GVPS (Grails Video Pseudo Streaming Plugin)

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My Background

Currently building a Grails and Cloud based infrastructure for ReachForce

Architected a Grails solution for Developerprogram.com that allows rapid deployment of Developer Program portals for all kinds of companies, specializing in the mobile industry.

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My Background

Built Java and Linux based webcasting for events such as SXSW, built telecom software, and ASPs for the financial sector

Worked with Java since 1996, and built server-side applications ever since

Enticed into the Groovy and Grails space by speakers at the early NFJS conferences

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Streaming Video In Grails

What We Will Cover

Reasons for usage

Plugin history

Video processing flows

ffmpeg / yamdi / qtfaststart usage

Distributed video processing

Taglib usage

Plugin Configuration

Code review / Demo

How you can help

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Common Need – Light Video Streaming For Grails

Options
Youtube
Vimeo
Flickr
Slideshare
Screencast
Animoto
… and more

Yes they are great but.....

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What About Security?

What if you want your users to be able to upload video assets into your app?

If they do upload, how are you going to manage all kinds of video formats and stream them?

How can I handle streaming if users upload all kinds of different formats?

How do I divide up the load as to not slow down my server after they upload them?

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What About Security?

How do I lock the video streams down to authorized users?

Are your video assets public or private?

How can I do all of this for little to no license cost?

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Video Plugin History

Abandonware created by Cantina Consulting made for Grails 1.0 RC1 - 2007
Fixed up for Grails 1.3.X by KPI Consulting (Ryan Vanderwerf and Shawn McKisson) – 2011
– Also fixed streaming, used Tomcat byte range support so mp4 streaming will work
Fixed up for Grails 2.x by Ryan – 2012
Updated to use JWFLV 5.10
Renamed to GVPS plugin and published on Grails Public Repository

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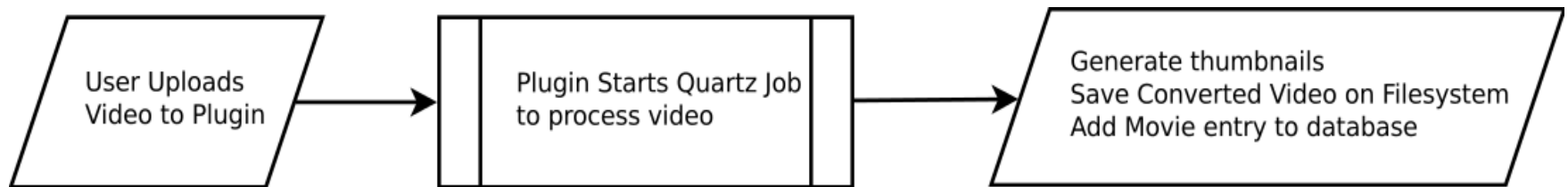
Distributed video processing

