,
- a satellite card (DVB−S) or a digital terrestial television card (DVB−T) ,
- an MPEG encoding card ;

to:

- one machine (i.e. to one IP address) : this is called *unicast*,
- a dynamic group of machines that the clients can join or leave (i.e. to a multicast IP address) : this is called *multicast*,

in IPv4 or IPv6 .

A Pentium 100 MHz with 32 MB of memory should be enough to send one stream on the network. When streaming a lot of videos stored on a hard drive, the actual limitation is not the processor but the hard drive and the network connection.

VLS works under Linux and Windows. To get the complete list of VLS's possibilities on each plateform supported, see the streaming features page.

1.1.2.3. Mini−SAP−server

You can add a channel information service based on the SAP/SDP standard to the VideoLAN solution. The mini−SAP−server sends announces about the multicast programs on the network in IPv4 or IPv6, and VLCs receive these annouces and automatically add the programs announced to their playlist.

The mini−SAP−server works under Linux and Mac OS X.

1.2. What is a codec ?

To fully understand the VideoLAN solution, you must understand the difference between a *codec* and a *container format*

- A *codec* is a compression algorithm, used to reduce the size of a stream. There are audio codecs and video codecs. MPEG−1, MPEG−2, MPEG−4, Vorbis, DivX, ... are codecs
- A *container format* contains one or several streams already encoded by codecs. Very often, there is an audio stream and a video one. AVI, Ogg, MOV, ASF, ... are container formats. The streams contained can be encoded using different codecs. In a perfect world, you could put any codec in any container format. Unfortunately, there are some incompatibilities. You can find a matrix of possible codecs and container formats on the features page

To decode a stream, VLC first *demuxes* it. This means that it reads the container format and separates audio, video, and subtitles, if any. Then, each of these are passed *decoders* that do the mathematical processing to decompress the streams .

There is a particular thing about MPEG:

- MPEG is a *codec*. There are several versions of it, called MPEG−1, MPEG−2, MPEG−4, ...
- MPEG is also a container format, sometimes refered to as *MPEG System*. There are several types of MPEG: ES, PS, and TS

    When you play an MPEG video from a DVD, for instance, the MPEG stream is actually composed of several streams (called Elementary Streams, ES): there is one stream for video, one for audio, another for subtitles, and so on. These different streams are mixed together into a single Program Stream (PS). So, the .VOB files you can find in a DVD are actually MPEG−PS files. But this PS format is not adapted for streaming video through a network or by satellite, for instance. So, another format called Transport Stream (TS) was designed for streaming MPEG videos through such channels.

1.3. How can I use VideoLAN ?

1.3.1. Documentation

The user documentation of VideoLAN is made up of 4 documents :

- the *VideoLAN Quickstart*. This document will give you a quick overview of of VLC, VLC's stream output, the Video On Demand solution and the channel information service system.

- the *VideoLAN HOWTO*. This document is the complete guide of the VideoLAN streaming solution.
- the *VLC user guide*. This document is the complete guide for VLC.
- the *VLS user guide*. This document is the complete guide for VLS.
- the *VideoLAN FAQ*. This document contains Frequently Asked Questions about VideoLAN.

The latest version of these documents can be found on the documentation page .

You can also have a look at the VideoLAN Wiki. This is a website that everyone can change. We use it to document everything that is not in the "official" documentation: the tips and tricks for each O.S., the graphical interfaces, etc...

1.3.2. User support

If you have problems using VideoLAN, and if you don't find the answer to your problems in the documentation, please look at the online archive of the mailing–lists. There are two English–speaking mailing–lists for the users :

- *vlc@videolan.org* for the questions on VLC ,
- *streaming@videolan.org* for the questions on VLS, mini–SAP–server and the network .

If you want to subscribe or unsubscribe to the mailing–lists, please go to the mailing–list page.

You can also talk with VideoLAN users and developers on IRC : server *irc.freenode.net*, channel *#videolan* .

If you find a bug, please follow the instructions on the bug reporting page .

1.4. Command line usage

- VLC has many different graphical interfaces, that are organized quite differently in order to be in harmony with the guidelines of each operating system supported. Documenting the use of each graphical interface is too long, and some features are only available via the command line interface. Therefore we decided to document only the command line interface, but in many cases it shoud be easy to guess how to use the graphical interface for the same use !
- VLS has a command line and a telnet interface, but no graphical interface !

All the commands that show up in this document should be typed inside a terminal. .

1.4.1. Open a terminal

1.4.1.1. Windows

Click on *Start*, *Run* and type :

- **cmd Enter** (Windows 2000 / XP),
- **command Enter** (Windows 95 / 98 / ME).

