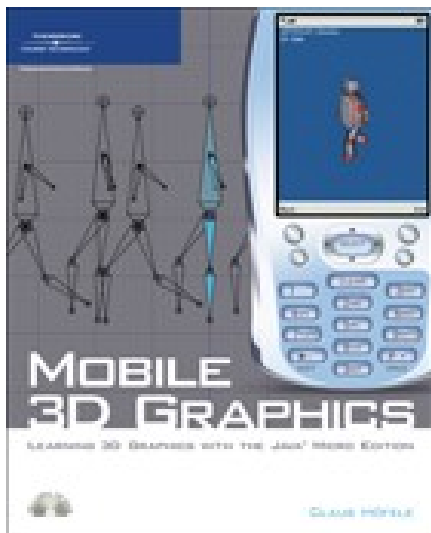


Share Your Experience: YouTube Integration In Games

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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?

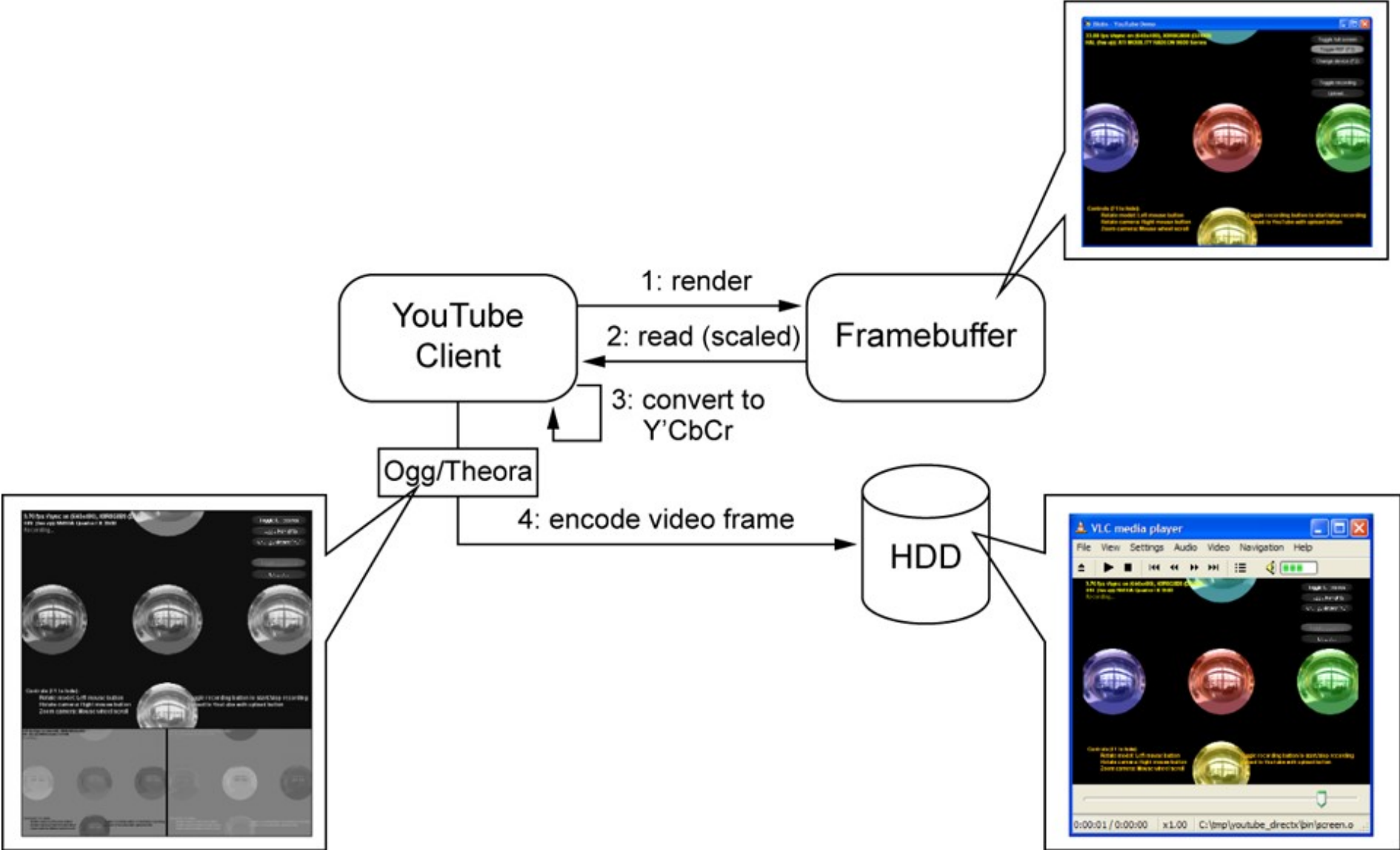
Spore Creature Creator (EA)



