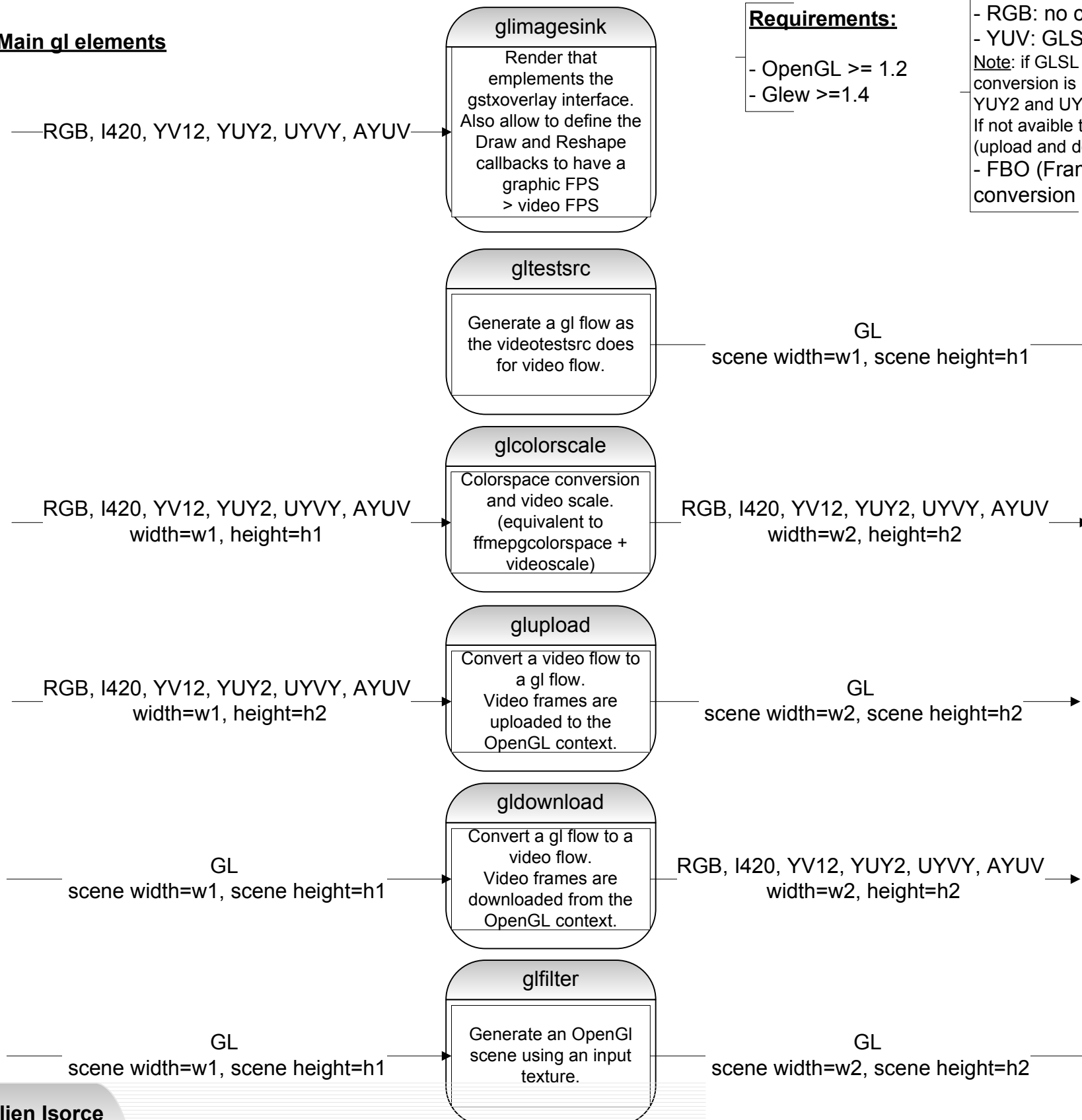


# Gst-plugins-gl / The gl elements

Monday, December 08, 2008

## Main gl elements



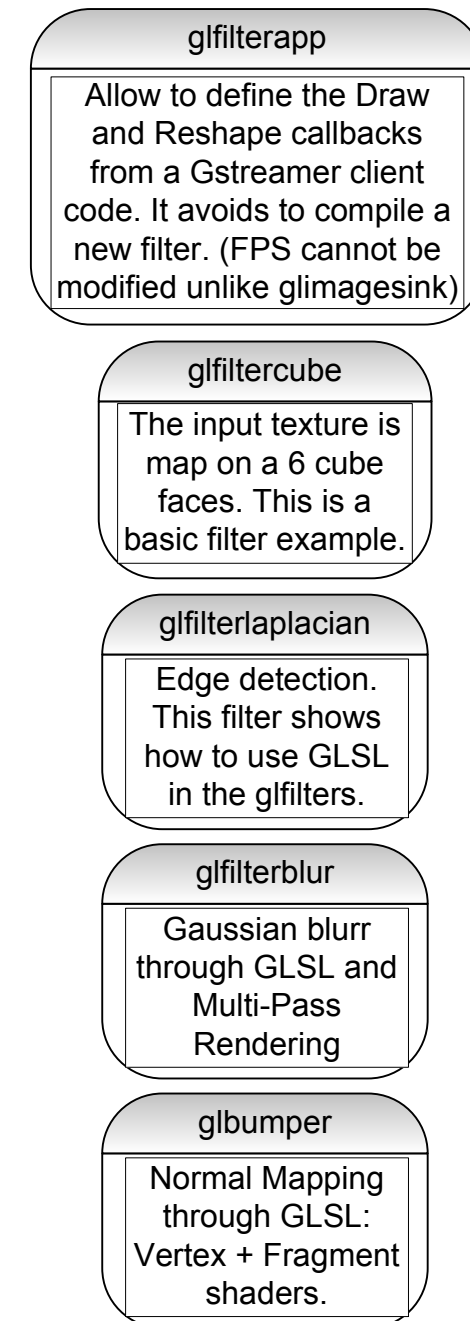
## Requirements:

- OpenGL >= 1.2
- Glew >=1.4

## Color space conversion:

- RGB: no conversion needed
- YUV: GLSL (OpenGL Shading Language)  
Note: if GLSL is not available on your driver or OpenGL version, color space conversion is made through the GL\_MESA\_ycbcr\_texture extension for upload YUY2 and UYVY only.  
If not available too and for the other yuv formats, we plan to made the conversion (upload and download) through ColorMatrix (if ARB\_imaging extension available)
- FBO (Frame Buffer Object) is used only when colorspace conversion is needed (no need with rgb and mesa\_ycbcr)

## Some glfilters



# Gst-plugins-gl / Internal functioning

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A GstGLDisplay is the connection between the gl elements and an OpenGL context. There is one GstGLWindow and one gl thread, per gstgldisplay. A GstGLDisplay is known by elements of a same flow or branch. A glthread executes the OpenGL code from a GstGLDisplay. A GstGLWindow is created when a gl thread is starting. An destroyed just before a gl thread terminates. The gl elements communicate with a glthread through a GstGLWindow. So they need to post a message for their needs. A pool of textures is maintained for each GstGLDisplay. In a pipeline that has several branches, each one have a gl thread in which an OpenGL context is