The terminal appears Le terminal apparait

Figure 1−2. Windows terminal
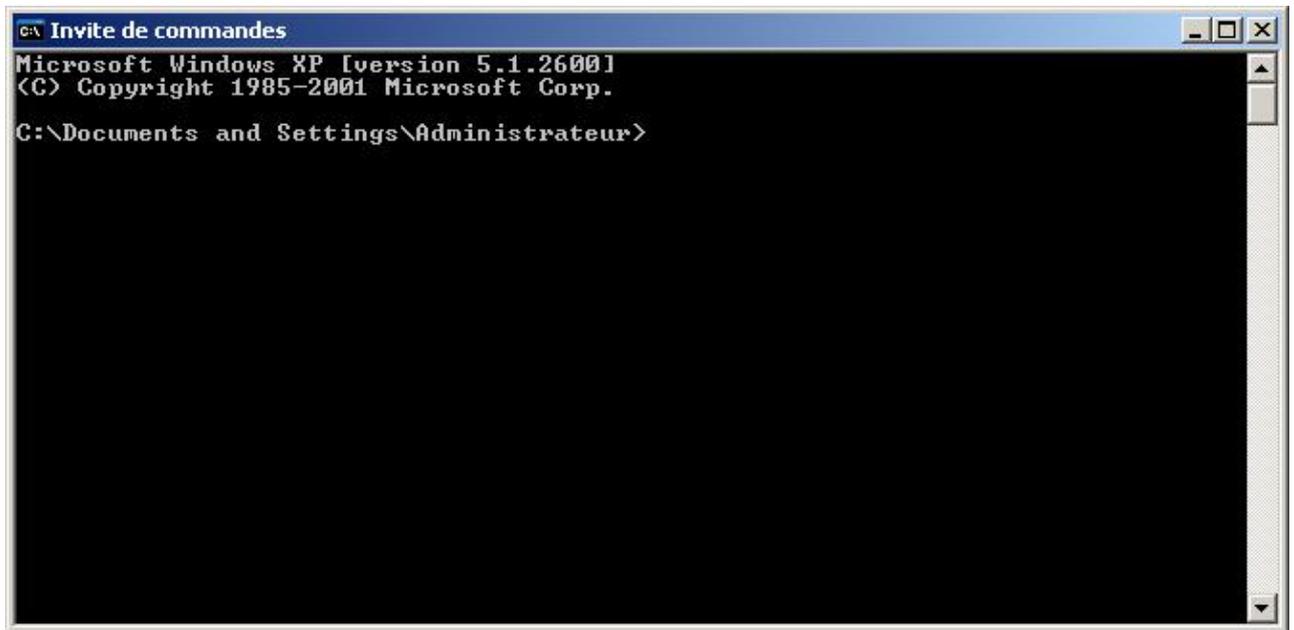
☞ Under Windows, you need to be in the directory where the program is installed to run it.

1.4.1.2. Linux / Unix

Open a terminal :

Figure 1−3. Linux X terminal

In the documentation, we adopt the following conventions for the Unix commands :

- commands that should be typed as *root* have a # prompt :

```
# command_to_be_typed_as_root
```
• commands that should be typed as a regular user have a **%** prompt :
```
% command_to_be_typed_as_regular_user
```

1.4.1.3. Mac OS X

Go to *Applications*, open the folder *Utilities* and double–click on *Terminal* :

Figure 1–4. Mac OS X terminal

☞ Under Mac OS X, you need to be in the directory where the program is installed to run it, and start the command with **./** .

1.4.1.4. BeOS

In the deskbar, go to *Application* and then *Terminal* :

Figure 1–5. BeOS terminal
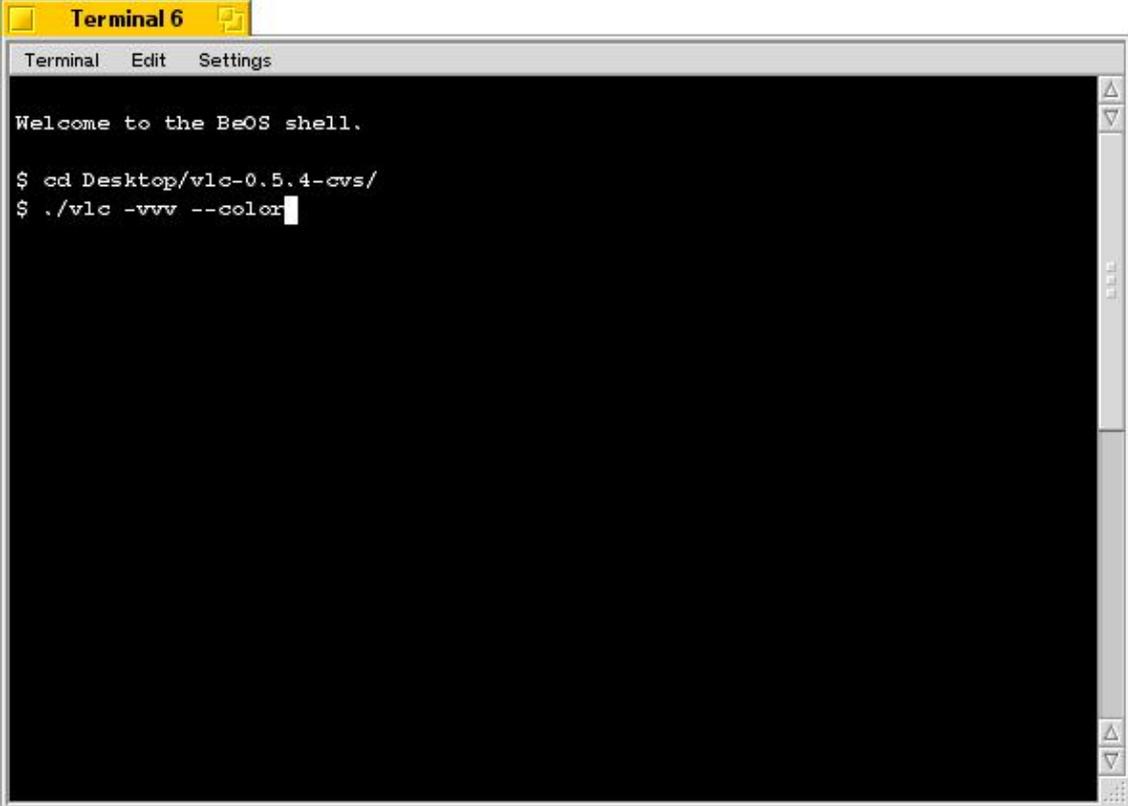
Under BeOS, you need to be in the directory where the program is installed to run it, and start the command with **./** .

Chapter 2. Install the required software and hardware

2.1. Install VLC

There are VLC binaries available for the many OSes, but not for all supported OSes. If there are no binaries for your OS or if you want to change the default settings, you can compile VLC from sources.

2.1.1. Windows

VLC works under Windows 95/98/ME/2000/XP. Download the self−extracting file from the VLC Windows download page. Launch the `.exe` to install VLC.

2.1.2. BeOS

Download the Zip file from the VLC BeOS download page. Unzip the file in a directory to install VLC.