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

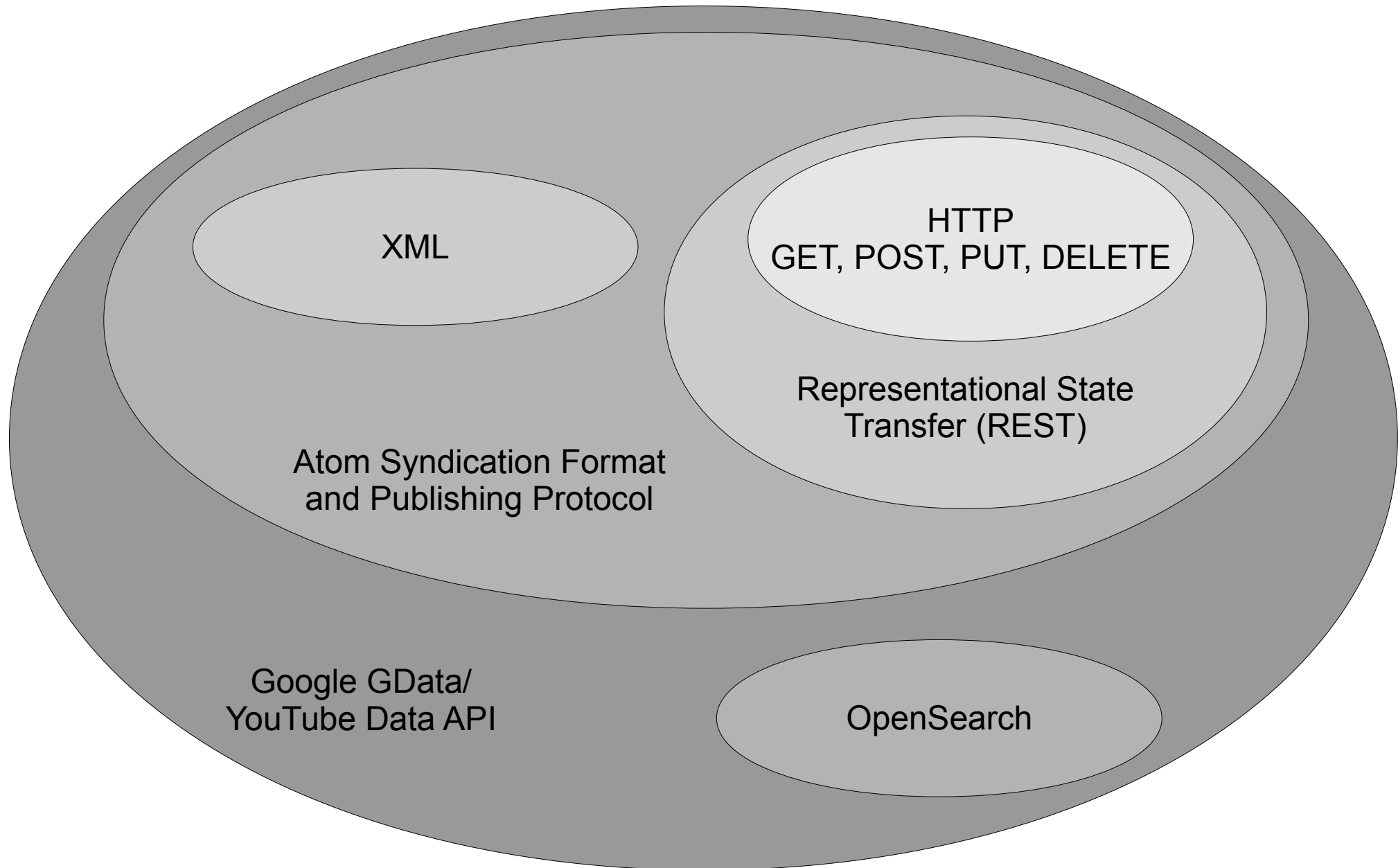
PixelJunk Eden (Q-Games)



