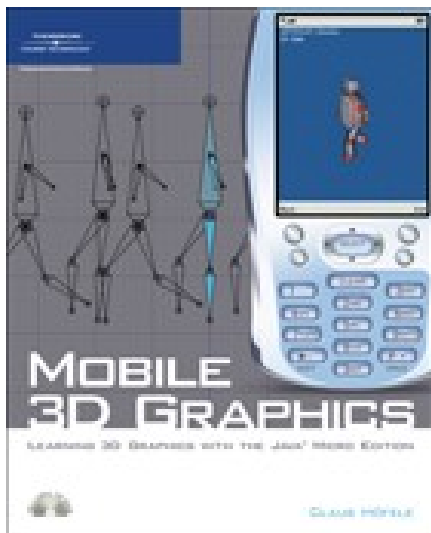


# Share Your Experience: YouTube Integration In Games

Linux.conf.au 2009 Gaming Miniconf



Claus Höfele  
[claus@claushoeefe.com](mailto:claus@claushoeefe.com)

# Three Steps from Game to YouTube

1) Render individual frames of your game

- How to turn gameplay into screenshots?

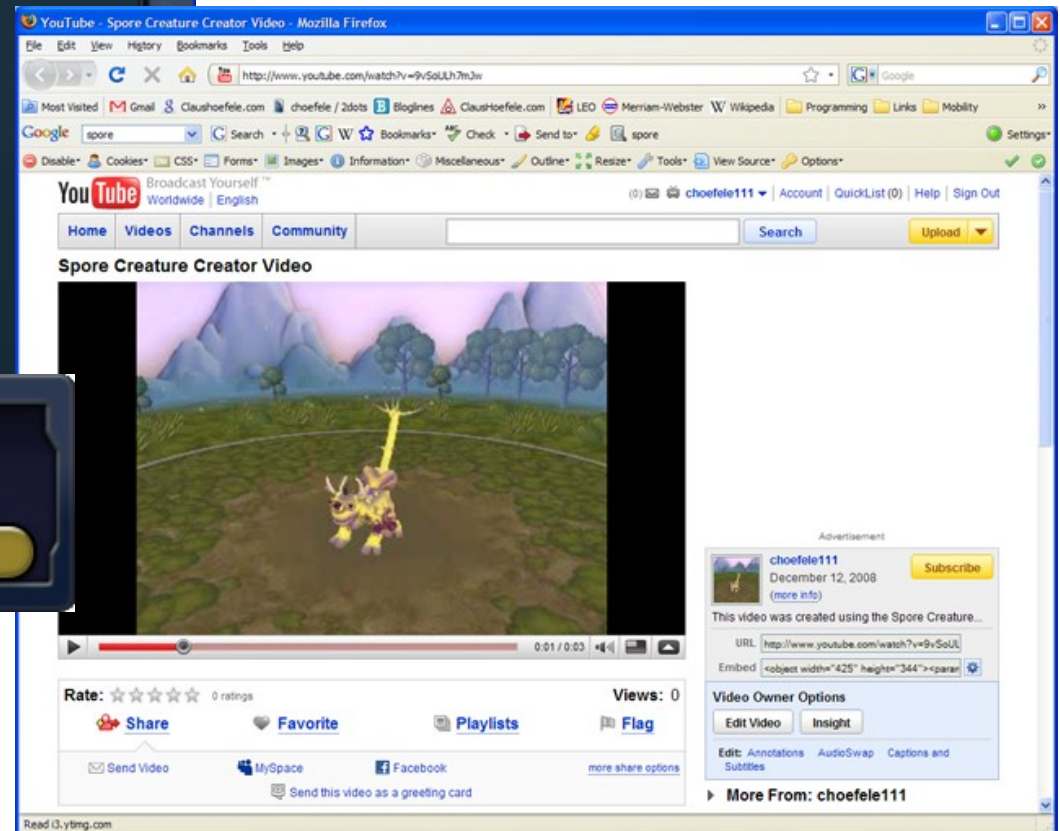
2) Create video from frames

- How to encode screenshots into video?

3) Upload video to YouTube

- How to upload the video to YouTube?