2.1.3. Mac OS X

Download the Mac OS X package from the VLC MacOS X download page . Double−click on the icon of the package : an icon will appear on your Desktop, right beside your drive(s). Open it and drag the VLC application from the resulting window to the place where you want to install it (it should be `/Applications`).

2.1.4. Debian GNU/Linux

2.1.4.1. Debian stable (woody)

Add the following lines to your `/etc/apt/sources.list`:

```
deb http://www.videolan.org/pub/videolan/debian $(ARCH)/
deb-src http://www.videolan.org/pub/videolan/debian sources/
```

Then, for a normal install, do:

```
# apt-get update
# apt-get install gnome-vlc libdvdcss2
```

2.1.4.2. Debian unstable (sid)

Add the following lines to your `/etc/apt/sources.list`:

```
deb http://www.videolan.org/pub/videolan/debian $(ARCH)/
deb-src http://www.videolan.org/pub/videolan/debian sources/
```

Then, for a normal install, do:

```
# apt-get update
# apt-get install wxvlc libdvdcss2
```

2.1.4.3. Debian testing (sarge)

You should not be using Debian testing unless you perfectly know what you are doing. It is almost impossible to support Debian testing and there are no plans to do it. For more informations on Debian testing, please look: testing page

2.1.5. Linux Mandrake

There are VLC packages for Mandrake 9.1 and cooker.

To install them, add the following sources for either Mandrake 9.1 or Cooker (you can use Easy urpmi for that): *contrib* from the core distribution and *plf* (Penguin Liberation Front) from the external add–ons.

Then install the required packages with **urpmi**:

```
# urpmi libdvdcss2 libdvdplay0 wxvlc vlc-plugin-a52 vlc-plugin-ogg vlc-plugin-mad
```

2.1.6. Linux Redhat

Download the RPM package *vlc* and the packages listed in the *required libraries and codecs* section (the other packages are just optional) from the VLC Red Hat download page and put them all into the same directory.

Then install the RPM packages you have downloaded:

```
# rpm -U *.rpm
```

If you have not installed all the RPM packages included with your distribution, you may be asked to install a few of them first.

2.1.7. Compile the sources by yourself (for every other OS)

The method below is for any Unix system supported by VLC, for which there is no packages available. It explains how to compile and install VLC and the needed libraries from their source code.

You can also compile VLC under Linux this way if you want to modify the default supported modules.

2.1.7.1. Install the libraries

Many libraries are needed :

- *libdvbpsi* (compulsory) ,
- *mpeg2dec* (compulsory) ,
- *libdvdcss* if you want to be able to read encrypted DVDs ,
- *libdvdplay* if you want to have DVD menu navigation ,
- *a52dec* if you want to be able to decode the AC3 (i.e. A52) sound format often used in DVDs ,
- *ffmpeg*, *libmad*, *faad2* if you want to read MPEG 4 / DivX files ,

- *libogg* & *libvorbis* if you want to read Ogg Vorbis files .

Download the libraries from the VLC sources download page.

For each library :

- uncompress :
  ```
  % tar xvzf library.tar.gz
  ```
  or

  ```
  % tar xvjf library.tar.bz2
  ```
- configure :
  ```
  % cd library
  % ./configure
  ```
- compile and install :
  ```
  % make
  # make install
  ```

Check that the configuration file /etc/ld.so.conf contains the following line :

```
/usr/local/lib
```

If the line is not present, add–it and then run (as root):

```
# ldconfig
```

2.1.7.2. Install VLC

Download the sources of the lastest release : get the file vlc-version.tar.gz from the VLC sources download page. Uncompress–it :

```
% tar xvzf vlc-version.tar.gz
% cd vlc-version
```

To get the list of configuration options, do :

```
% ./configure --help
```

Please note that all the modules are described in the *Modules* section of the VLC User Guide .

Examples of very simple configurations:

- if you want a basic VLC, do :
  ```
  % ./configure
  ```
- if you want the Gnome interface instead of the GTK interface (you will need the developement packages of Gnome) :
  ```
  % ./configure --enable-gnome
  ```

Then, compile and install :

```
% make
```

```
% su
Password:  [Root Password]
# make install
```

Please note that the installation (**make install** command) is not mandatory. You can execute VLC from where you compiled it.

2.2. Install VLS

2.2.1. Windows

Download the ZIP file from the VLS Windows download page, unzip–it and run `setup.exe` .

2.2.2. GNULinux & Mac OS X

2.2.2.1. Install the libraries

Many libraries are needed for particular uses

- *libdvbpsi* (always needed)
- *libdvdcss* if you want to be able to access encrypted DVDs ,
- *libdvdread* if you want to be able to stream DVDs ,
- *libdvb* if you want to be able to stream from a DVB card (a satellite card or a digital terrestial TV card) .

Download the libraries from the VLS sources download page .

For each library, uncompress, configure (unless for *libdvb* which doesn't have a *./configure*), compile and install :

```
% tar xvzf library.tar.gz
% cd library
% ./configure
% make
# make install
```

Check that the configuration file `/etc/ld.so.conf` contains the following line :

```
/usr/local/lib
```

If the line is not present, add–it and then run :

```
# ldconfig
```

2.2.2.2. Install VLS

Download the sources of the latest release : get the file `vls-version.tar.gz` from the VLS sources download page. Uncompress–it and generate *./configure* :

```
% tar xvzf vls-version.tar.gz
```

```
% cd vls-version
```

To get the list of configuration options, do

```
% ./configure --help
```

Then configure vls :

- if you want a basic VLS without DVD support, do :
  ```
  % ./configure --disable-dvd
  ```
- if you want a VLS with DVD support, do :
  ```
  % ./configure
  ```
- if you want a VLS with DVB support, do :
  ```
  % ./configure --enable-dvb --with-dvb=PATH_TO_DVB_DRIVERS --with-libdvb=PATH_TO_LIBDVB
  ```

Then, compile and install :

```
% make
# make install
```

You can also do a **make uninstall**, **make clean** or **make distclean** as needed .