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

Dylan Cuthbert, President and Exec. Producer

YouTube Data API

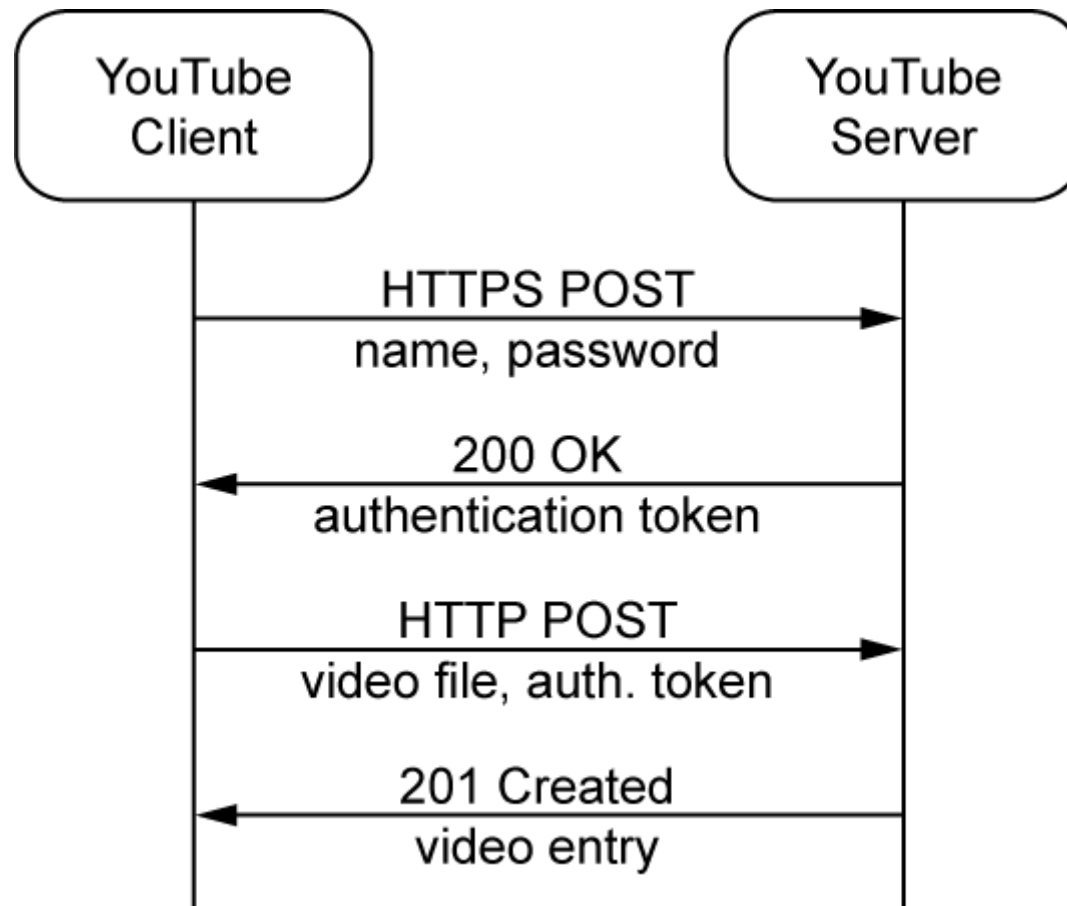


Example Request: Most highly rated YouTube videos

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?](#)