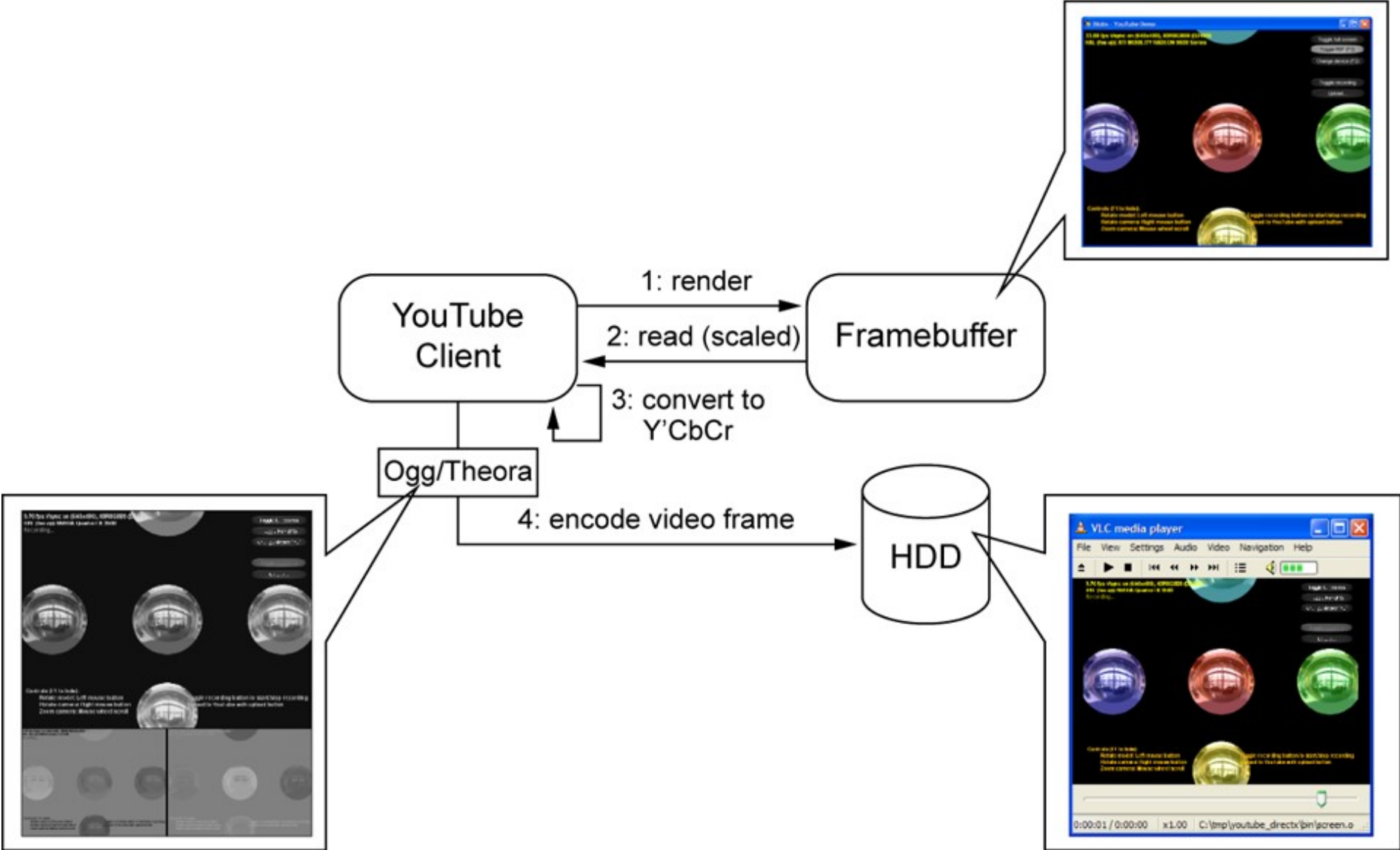
# Spore Creature Creator (EA)



# Recording Gameplay

- Framebuffer captures
  - Record screen shots during gameplay
  - Simple to add to game
  - `IDirect3DDevice9::StretchRect()` or `glReadPixels()`
- Game state captures
  - Two steps: first record game state, then render screenshots based on game state
  - More flexible
  - Think Halo 3 “Saved Films”

# Encoding videos with Ogg/Theora



# Implementing Video Recording

- Bottleneck: copying back render results
- Pentium-M 1.8Ghz, 320x240, /O2, USE\_ASM
  - Sim: 0.5, render: 2.0, copy: 60.0, YCbCr: 4.0, Theora: 13.4 ms
  - TH\_ENCCTL\_SET\_SPLEVEL=2: Theora: 6.2 ms
- More tuning required
- Difficult to keep framerate even
- Examples that manage: Spore Creature Creator and PixelJunk Eden