Taglib usage

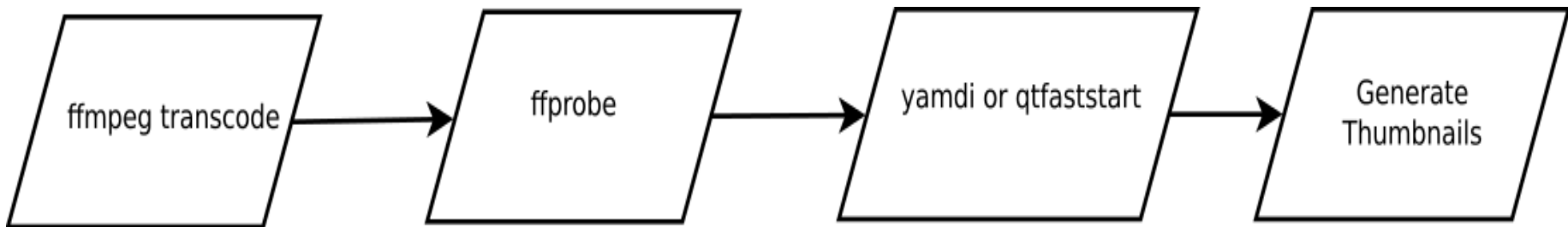Plugin Configuration

Code review / Demo

How you can help

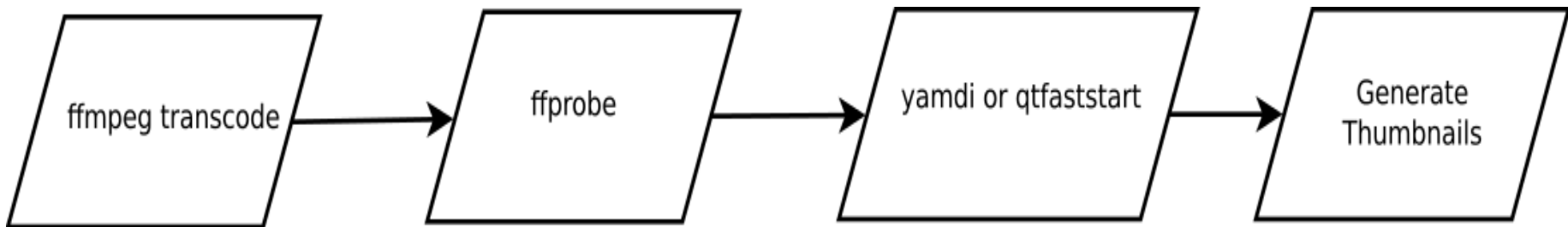**··REACHFORCE··**

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Video Upload Process

Video Transformation Process

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Streaming Video In Grails

Answers to our questions.. yes I want to add video support into my application
Security: Override either of these actions In MovieController

    streamflv (Streaming FLV only)

    display (mp4)

    Add your security to your own actions with either
      Spring Security @Secured closure
   Use SpringSecurity or other framework and protect via
      URI
    Feel free to take what you need out of those methods
      or extend them to do any specialty work

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Security and Usage Continued:

use VideoService class directly in your own controllers (If not using the plugin's tag libraries) that handle whatever security you need)

Use methods streamMp4() or streamflv() directly

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FFmpeg (bundled with libavcodec) – quick overview

Is a complete, cross-platform solution to record, convert and stream audio and video

Includes libavcodec - the leading audio/video codec library

FFmpeg is free software licensed under the LGPL or GPL depending on your choice of configuration options

Takes care of the hard work of video & audio transcoding

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FFmpeg (bundled with libavcodec) – installation

Ubuntu & Debian based Linux
    sudo apt-get install ffmpeg
Redhat/Centos
    su -c yum install ffmpeg

Windows
    Builds available at Zeranoe FFmpeg builds
    http://ffmpeg.zeranoe.com/builds/

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FFmpeg (bundled with libavcodec) – quick overview

Tool will try to make its best guess to use fewest parameters possible

ex. conversionArgs = "-b 600k -r 24 -ar
22050 -ab 96k"
"-b 600k" set video bitrate of video to
600kbps
"-r 24" set framerate to 24 fps
"-ar 22050" audio sampling frequency rate
"-ab 96k" audio bit rate

Wait, Isn't ffmpeg dead? I keep hearing this!

Not quite – apparently the avconv developers tried to
take over ffmpeg code and domain
Attempt failed – forked to create avconv
Either way they are largely compatible with same
command line args

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Why Do I Have To Run A Binary, Why No Pure Java/Groovy?

Attempts have been made to port ffmpeg to java however they are very out of date

ffmpeg/avconv development is very fast paced and hard for a Java based port to keep up
Not all features are ported from original
Some options:
jjmpeg http://code.google.com/p/jjmpeg/
Jffmpeg http://jffmpeg.sourceforge.net/

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Managing Video Formats

Shells and runs ffmpeg to transcode video into common format

- Users can upload anything you can throw at ffmpeg, the most common video transcoding engine available (You can plug something else in without too much trouble)
- Uses YAMDI to extract metadata from video
- Uses ffprobe to extract mp4 data from footer and move to front of file to make streaming work
- Has support out of the box for Flowplayer and Jw-Flv

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yamdi

yamdi stands for Yet Another MetaData Injector and is a metadata injector for FLV files. It adds the onMetaData event to your FLV files.