RR Real Racing **FIREMINT**

Leaderboard
Track: Richmond Park

click to watch on YouTube

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

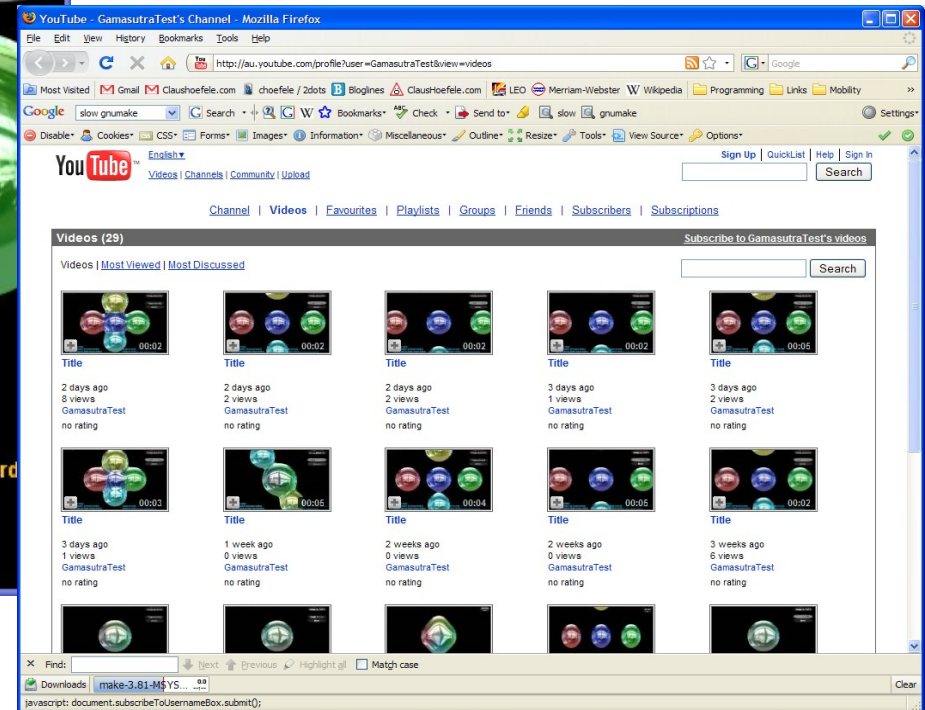
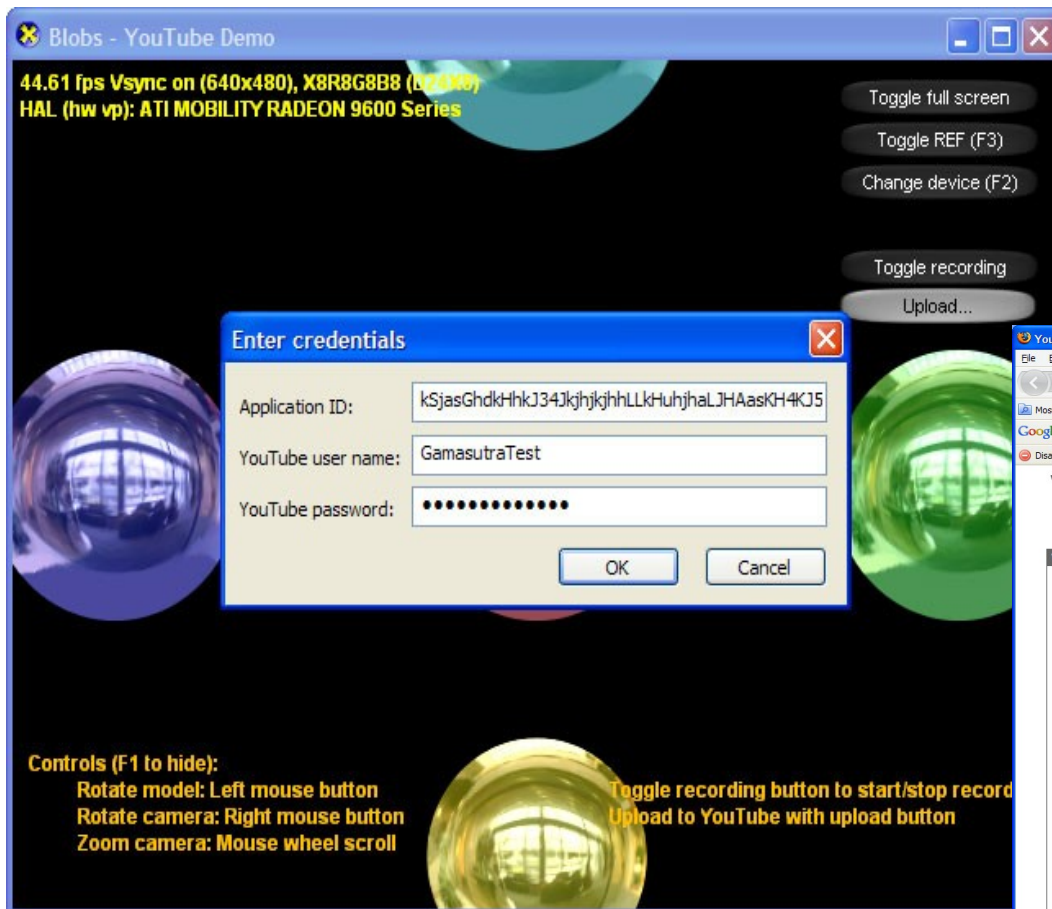
1 woody 1" 1' 302s		4 CillyA 1" 3' 406s	
2 doeda 1" 1' 719s		5 CNicoll 1" 4' 656s	
3 Kramer 1" 2' 705s		6 Test1 1" 4' 973s	
		7 rmurray 1" 6' 554s	
		8 FOO 1" 7' 761s	
		9 New Guy 1" 7' 761s	
		10 LRRegister 1" 10' 767s	

Recently added laps

CNicoll Richmond Park 1" 4' 656s	rmurray Richmond Park 1" 27' 930s	rmurray Richmond Park 1" 34' 18s	rmurray Richmond Park 1" 11' 753s	rmurray Richmond Park 1" 26' 824s
anon Richmond Park 1" 22' 880s	rmurray Richmond Park 1" 9' 822s	FOO Richmond Park 1" 7' 761s	FOO Richmond Park 1" 11' 125s	CillyA Richmond Park 1" 4' 162s

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

Demo



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

Thanks!

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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);
```