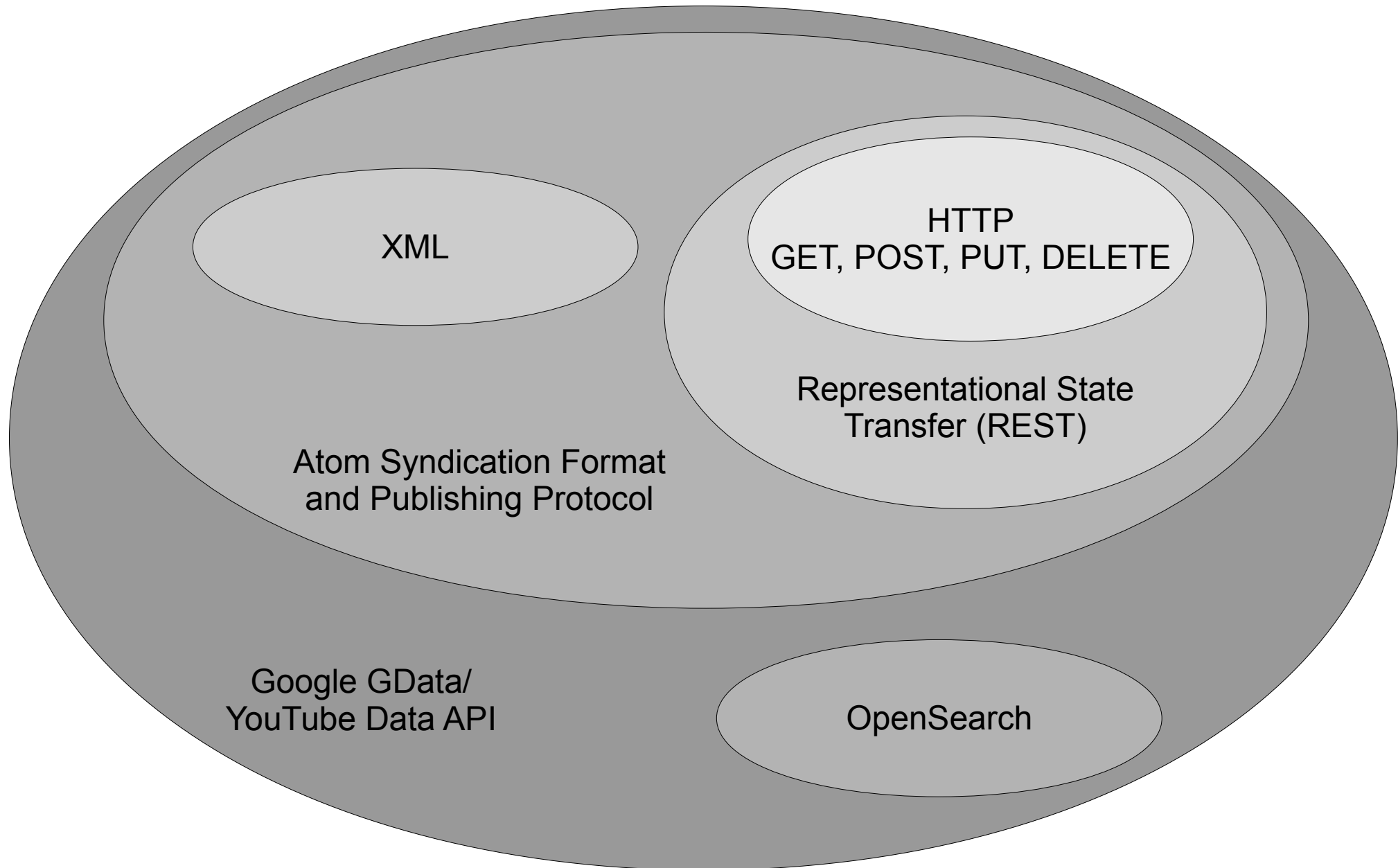
# PixelJunk Eden (Q-Games)