Some key features of yamdi are:

H.264 support

onMetaData, onLastSecond, onLastKeyframe events

XML metadata output

More @ http://yamdi.sourceforge.net/

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qtfaststart

Moves metadata (moov atom) in Quicktime movie from end of file to beginning
    This allows fast forward / rewind
    Allows player to tell how long the movie is to populate progress bar
Part of ffmpeg as native c code
Java Version here: http://www.wired-space.de/media/JQTFaststart.java
Python version available

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Distribute the load

Uses Quartz plugin to transcode uploads
    Pair with Clustered Quartz or Terracotta to
        distribute the load for large number of
        uploads (or offload to a separate set of
        servers that just process video)
    See my distributed Quartz slides for setting up
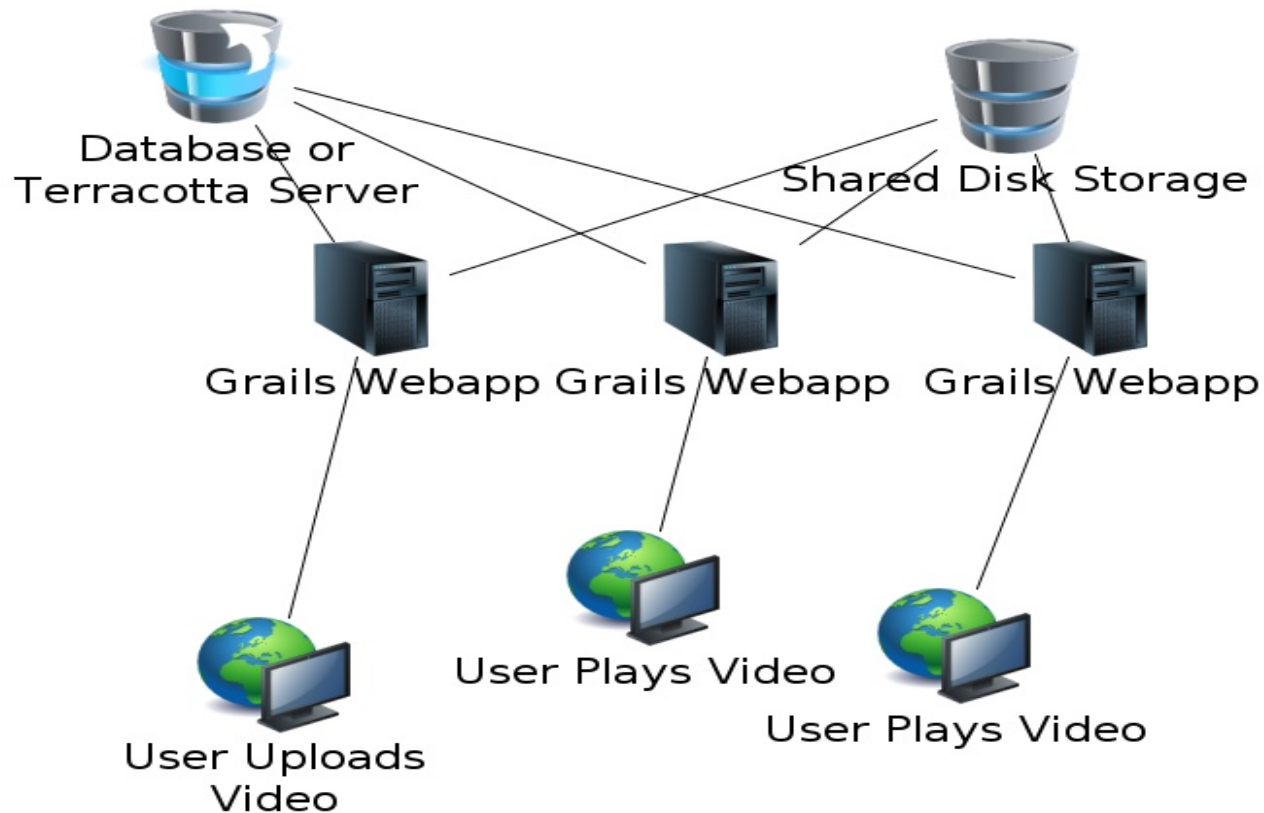   JDBCJobStore with clustering or Terracotta
        setup