Chapter 3. Receive and save a stream

3.1. Receive a stream with VLC

3.1.1. Receive an unicast stream

```
% vlc -vvv udp:
```

3.1.2. Receive a multicast stream

```
% vlc -vvv udp:@239.255.12.42
```
where *239.255.12.42* is the multicast IP address you want to join .

3.1.3. Receive an HTTP/FTP/MMS stream

Use one of the following command lines :

- ```
  % vlc -vvv http://example/stream.xyz
  ```
  where *http://example/stream.xyz* is the HTTP address of the stream ;
- ```
  % vlc -vvv ftp://example/stream.xyz
  ```
  where *ftp://example/stream.xyz* is the FTP address of the stream ;
- ```
  % vlc -vvv mms://viptvr.yacast.fr/encoderfranceinfo
  ```
  where *mms://viptvr.yacast.fr/encoderfranceinfo* is the MMS address of the stream .

3.2. Save a stream with VLC

VLC can save the stream to the disk. In order to do this, use the Stream Output of VLC : you can do it via the graphical interface, or you can add to the command line the following argument :

```
--sout file/muxer:stream.xyz
```

where :

- *muxer* is one of the formats supported by VLC's stream output, i.e. :

    - ♦ *avi* for AVI format ,
    - ♦ *ogg* for OGG format ,
    - ♦ *ps* for MPEG2−PS format ,
    - ♦ *ts* or *ts_dvbpsi* for MPEG2−PS format (the latter uses *libdvbpsi* for the task) .
- and `stream.xyz` is the name of the file you want to save the stream to, with the right extension .

3.3. Receive a stream with a set−top−box

Some set−top−boxes with Ethernet cards can receive MPEG2−TS streams over UDP and support multicast. This is the case of the Pace and Aminocom set top boxes. We have tested the *AmiNET 100* set−top−box from Aminocom: it is nice and small, and it works very well with VideoLAN .

Chapter 4. Stream a file

4.1. Stream a file with VLC

```
% vlc -vvv video1.xyz --sout udp:192.168.0.42 --ttl 12
```
where :

- video1.xyz is the file you want to stream ,
- *192.168.0.42* is either :

  - ◆ the IP address of the machine you want to unicast to ;
  - ◆ or the DNS name the machine you want to unicast to ;
  - ◆ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

If you want to stream the file continuously, add the *−−loop* option .

4.2. Stream a file with VLS

```
% vls -vv -d udp:192.168.0.42 file:video1.xyz --ttl 12
```
where :

- video1.xyz is the file you want to stream ,
- *192.168.0.42* is either :

  - ◆ the IP address of the machine you want to unicast to ;
  - ◆ or the DNS name the machine you want to unicast to ;
  - ◆ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

When you want to stop VLS, use the key combination **Ctrl−c**.

If you want to stream the file continuously, add the *−−loop* option .

☞ VLS can stream MPEG files that meet two critera :

- the file must be MPEG *PS* (Program Stream) or MPEG *TS* (Transport Stream), that contain video and audio multiplexed. VLS cannot stream MPEG *ES* (Elementary Stream), i.e. a file with only audio or video .

  In order to know if an MPEG file is MPEG *PS*, MPEG *TS* or MPEG *ES*, read the file with VLC and look at the messages (select in the menu *View / Messages*, or use the command line **vlc −vvv**) .

  - ◆ If you see a line :
    ```
    [00000107] main module debug: using demux module "ts_dvbpsi"
    ```

it means the file is MPEG TS .

♦ If you see a line :

```
[00000109] main module debug: using demux module "ps"
```

it means the file is MPEG PS .

♦ If you see a line :

```
[00000109] main module debug: using demux module "es"
```

it means the file is MPEG ES, VLS can't stream it. .

• the sequence header of the video must repeat itself regularly, which is often the case with MPEG−2, but very rare with MPEG−1. There is no easy way to know if the sequence header is repeated regularly. Files with a *.vob* extension are normally MPEG−2 files and files with *.mpg* or *.mpeg* extension or usually MPEG−1 files .

You can download this streamable MPEG−2 PS file for your tests : presentation_short.vob .

Chapter 5. Stream a DVD

☞ Under Unix/Linux, you must have write access to the device corresponding to your DVD drive. For that, you should be in the *disk* or *cdrom* group (look at the permissions in `/dev`). If you're not, add yourself to the group :

```
# adduser your_login disk_or_cdrom
```

and then restart your session .

5.1. Stream a DVD with VLC

```
% vlc -vvv dvdold:/dev/dvd --sout udp:192.168.0.12 --ttl 12
```
where :

- `/dev/dvd` is the name of your DVD drive (put `D:` under Windows if `D` is the letter of your DVD drive) or the directory where you copied your DVD ,
- *192.168.0.42* is either :

    ♦ the IP address of the machine you want to unicast to ;
    ♦ or the DNS name the machine you want to unicast to ;
    ♦ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

If you want to stream the DVD continuously, add the *−−loop* option .

5.2. Stream a DVD with VLS

☞ This is possible under GNU/Linux only .

```
% vls -vv -d udp:192.168.0.42 dvd:/dev/dvd --ttl 12
```

where :

- `/dev/dvd` is the name of your DVD drive or the directory where you copied your DVD ,
- *192.168.0.42* is either :

    ♦ the IP address of the machine you want to unicast to ;
    ♦ or the DNS name the machine you want to unicast to ;
    ♦ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

If you want to stream the DVD continuously, add the *−−loop* option .

Chapter 6. Stream a DVB channel (satellite or digital terrestrial TV)

This is possible under GNU/Linux only .

6.1. Install the DVB drivers

If you want to be able to stream from a DVB card (a satellite card or a digital terrestrial TV card), you need to install the DVB drivers:

- if you use a Linux 2.6.x kernel, you just need to compile the right modules ;
- if you are using a Linux 2.4.x kernel, you must download the latest release of the DVB drivers from the DVB drivers download page of the LinuxTV Project.