*“The YouTube upload feature is going to revolutionize how people share tips.”*

Dylan Cuthbert, President and Exec. Producer

# YouTube Data API

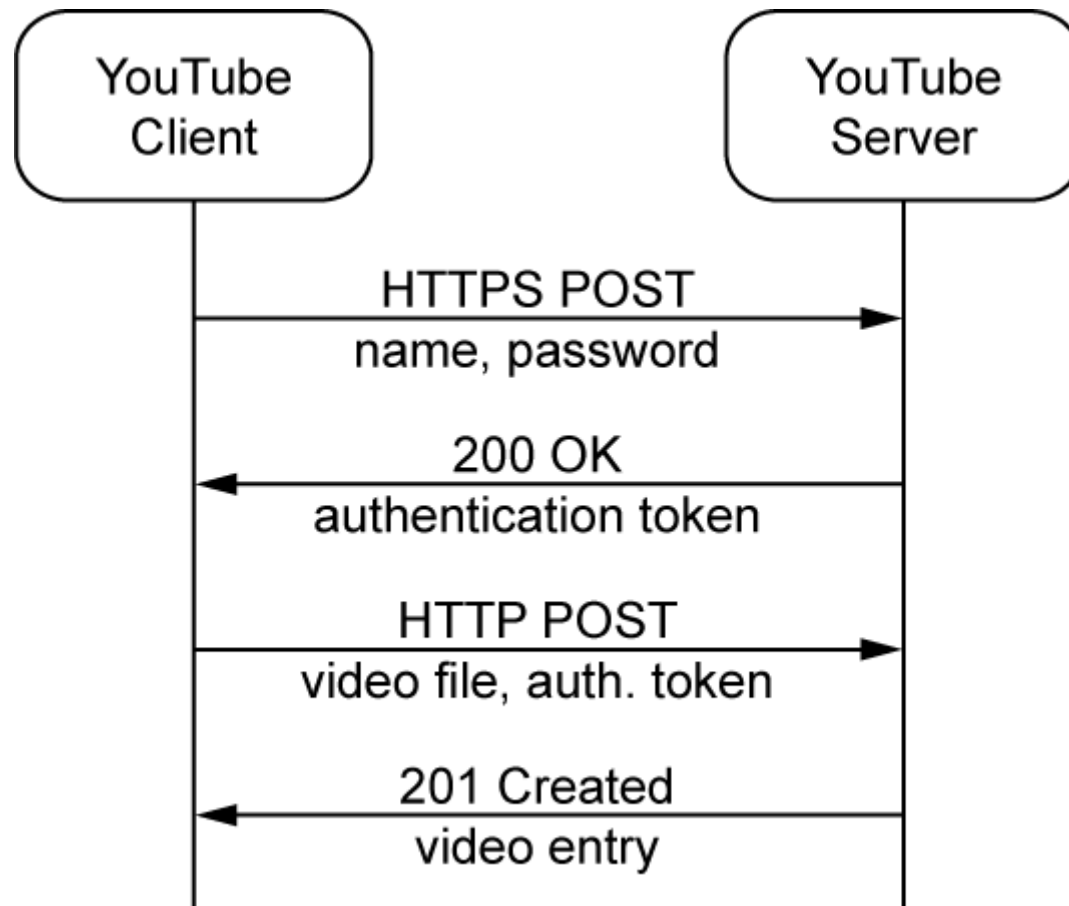


# Example Request: Most highly rated YouTube videos

HTTP GET <http://gdata.youtube.com/feeds/api/standardfeeds/top Rated>

```
<?xml version='1.0' encoding='UTF-8'?>
<feed xmlns='http://www.w3.org/2005/Atom' ...>
  <id>http://gdata.youtube.com/feeds/api/standardfeeds/top Rated</id>
  ...
  <entry>
    <id>http://gdata.youtube.com/feeds/api/videos/Us-TVg40ExM</id>
    <openSearch:totalResults>100</openSearch:totalResults>
    <published>2008-11-07T00:39:41.000Z</published>
    <updated>2009-01-03T10:22:05.000Z</updated>
    ...
    <yt:statistics viewCount='2943033' favoriteCount='17449'/>
    ...
  </entry>
  ...
</feed>
```

# Uploading Videos



# Real Racing (Firemint)



cloudcell  
cloudcell

User name   
Password    
[Join for free](#) [Forgot password?](#)