Possible Distributed Video Processing Example

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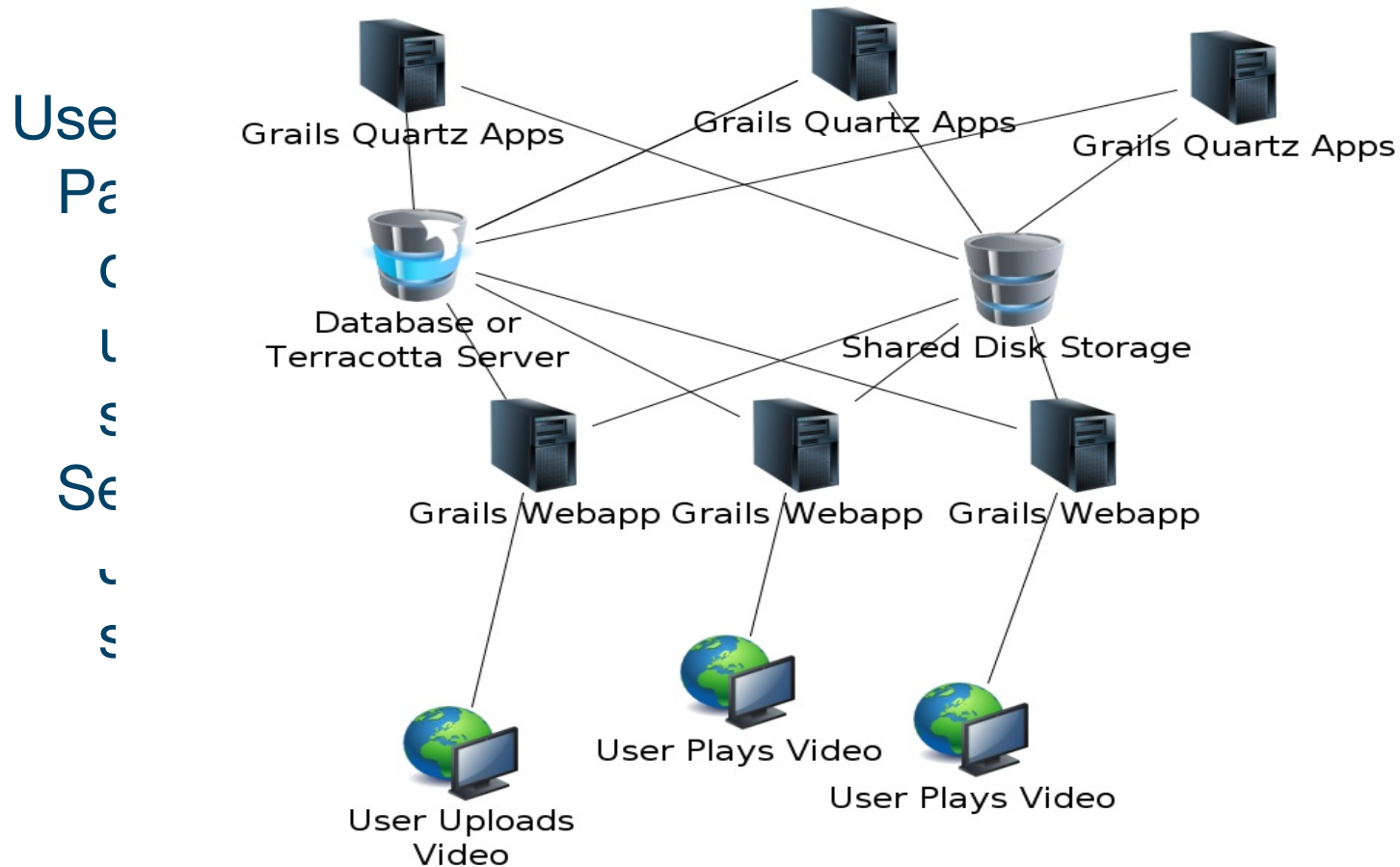
Possible Distributed Video Processing Exam

What Is Quartz?