current. And so an OpenGL context is made current only one time just after being created. And so several OpenGL context can be current at the same time. The implementation of gstgldisplay.h is platform specific (X11 (glx), win32 (wgl), mac (agl)).

**Init:** A unique GstGLDisplay is made for one gl flow. Each one create aone GstGLWindow and a gl thread in which OpenGL calls are executed. A FBO is always made for the colorspace conversion.

**glbuffer:** A glbuffer contains a texture and its size. Note that there is no texture per color space, because colorspace conversion is made when creating the glbuffer. It means that the texture in the glbuffer is always rgb32.

**Glew:** « The OpenGL Extension Wrangler Library (GLEW) is a cross-platform open-source C/C++ extension loading library ». (<http://glew.sourceforge.net/>)

**Pool of textures:** The pool of texture is a simple queue that contains textures id. There is one pool for one GstGLDisplay. At the beginning the pool is empty. When a new texture is needed, we first look at the pool. If the pool is empty we call glGenTextures. If not, we pop the queue to have a texture id. Then, rather than call glDeleteTextures on an outdated texture, we add it to the pool. At the end, when the GstGLDisplay is destroyed, each texture of the pool are popped and we call glDeleteTextures on it.

**Scene size:** The OpenGL scene size is selected in the caps « video/x-raw-gl, width=w, height=h ». Input and output caps can be different for each gl elements.