**Real Racing** FIREMINT

click to watch on YouTube

### Leaderboard

Track: Richmond Park

1		woody	1" 1' 302s
2		doeda	1" 1' 715s
3		Kramer	1" 2' 705s
4		CliffyA	1" 3' 405s
5		CNicoll	1" 4' 655s
6		Test1	1" 4' 973s
7		rmurray	1" 6' 554s
8		FOO	1" 7' 761s
9		New Guy	1" 7' 761s
10		LRRegister	1" 10' 767s

If you received a key in-game, please enter it here to link your phone.  
Key   [Digg](#)

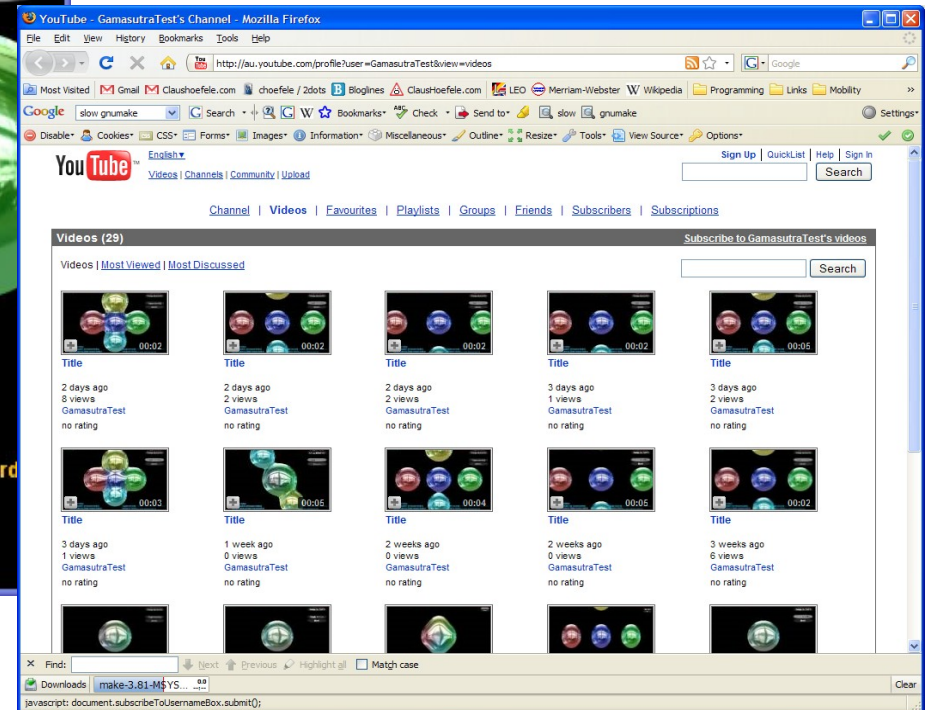
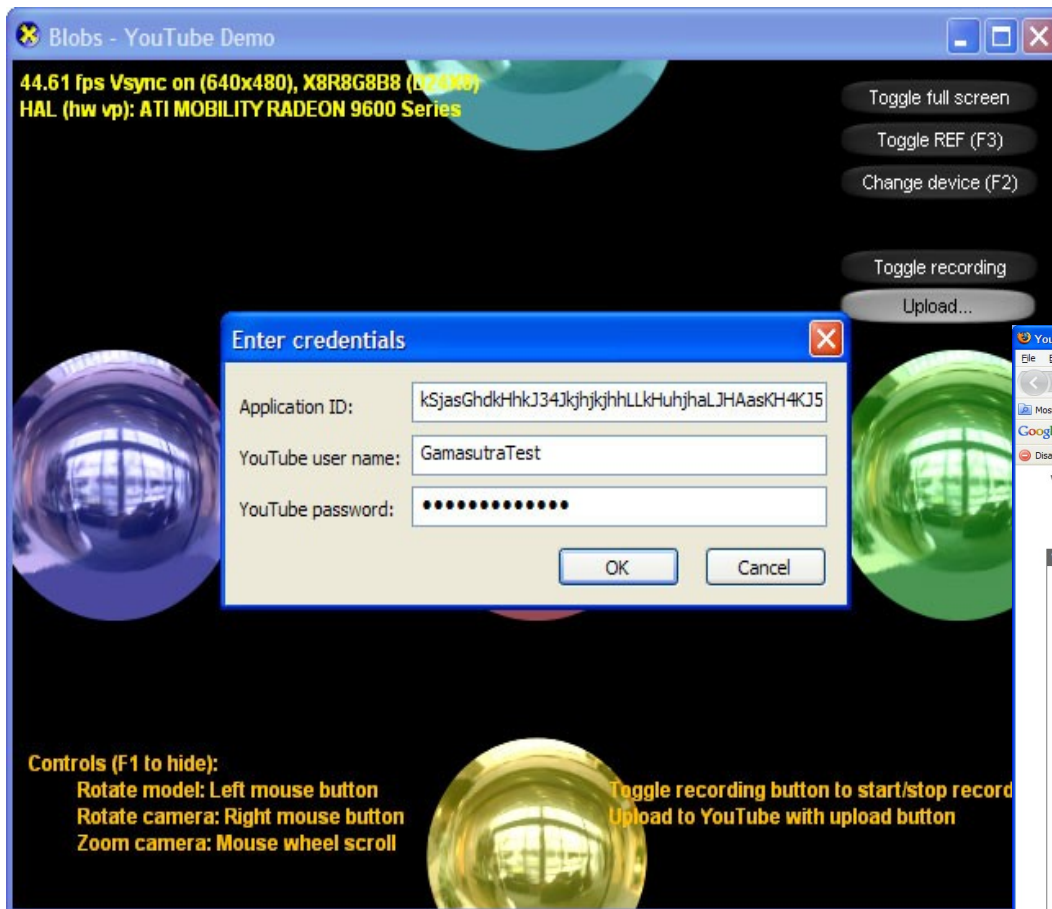
Add to Facebook Google