Uncompress the tarball and follow the instructions written in the `INSTALL` file to compile and install the drivers .

6.2. Stream with VLS

Put a `.dvbrc` file containing the DVB channels (satellite or digital terrestrial TV channels) you want to stream in your home directory (some are provided in the *libdvb* tarball for the satellite channels) .

Run VLS with the following command line :

```
% vls -vv -d udp:192.168.0.42 dvb:"EUROSPORT" --ttl 12
```

where :

- *"EUROSPORT"* is the channel you want to stream as written in your `~/.dvbrc` file ,
- *192.168.0.42* is either :

  ♦ the IP address of the machine you want to unicast to ;
  ♦ or the DNS name the machine you want to unicast to ;
  ♦ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

6.3. Stream with VLC

For this, you must use the CVS version of VLC and compile it with **./configure −−enable−dvb** This feature should still be considered as experimental.

```
% vlc -vvv --program 8211 dvb:12597000:0:3:27500000 --sout udp:192.168.0.12 --ttl 12
```

where :

- 8211 is the PID of the DVB channel you would like to stream, expressed as a decimal number ;
- 12597000 is the frequency of the transponder you want to stream from in Hz;
- 0 is the polarization (0 for vertical, 1 for horizontal) ;
- 3 is the FEC (3 for 3/4, 9 for auto) ;
- 27500000 is the transponder symbol rate in Hz ;
- *192.168.0.12* is either :

  - ♦ the IP address of the machine you want to unicast to ;
  - ♦ or the DNS name the machine you want to unicast to ;
  - ♦ or the multicast IP address.
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers).

Chapter 7. Stream from an MPEG encoding card

☞ This is possible under GNU/Linux only .

VideoLAN supports two MPEG−2 encoding cards :

- Hauppauge WinTV−PVR−250,
- Visiontech Kfir.

The Hauppauge WinTV−PVR−250 gives much better results and is cheaper than the Visiontech Kfir .

7.1. Stream with the Hauppauge WinTV−PVR−250 card

7.1.1. Install the drivers

First, you will have to patch your kernel to support the v4l2 API (Video 4 Linux version 2). The patch is available on the Video4Linux HQ .

Once your kernel is ready, install the CVS version of the Linux drivers for the Hauppauge WinTV−PVR−250. They are hosted on ivtv.sourceforge.net. Then, you will have to create the device and load the modules; for this, please refer to the documentation shipped with the drivers .

7.1.2. Stream with VLC

☞ You must add **−−enable−pvr** to **./configure** to use this feature. You may want to change the value of *CR_MAX_AVERAGE_COUNTER* to *1000* in src/input/input_clock.c to work around a problem with the card .

```
% vlc -vvv pvr:/dev/video0:norm=secam:size=720x576:frequency=576250:
bitrate=3000000:maxbitrate=4000000 --sout udp:192.168.0.42 --ttl 12
```

where :

- */dev/video0* is the device corresponding to the encoding card ,
- *norm=secam* is name of the standard of the analogic signal (possible values are pal, secam, and ntsc) ,
- *size=720x576* is the size of the video you want to stream ,
- *frequency=567250* is the frequency in kHz of the channel you want to stream ,
- *bitrate=3000000* is the average bitrate of the stream ,
- *maxbitrate=4000000* is the maximum bitrate of the stream ,
- *192.168.0.42* is either :

  - ◆ the IP address of the machine you want to unicast to ;
  - ◆ or the DNS name the machine you want to unicast to ;
  - ◆ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

7.1.3. Stream with VLS

There is no command line interface for this input for the moment, so you will have to use the configuration file .

You cannot set−up the parameters of the drivers (norm, size, frequency, bitrate, etc...) with VLS: for that, you will have to use the program **ptune.pl** that come with the drivers. Please refer to the documentation shipped with the drivers to learn how to use this program .

Here is a typical configuration file `vls.cfg`to run VLS with a Hauppauge WinTV−PVR−250 encoding card :

```
# vls.cfg (VLS configuration file)
# Example of the VideoLAN HOWTO for the Hauppauge WinTV-PVR-250 encoding card

BEGIN "Inputs"

  pvr      = "video"

END

BEGIN "pvr"

  # Hauppauge WinTV-PVR-250 device
  Device       = "/dev/video0"

  # Stream type
  Type         = "Mpeg2-PS"

END

BEGIN "Channels"

  channel1       = "network"

END

BEGIN "channel1"

  # Unicast or multicast IP address
  DstHost = "192.168.0.42"

  # Destination port
  DstPort = "1234"

  # If it's a multicast IP address, uncomment the line below
  #Type    = "multicast"

  # If it's a multicast IP address, set the "Time To Live" below
  #TTL     = "12"

END

BEGIN "LaunchOnStartUp"

  command1 = "start video channel1 pvr"

END
```

Once you have adapted the configuration file above, run VLS :

```
% vls -vv -f vls.cfg
```

7.2. Stream with the Visiontech Kfir card

7.2.1. Install the drivers

If you want to be able to stream from a Visiontech Kfir card, you need to install its Linux drivers. Download the latest release of the drivers from the drivers download page of the LinuxTV web site .

Uncompress the tarball and follow the instructions written in the INSTALL file to compile and install the drivers .

☞ If you have a VIA chipset, you need to disable USB in the BIOS .

7.2.2. Stream with VLC

```
% vlc -vvv kfir:/dev/video --sout udp:192.168.0.42 --ttl 12
```
where :

- /dev/video is the device corresponding to the Kfir card ,
- *192.168.0.42* is either :

  ♦ the IP address of the machine you want to unicast to ;
  ♦ or the DNS name the machine you want to unicast to ;
  ♦ or a multicast IP address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

7.2.3. Stream with VLS

There is no command line interface for this input for the moment, so you will have to use the configuration file .