Open source Java API Used to schedule, persist, and distribute jobs

Great Grails support

Great community support and large usage (thousands)

Most common solution for scheduling execution in Java

applications

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Why Cluster Quartz

Distribute Load

Scale easily

Handle many batch jobs at once

Persist scheduled work queue in case of crash

Fail-over

JDBCJobStore Clustering

Most common and least work to configure

Set up JobStore and Delegate

Configure database table prefix

Setup database schema

Works with Grails 'quartz' (Quartz 1.8) or

'quartz2' (Quartz 2) plugin

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Terracotta Clustering

No Database setup required

Currently only works with Quartz 1.8 and 'quartz' plugin

Doesn't work with Quartz2 plugin because it implements a different class for the JobDetails interface that is not JobDetailsImpl. Terracotta will throw errors because it assume JosDetailsImpl class is used. JIRA logged at https://jira.terracotta.org/jira/browse/QTZ-310 if you'd like to vote on it

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Taglib setup

Include the player resources:

JWFlv:
`<vid:includes player="jwflv"/>`

Flowplayer
`<vid:includes player="flowplayer"/>`

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JW-FLV Player

http://www.longtailvideo.com/players/jw-flv-player/

Open sourced flash and HTML5 video player, Cross platform playback

Rich ecosystem of plugins (hundreds!)

3 ways to embed:
    manual javascript
    gvps taglib
    JW player setup wizard at
       http://www.longtailvideo.com/support/jw-player-setup-wizard

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Streaming Video In Grails

JW-FLV Player Direct Embed

```
<script type='text/javascript' src='jwplayer.js'></script>
<div id='mediaspace'>This text will be replaced</div>
<script type='text/javascript'>
  jwplayer('mediaspace').setup({
    'flashplayer': 'player.swf',
    'file': 'http://content.longtailvideo.com/videos/flvplayer.flv',
    'provider': 'http',
    'streamer': 'http://localhost:8080/gvps/movie/display/1',
    'controlbar': 'bottom',
    'width': '470',
    'height': '320'
  });
</script>
```

Streaming Video In Grails

JW-FLV Player

Embed player directly (i.e. content page)

Or use taglib of plugin:
        <vid:display movie='${movie}' player="jwflv" stream='true'/>

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Streaming Video In Grails

JW-FLV Player Taglib Parameters

movie	Movie domain object
id	Id of movie object
stream	true/false stream or download
player	jwflv or flowplayer
height	Force video to height in pixels
width	Force video to width in pixels

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Flowplayer

http://flowplayer.org/demos/plugins/streaming/index.html

Or Use taglib of plugin: (currently uses older version of flowplayer)
        <vid:display movie='${movie}' player="flowplayer" stream='true'/>

Branded player free for commercial and personal use

Community plugins bundled on Github

HTML5 and RTMP support not added yet (Flowplayer 5)

