

# WebcamStudio

A virtual webcam for free!



Patrick Balleux

2011

# WebcamStudio

A virtual webcam for free!

## User Manual

This document will give you an overview of the usage of WebcamStudio on your system. Tips about installations, broadcasting and special effects will be covered.



If you ever wanted to become a broadcaster, WebcamStudio is the tool that you need. No complex script files to configure, easy installation and update, easy interface to use while streaming live over the Internet.

## A quick overview

What is WebcamStudio? Derived from the Latin words "webcamus" and "studioamus", meaning "the one who sees" and "a creative room"... Nah, I'm kidding. Seriously, the name is quite easy since it involves webcams and putting them together in a pseudo tv studio on your computer. So now let's start with more serious stuff..

WebcamStudio is by design a virtual webcam in your computer. On Linux operating system, a true virtual device is created so any software supporting v4l2 devices will see WebcamStudio as any real USB webcam. On other OSes, a lighter version of WebcamStudio is started, without any device detection and no virtual webcam device. Instead, you can connect any software supporting video streaming on a local tcpip port.

The main strength of WebcamStudio is its ability of mixing any kind of video **sources** like webcams, movies, pictures and even text. Each source has to be setup for its location in the virtual output, its size, and a few other parameters that you can play with. The order of the sources will define which one will be at the top and which one will be at the bottom. Imagine having a few pictures in a box, and you have to decide visible.

Once your sources are set in your virtual output, WebcamStudio will refer to that setup as a **layout**. The fun part is that you can have several layouts in WebcamStudio, and save those layouts in a file called a **Studio**. By saving your setup in a Studio file, you'll be able to reload that setup at a later time for another broadcast.

While broadcasting, you can switch from one layout to another, on the fly without having to restart anything. This is pretty useful if you want to switch from your webcam to a capture of your desktop or your sponsor segment for example.

# The installation

WbcamStudio was built using the java technology. Essentially, it would work on any operating system. But it is relying on a library called Gstreamer for media manipulation, transcoding and device capture. So the first thing you have to make sure is to have those libraries installed. If you are using Ubuntu, then you are part of the lucky ones has everything is already available in Synaptic packages. Just double-click on the WebcamStudio package, install it and it's ready to go. For other environments, it is a bit more complex, but not that hard...

## GSTREAMER

The first thing you need to do, is install the gstreamer framework. As of writing this documents, the library is available on almost any Linux distribution. Windows has it's installation setup also, but the libraries are a bit older and some components are missing compared to the Linux version. OSX seems to be supported also...

Install the appropriate libraries using the setup/package for your operating system, and from a console, you can test by launching "gst-launch videotestsrc ! autovideosink".

## JAVA RUNTIME

You will need to install a Java Runtime on your system. OpenJDK works really well on Linux distribution, but Oracle JRE is also available. The same goes for all other operating systems. Something to keep in mind if you have a 64 bits OS: make sure to install the JRE as the same architecture of the gstreamer libraries. Let's say that you install the 32 bits version of gstreamer, then you'll need the 32 bits version of the Java Runtime, even if your system is an amd64. But it's best to install the same architecture as your operating system.

## FFMPEG

Optionally, you can install FFMPEG on Linux. On other OSes, it is in a way mandatory as FFMPEG will be the one rebroadcasting your video stream.

## FLASH PLAYER

The Linux version of WebcamStudio can create a true virtual device that can be detected by the Adobe Flash Player. When using a 64 bits architecture OS, you should use the Flash Player Square instead of the 32 bits version of the player. This will help a lot with stability and performance when capturing video from a Flash application.

## MORE DETAILS...

To get more technical details about the installation, visit the WebcamStudio website at <http://ws4gl.org>

# Starting with WebcamStudio

Assuming that you got thru the installation, you should now be able to start WebcamStudio. Upon starting, you'll see a pulsating logo appear while WebcamStudio finishes loading into memory. Then, the main screen will appear, waiting for your mighty wishes.

On the left, you'll see media that were detected when starting up. If nothing was detected, you can go in the Sources menu, and add a new folder to scan. This folder will be scanned each time WebcamStudio is started. For each recognized media file, a small icon will be added to the panels on the left. Media types will be group together, making it easy to select them. Movies, pictures, **animations**, **widget** and **pipelines** will be automatically detected and available in the left panel. For Linux, video input devices like webcams will also be detected and presented by using their respective names.