Here is a typical configuration file vls.cfgto run VLS with a VisionTech Kfir encoding card :

```
# vls.cfg (VLS configuration file)
# Example of the VideoLAN HOWTO for the Visiontech Kfir encoding card

BEGIN "Inputs"

  kfir       = "video"

END

BEGIN "kfir"

  # Visiontech Kfir device
  Device        = "/dev/video"
```

```
  # Stream type (default is "Mpeg2-PS")
  Type         = "Mpeg2-PS"

END

BEGIN "Channels"

  channel1       = "network"

END

BEGIN "channel1"

  # Unicast or multicast IP address
  DstHost = "192.168.0.42"

  # Destination port
  DstPort = "1234"

  # If it's a multicast IP address, uncomment the line below
  #Type    = "multicast"

  # If it's a multicast IP address, set the "Time To Live" below
  #TTL     = "12"

END

BEGIN "LaunchOnStartUp"

  command1 = "start video channel1 kfir"

END
```

Once you have adapted the configuration file above, run VLS :

```
% vls -vv -f vls.cfg
```

Chapter 8. Stream from an acquisition card or a webcam

⚲ This is possible under GNU/Linux only .

8.1. Install the Video for Linux drivers

If you want to stream from an acquisition card or a webcam, a video4linux driver must be available for it. You can find more information about video4linux and supported devices here .

Compile the right module for your device, and insert it into your kernel (Some video4linux modules are shipped with the 2.4.x Linux kernels). You can test your device by using any of the listed programs in the *Video: TV and PVR/DVR* section of this page .

Note that v4l2 modules will also work with VLC .

8.2. Stream with VLC

⚲ You must add −−**enable−v4l** to **./configure** to use this feature .

```
% vlc -vvv v4l:/dev/video:norm=secam:frequency=543250:size=640x480:channel=0:adev=/dev/dsp:audio=
--sout '#transcode{vcodec=mp4v,acodec=mpga,vb=3000,ab=256,vt=800000,keyint=80,deinterlace}:std{ac
```

where :

- /dev/video is the device corresponding to your acquisition card or your webcam ,
- *norm=secam* is name of the standard of the analogic signal (possible values are pal, secam, and ntsc) ,
- *frequency=543250* is the frequency of the channel in khz (*Warning :* for VLC < 0.6.1, Frequency is channel frequency in MHz multiplied by 16) ,
- *size=640x480* is the size of the video you want (you can also put the standard size like *subqcif* (128x96), *qsif* (160x120), *qcif* (176x144), *sif* (320x240), *cif* (352x288) or *vga* (640x480)) ,
- *channel=0* is the number of the channel (usually 0 is for tuner, 1 for composite and 2 for svideo) ,
- *adev=/dev/dsp* is the audio device ,
- *audio=1* is the number of the audio channel (usually 0 is for mono and 1 for stereo) ,
- *vcodec=mp4v* is the video format you want to encode in (*mp4v* is MPEG−4, *mpgv* is MPEG−1, and there is also *h263*, *DIV1*, *DIV2*, *DIV3*, *I420*, *I422*, *I444*, *RV24*, *YUY2*),
- *acodec=mpga* is the audio format you want to encode in (*mpga* is MPEG audio layer 2, *a52* is A52 i.e. AC3 sound) ,
- *vb=3000* is the video bitrate in Kbit/s ,
- *ab=256* is the audio bitrate in Kbit/s
- *vt=800000* is the video bitrate tolerance in bit/s ,
- *keyint=80* is the maximum interval between two "I" images in number of images ,
- *deinterlace* tells VLC to deinterlace the video on the fly ,
- *192.168.0.42* is either :

    ◆ the IP address of the machine you want to unicast to ;
    ◆ or the DNS name the machine you want to unicast to ;

♦ or a multicast IP address .

- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

8.3. Stream with VLS

☞ You need the CVS version of VLS. When you compile it, you must do a **./bootstrap** and **./configure --enable-v4l --with-ffmpeg=PATH** (where *PATH* is the absolute path to the directory where you compiled ffmpeg, and not the relative path !) .

There is no command line interface for this input for the moment, so you will have to use the configuration file .

Here is a typical configuration file `vls.cfg` to run VLS with a v4l device :

```
# vls.cfg (VLS configuration file)
# Example of the VideoLAN HOWTO for the Video for Linux input

BEGIN "Inputs"

  webcam       = "v4l"

END

BEGIN "webcam"

  # V4L device
  Device       = "/dev/video"

  # Channel Source : Webcam is often "0"
  #                  TV Card, may be Tuner(0), Composite(1), Svideo(2)
  Channel      = "0"

  # Norm: PAL=0, NTSC=1, SECAM=2
  Norm         = "0"

  # Frequency of the channel in Mhz, multiplied by 16 (tuner cards only)
  Frequency    = "7668"

  # Size possibilities: can be either:
  # - empty string : default size
  # - width x height
  # - subQCIF(128x96), QSIF(160x120), QCIF(176x144), SIF(320x240),
  #   CIF(352x288), VGA (640x480)
  Size         = ""

  # DeInterlace: "0" = no ; "1" = yes
  DeInterlace  = "0"

  # Video compression format: "mpeg1" or "mpeg4"
  Compression  = "mpeg4"

  # Video bitrate (approx.) in kbps
  Bitrate      = "500"

  # Quality: "1.0" (good) to "31.0" (bad)
  Quality      = "1.0"
```

```
  # Sound device
  AudioDevice   = "/dev/dsp"

  # Audio compression format: "mp2", "mp3" or "ogg"
  AudioCompression = "mp2"

  # Audio bitrate in kpbs
  AudioBitrate  = "64"

  # Audio frequency ("16000", "22050", "24000", "32000", "44100" or "48000")
  AudioFreq     = "16000"

  # Audio channel: "1" = mono ; "2" = stereo
  AudioChannel  = "2"

END

BEGIN "Channels"

  channel1      = "network"

END

BEGIN "channel1"

  # Unicast or multicast IP address
  DstHost = "192.168.0.42"

  # Destination port
  DstPort = "1234"

  # If it's a multicast IP address, uncomment the line below
  #Type    = "multicast"

  # If it's a multicast IP address, set the "Time To Live" below
  #TTL     = "12"

END

BEGIN "LaunchOnStartUp"

  command1 = "start video channel1 webcam"

END
```

Once you have adapted the configuration file above, run VLS :

```
% vls -vv -f vls.cfg
```

Chapter 9. Advanced use of VLC's stream output (transcoding, multiple streaming, etc...)