All the excitement, competition and glory of championship racing on your mobile

### Recently added laps

Richmond Park 1" 4' 655s	Richmond Park 1" 27' 930s	Richmond Park 1" 34' 18s	Richmond Park 1" 11' 753s	Richmond Park 1" 26' 824s
Richmond Park 1" 22' 880s	Richmond Park 1" 9' 622s	Richmond Park 1" 7' 761s	Richmond Park 1" 11' 125s	Richmond Park 1" 4' 162s

# Demo



Demo and presentation material:  
<http://www.claushoefe.com/publications/>

Thanks!

Claus Höfele  
claus@claushoefele.com

# Code Sample: Upload Video

```
YouTubeService youTubeService("YouTubeDeveloperKey");
```

```
YouTubeAuthenticationData authenticationData;  
authenticationData.userName = "user";  
authenticationData.password = "password";  
youTubeService.authenticate(authenticationData);  
ASSERT(youTubeService.isAuthenticated());
```

```
YouTubeUploadData uploadData;  
uploadData.fileName = "screen.ogv";  
uploadData.mimeType = "video/ogg";  
uploadData.title = "Title";  
uploadData.description = "Test upload";  
uploadData.category = "Tech";  
uploadData.isPrivate = false;  
uploadData.developerTag = "TagName";  
uploadData.keywords = "1Dot, 2Dots, 3Dots, more";
```

```
YouTubeVideoEntry videoEntry;  
YouTubeServiceState upload =  
youTubeService.upload(uploadData, videoEntry);  
ASSERT(upload == YouTubeServiceStates::Ok);
```

# Code Sample: Framebuffer Capture

```
HRESULT YouTubeDemo::copySurface(IDirect3DDevice9* pd3dDevice,
    LPDIRECT3DSURFACE9 to, LPDIRECT3DSURFACE9 from)
{
    HRESULT hr = S_OK;

    if (to != NULL && from != NULL)
    {
        D3DSURFACE_DESC desc;

        from->GetDesc(&desc);
        RECT fromRect;
        fromRect.left = 0; fromRect.top = 0;
        fromRect.right = desc.Width; fromRect.bottom = desc.Height;

        to->GetDesc(&desc);
        RECT toRect;
        toRect.left = 0; toRect.top = 0;
        toRect.right = desc.Width; toRect.bottom = desc.Height;

        // ToDo: check cap bits for filter options.
        V_RETURN(pd3dDevice->StretchRect(from, &fromRect, to, &toRect,
            D3DTEXF_NONE));
    }

    return hr;
}
```

# Code Sample: Interface to Ogg/Theora

```
class TheoraResourceWriter
{
public:

    TheoraResourceWriter(size_t width, size_t height,
        unsigned int fps, unsigned int bitrate = 768000,
        unsigned int quality = 0);
    ~TheoraResourceWriter();
    bool open(const std::string& fileName);
    bool write(const Image& image);
    void close();
}

void convertRgbToYCbCr420p(Image& output, const Image&
    input);
```