This left panel is a shortcut for you most common video sources. Avoid selecting a folder that would contains several thousand files, making the left panel overcrowded. But that's not all, open the Sources menu, and you'll be able to add more sources by choosing manually the file source. Some other sources are also available in that menu like **Desktop**, **Text** or **IRC...**

The middle section is the list of currently created layouts. To create new ones, right-click on the layout list and select "Add". The newly created layout will be named "New Layout" by default. Select the layout with your mouse, then right-click to show the contextual menu and select "Rename". A dialog box will show up where you can set the new name for your layout.

Once a layout is created, you can add **sources** to that layout. Make sure that your layout is selected, then using the left panel or the Sources menu, add a new source. It will then appear on the right list, the sources list. If you have several layouts, the sources list will show only the sources for the selected layout. By selecting a source, a list of tab controls will appear below the source list. Those controls will set the parameters on that source, for the containing layout.

Remember that a layout will be visible only when activated. There can be only one active layout at a time. To activate a layout, select the desired layout with your mouse, right-click to display the contextual menu and select "Activate". You will see the small layout preview becoming green, meaning that it is active.

## The sources

WebcamStudio is able to use all kinds of video sources. Here is the details about each of them...

### V4L(2) DEVICES

Those are only supported under Linux. V4L and V4L2 devices, generally webcams are scanned using their device file (/dev/videoX). WebcamStudio is then able to get more information about each of them and displays them in the left panel under the "Devices" section. By default, the capture size is set at 320x240 pixels at 15 frames per second. Webcams support these controls:

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Format : here, you can have controls over the original capture size and framerate of the source
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Gstreamer effects : Gstreamer effects occurs at the capture level of the source, before the "Effects"
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.
- Activity : by selecting the sensivity slider, you can set a threshold where the source will be visible is motion is detected. Otherwise, the source will be invisible in the layout.

- Face detection : giving proper lightning, you can activate the face tracking feature. Beware that you will need a fast computer and a good quality webcam

## DV

This is commonly referred as FireWire video input. WebcamStudio only supports the default device using this source. Using a DV camera gives you a better quality input at the expense of requiring a bit more power from your CPU. Supported controls are...

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Format : here, you can have controls over the original capture size and framerate of the source
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.
- Activity : by selecting the sensivity slider, you can set a threshold where the source will be visible is motion is detected. Otherwise, the source will be invisible in the layout.

## IMAGES

You can use all kind of images with WebcamStudio. Jpeg, bmp, png, gif and even animated gif are available.

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Format : here, you can have controls over the original capture size and framerate of the source
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.



- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.

## MOVIES

All kinds of videos are supported. For best performance, do not use high definition videos as they will require more power from your CPU...

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout. For movies, you can set the initial volume for the sound.
- Format : here, you can have controls over the original capture size and framerate of the source
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.
- Activity : by selecting the sensivity slider, you can set a threshold where the source will be visible is motion is detected. Otherwise, the source will be invisible in the layout.
- Audio : for sources supporting an audio track, you can set manually the volume of the currently playing source.

## DESKTOP

You can capture a region of your desktop, make that region follow your mouse cursor or simply capture the whole screen...

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.

- **Format** : here, you can have controls over the original capture size and framerate of the source. You can also select if the capture area will follow your mouse cursor and if you want to display the mouse cursor.
- **Effects** : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- **Shapes** : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selecting a black and white mask in png format.
- **Activity** : by selecting the sensitivity slider, you can set a threshold where the source will be visible is motion is detected. Otherwise, the source will be invisible in the layout.

## MUSIC

Even if audio files do not have a visual output, you can use them in a layout as a background sound or as a jingle when entering the layout.

- **Position** : this is where you can set the initial sound volume. Transitions can also be applied when entering and exiting the layout.

## QR CODE

This is a special source that you can use to generate a QR Code to display in your layout. QR Codes are like barcodes but with much more data capacity. For example, you can set the data to be an URL (<http://ws4gl.org>) and when the resulting QR Codes will be scanned, the URL will be opened automatically by the scanning device. Usually, you can use a smart phone with a scanning application...

- **Position** : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- **Format** : here, you can have controls over the original size of the QR Codes and its content.

- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.

## TEXT

Your can display any text in your source as if they were images...

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Format : here, you set the original area size for your text, the font name and size, the foreground and background colors, the text content and the direction you want the text to scroll.
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.

## IRC

WebcamStudio can connect to a irc server and display the current conversation as the text source. Basic smilies are supported...

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Format : here, you can have controls over the area size, the irc server, username, password and channel. Password is encrypted when saved in a Studio file.
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selected a black and white mask in png format.

- Activity : by selecting the sensitivity slider, you can set a threshold where the source will be visible is motion is detected. Otherwise, the source will be invisible in the layout.