9.1. The syntax

Please refer to the *command line interface* chapter of the VLC user guide to learn the syntax of VLC's stream output. You can find the VLC user guide on the documentation page .

9.2. Examples

9.2.1. Transcoding

Transcode the input stream and send it to a multicast IP address with the associated SAP announce :

```
% vlc -vvv input_stream --sout '#transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128,deinterlace}:
standard{access=udp,mux=ts,url=239.255.12.42,sap=TestStream}'
```

Display the input stream, transcode it and send it to a multicast IP address with the associated SAP announce :

```
% vlc -vvv input_stream --sout '#duplicate{dst=display,dst=
"transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128,deinterlace}:
standard{access=udp,mux=ts,url=239.255.12.42,sap=TestStream}"}'
```

Transcode the input stream, display the transcoded stream and send it to a multicast IP address with the associated SAP announce :

```
% vlc -vvv input_stream --sout '#transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128,deinterlace}:
duplicate{dst=display,dst=standard{access=udp,mux=ts,url=239.255.12.42,sap=TestStream}}'
```

9.2.2. Multiple streaming

Send a stream to a multicast IP address and a unicast IP address :

```
% vlc -vvv input_stream --sout '#duplicate{dst=
standard{access=udp,mux=ts,url=239.255.12.42,sap=TestStream},
dst=standard{access=udp,mux=ts,url=192.168.1.2}}'
```

Display the stream and send it to two unicast IP addresses :

```
% vlc -vvv input_stream --sout '#duplicate{dst=display,dst=
standard{access=udp,mux=ts,url=192.168.1.12},
dst=standard{access=udp,mux=ts,url=192.168.1.42}}'
```

9.2.3. Transcoding and multiple streaming

Transcode the input stream, display the transcoded stream and send it to a multicast IP address with the associated SAP announce and an unicast IP address :

```
% vlc -vvv input_stream --sout '#transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128,deinterlace}:
duplicate{dst=display,dst=standard{access=udp,mux=ts,url=239.255.12.42,sap=TestStream},
dst=standard{access=udp,mux=ts,url=192.168.1.2}}'
```

Display the input stream, transcode it and send it to two unicast IP addresses :

```
% vlc -vvv input_stream --sout '#duplicate{dst=display,
dst="transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128}:
duplicate{dst=standard{access=udp,mux=ts,url=192.168.1.2},
dst=standard{access=udp,mux=ts,url=192.168.1.12}}"}'
```

Send the input stream to a multicast IP address and the transcoded stream to another multicast IP address with the associated SAP announces :

```
% vlc -vvv input_stream --sout '#duplicate{dst=
standard{access=udp,mux=ts,url=239.255.1.2,sap=OriginalStream},
dst="transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128}:
standard{access=udp,mux=ts,url=239.255.1.3,sap=TranscodedStream}"}'
```

9.2.4. HTTP streaming

Stream in HTTP :

- on the server, run :
  ```
  % vlc -vvv input_stream --sout '#standard{access=http,mux=ogg,url=server.example.org:8080}
  ```
- on the client(s), run :
  ```
  % vlc http://server.example.org:8080
  ```

Transcode and stream in HTTP :

```
% vlc -vvv input_stream --sout '#transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128}:
standard{access=http,mux=ogg,url=server.example.org:8080}'
```

For example, if you want to stream an audio CD in Ogg/Vorbis over HTTP :

```
% vlc -vvv cdda:/dev/cdrom --sout '#transcode{acodec=vorb,ab=128}:
standard{access=http,mux=ogg,url=server.example.org:8080}'
```

9.2.5. Use the *es* module

Separate audio and video in two PS files :

```
% vlc -vvv input_stream --sout
'#es{access=file,mux=ps,url_audio=audio-%c.%m,url_video=video-%c.%m}'
```

Extract the audio track of the input stream to a TS file :

```
% vlc -vvv input_stream --sout '#es{access_audio=file,mux_audio=ts,url_audio=audio-%c.%m}'
```

Stream in unicast the audio track on a port and the video track on another port :

- on the server side :

```
% vlc -vvv input_stream --sout
'#es{access=rtp,mux=ts,url_audio=192.168.1.2:1212,url_video=192.168.1.2:1213}'
```
- on the client side: to receive the audio :
```
% vlc udp:@:1212
```
to receive the video :

```
% vlc udp:@:1213
```

Stream in multicast the video and dump the audio in a file :

```
% vlc -vvv input_stream --sout '#es{access_video=udp,mux_video=ts,url_video=239.255.12.42,
access_audio=file,mux_audio=ps,url_audio=audio-%c.%m}'
```

☞ You can also combine the *es* module with the other modules to set–up even more complex solution .

Chapter 10. Stream in IPv6

10.1. Stream in IPv6

☞ You will need an IPv6–aware operating system, like Linux 2.4.21 with the *ipv6* module loaded, Windows XP Service Pack 1 or Mac OS X version 10.2 or higher. Please look at the features pages on the VideoLAN web site to know about the status of IPv6 in VLC and VLS for each O.S .

⚠ If you are using VMware under Linux, you will have to stop VMware and unload the VMware kernel modules, because we noticed it prevented IPv6 streaming !

10.1.1. Stream with VLC

```
% vlc -vvv video1.xyz --ipv6 --sout udp:[ff08::1] --ttl 12
```
where :

- `video1.xyz` is the file you want to stream (you can also put **dvdold:/dev/dvd** to stream a DVD or any other input configuration) ,
- *ff08::1* is either :

    ◆ the IPv6 address of the machine you want to unicast to ;
    ◆ or the multicast IPv6 address .
- *12* is the value of the TTL (Time To Live) of your IP packets (which means that the stream will be able to cross 11 routers) .

☞ Under Unix/Linux, you may have to protect the square brackets around the IPv6 address :

```
% vlc -vvv video1.xyz --ipv6 --sout udp:\[ff08::1\] --ttl 12
```

☞ You may have to specify the output network interface :

```
% vlc -vvv video1.xyz --ipv6 --sout udp:[ff08::1%eth0] --ttl 12
```

where *eth0* is the name of the network interface (under Linux the network interfaces are named *ethX*, under Mac OS X it's *enX* and under Windows it's *X*, where *X* is the appropriate number) .

10.1.2. Stream with VLS

You will need to use the configuration file `vls.cfg`. Please, see the VLS user guide to know how to write one for IPv6 streaming in unicast or multicast .

10.2. Receive in IPv6

10.2.1. Receive an unicast stream

```
% vlc -vvv --ipv6 udp:
```

10.2.2. Receive a multicast stream

```
% vlc -vvv --ipv6 udp:@[ff08::1]
```

☞ Under Unix/Linux, you may have to protect the square brackets around the IPv6 address :

```
% vlc -vvv --ipv6 udp:@\[ff08::1\]
```

☞ You may have to specify the output network interface :

```
% vlc -vvv video1.xyz --ipv6 --sout udp:[ff08::1%eth0] --ttl 12
```

where *eth0* is the name of the network interface (under Linux the network interfaces are named *ethX*, under Mac OS X it's *enX* and under Windows it's *X*, where *X* is the appropriate number) .

Chapter 11. Video On Demand

11.1. Overview

With Video On Demand (VOD), the user can start the video when he wants, make pauses, go forward and back in the video. It is of course the best in video streaming and the dream for every user.

VOD is a very big consumer of resources for the server and the network. VOD is unicast, not multicast : this means that the network and server resources needed are directly proportional to the number of clients.

The design of VideoLAN's VOD solution is very simple. The idea is to do HTTP streaming, i.e. stream an MPEG video encapsulated in HTTP. The regulation of the bitrate between the client and the server is done automatically by TCP. With HTTP version 1.1, there is the possibility to seek in a file downloaded, that's what we use to seek in the video.

11.2. On the server side

On the VOD server, you need a running Web server. For example, you can use a Linux server running Apache. Other operating systems and other Web servers should work too, but we have never tested.

Make your MPEG–1, MPEG–2 or MPEG–4 / DivX files available to the clients on the Web server.

For example, we have a Web server whose DNS name is *localserver*. On this server, we put an MPEG file `video1.mpg` which will be available to the clients at the URL `http://localserver/video1.mpg`.

11.3. On the client side

```
% vlc -vvv http://localserver/video1.mpg
```
VLC starts to read the stream nearly immediately and you can seek in the stream, make pauses, etc... as if the stream was a local file.

Chapter 12. Add a channel information service

Typing multicast addresses is not very fun... that's why you need a channel information service ! VideoLAN has implemented a channel information service based on the SAP/SDP standard. The SAP announces about the multicast programs are sent on the network (via the multicast address *224.2.127.254* reserved for this purpose). On the client side, VLCs receive these annouces and automatically add the programs announced to their playlist.

VLC can send the SAP announces associated with the programs it is streaming. VLS can't do that, but an independant program, the mini−SAP−server, can send the announces for the programs sent by VLS.

12.1. Send announces when streaming with VLC

To send announces with VLC, you need to use the complex syntax of VLC's stream output, like this:

```
% vlc -vvv input_stream --sout '#standard{access=udp,url=239.255.12.42,sap="Test Stream"}' --ttl
```

where `video1.xyz` is the file you want to stream, *239.255.12.42* is the multicast IP address you want to stream on, *Test Stream* is the name that will be used for this program in the SAP announces and *12* is the value of the TTL (Time To Live) of the stream and of the SAP announces.

To do the SAP announces in IPv6, just add the *sap_ipv=6* option:

```
% vlc -vvv input_stream --sout '#standard{access=udp,url=239.255.12.42,sap="Test Stream",sap_ipv=
```

12.2. Send announces for the programs streamed by VLS with the mini−SAP−server

☞ The mini−SAP−server is only available for Linux and Mac OSX.

12.2.1. Install the mini−SAP−server

Download the latest version of the mini−SAP−server from the streaming download page.

Install−it:

```
% tar xvzf miniSAPserver-version.tar.gz
% cd miniSAPserver-version
% ./configure (if version >= 0.2.3)
% make
```

12.2.2. Configure the mini−SAP−server

Edit the configuration file `sap.cfg` shipped with the tarball. It should contain a global section with the Time To Live (TTL) and the IP version (IPv4 or IPv6) used for the SAP announces and a section per program announced. Use the comments to understand each parameter.

The Time To Live option indicates the maximum number of routers that the SAP announce packets can cross before being dropped.

12.2.3. Run the mini−SAP−server

Start the mini−SAP−server:

```
% ./sapserver -c sap.cfg
```

If you want to run the mini−SAP−server in the background, use the **−d** command line switch. For instance:

```
% ./sapserver -d -c sap.cfg
```

You can also omit the **−c** command line switch if your config file is `/etc/sap.cfg`.

12.3. Start VLC(s) on the client(s)

- If the announces are sent in IPv4 :
  ```
  % vlc -vvv --extraintf sap
  ```
- If the announces are sent in IPv6 :
  ```
  % vlc -vvv --extraintf sap --sap-ipv6
  ```

Then open the playlist: you should see the names of the programs announced in SAP. When you double−click on the name of a program, VLC will subscribe to the multicast address and start to play the stream !

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A.1. PREAMBLE

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