## WIDGETS

Widgets are special XML files used to retrieve information from web services or RSS feeds. To create your own widgets, visit <http://ws4gl.org...>

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selecting a black and white mask in png format.

## PIPELINES

If your video source is not supported by WebcamStudio, you can create your own video input using the gstreamer pipeline configuration. Basically, you set the input source, apply the effects you want on it and finish with the last component named "tosink" so WebcamStudio can identify the last component in your pipeline to send to its own RGB video receiver. For more details about creating pipelines, visit the "Pipelines" section for <http://ws4gl.org...>

- Position : this is where you can set the location and size in the containing layout. Transitions can also be applied when entering and exiting the layout.
- Effects : you can select multiple effects on the source, combining them at will, and selecting the order in which the images will be treated.
- Shapes : by selecting a shape, you can crop the source in the selected shape or by selecting "Reverse", apply the reverse cropping of the selected shape. You can use your own shape by selecting a black and white mask in png format.

Since WebcamStudio X does not support device detection, you can use pipelines to configure your webcams to be used in your layouts.

# The layouts

Now that you've mastered the configuration of sources, you already know that a source is always part of a layout. Essentially, a layout is a specific view of your sources. And since you can have several layouts, you can change on the fly the current display of your video output. For example, you can have one layout showing your webcam with some text at the bottom, another to show your desktop and another to display information about your sponsor.

This means that while you are broadcasting, you can switch from one layout to another giving a more professional look to your show and avoiding post video editing if you are recording to a file. Using movies or music, you can integrate jingles, background music or show a sponsor ad if needed.

Under Linux, you even have control over the audio source using Pulseaudio. When switching to a layout, you can select the input source and the target software sowing the recording of your broadcast. Assuming that you want to play a short video sponsor, you can set a layout to use the internal sound monitor instead of using the microphone. If you are using two webcams, you can switch microphone input depending on the webcam that is currently display. This can be pretty handy if you have a front facing webcam and another one showing your lab experiment a few feet away.

Layouts also have a configurable duration. At the end of the selected duration, the next layout will be selected automatically, a bit like on a DVD with titles and chapters. Again, assuming that you have a short video from a sponsor to show, you can configure the sponsor layout to show for the time of the video, then switch back to your main display of your broadcast automatically.

Combining transitions, effects and layout events, you can create a great looking broadcast like rotating webcams, alternating webcams or movie playlist...

A source can be shared in multiple layouts. For example, you want to have your webcam in two different layouts. To avoid having two different sources using the same device, you can duplicate the source in another layout. By doing this, you can have your webcam showing in a different location and size without having to stop it

between layouts transition. Using the transition out "None", your webcam will simply continue working as if nothing happened. With the "Slide" transition in, you can have some pretty cool animation of your source.

To duplicate a source to another layout, select the source with your mouse, right-click to display the contextual menu and choose the other layout in the "Duplicate in..." menu.

## The studios

Everything is setup and it took you a bit of time creating the perfect layouts. To be able to reuse that setup, you can save it to a studio file by selecting the Studios menu. The next time you'll be ready to broadcast, simply use the same menu and select "Load Studio..."

If you want to do quick modifications to your setup without having to open WebcamStudio, the studio files are plain XML files that you can edit with any text editor..

## WebcamStudio Console

With WebcamStudio comes the Console which is a stripped down version of WebcamStudio. Its only purpose is to load a Studio file and let you switch layouts as needed. Since it's a lot lighter than the original WebcamStudio, you will use less memory and CPU processing while broadcasting.

## Tips

- Make sure to use a power computer if you are planning a lot of sources of effects
- Use low definition movies for your broadcasts
- Adjust the bitrate of FFMPEG or Gisscaster according to your upload bandwidth
- Smaller is usually faster. Trying to do a broadcast at 480p on a slow computer will eventually lag the broadcast or overheat the computer
- Some webcams require more CPU time at some resolutions. Do some tests to find out if this is the case with your webcam
- Fullscreen desktop capture can create lags depending of your video card model or currently running softwares. Be reducing the frame rate, you can get a smoother broadcast
- When monitoring your broadcast on the selected server, mute the speaker volume to avoid an audio feedback loop
- If you find an issue with WebcamStudio, report it on the project page at <http://webcamstudio.googlecode.com>
- When reporting an issue, make sure that it has not been already reported before creating a new issue. Otherwise, simply add you comment on the existing issue...
- Comments and support can be found in the forum section of the main website (<http://www.ws4gl.org>)