Streaming Video In Grails

Flowplayer Taglib Parameters

movie	Movie domain object
id	Id of movie object
stream	true/false stream or download
player	jwfly or flowplayer
height	Force video to height in pixels
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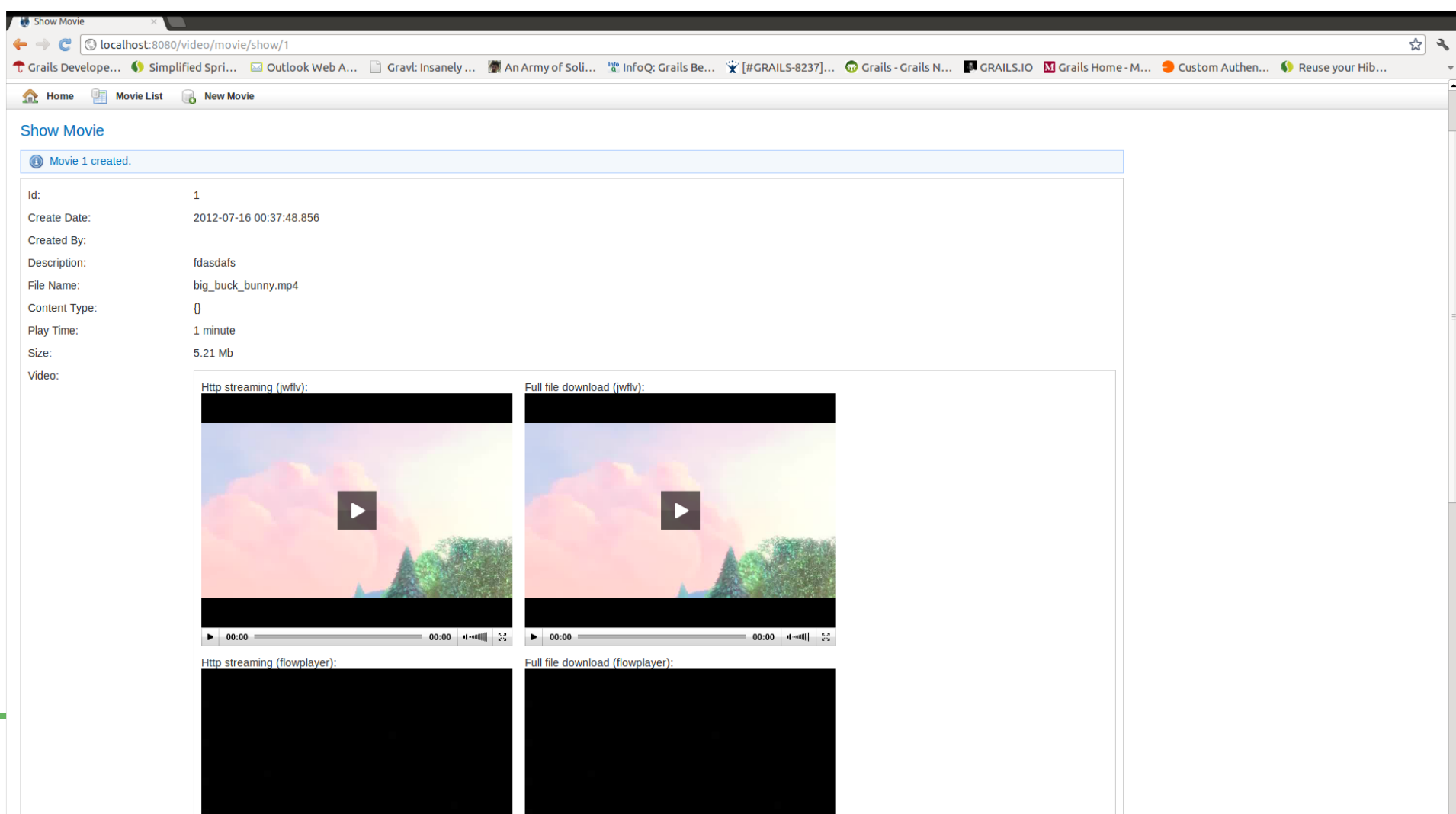
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Plugin Installation

```
Grails 1.3.x
    grails install-plugin gvps

Grails 2.x
    BuildConfig.groovy
        plugins {
            compile (“:gvps:0.2”)

        }
```

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Config.groovy

```
video{
    location="/tmp/"  // or shared filesystem drive for a cluster
    yamdi{
        path="/usr/bin/yamdi"     // FLV metadata injector (IF
TYPE= FLV)
    }
    ffmpeg  {
        fileExtension = "flv"  // use flv or mp4
        conversionArgs = "-b 600k -r 24 -ar 22050 -ab 96k"
        path="/usr/bin/ffmpeg"
        makethumb = "-an -ss 00:00:03 -an -r 2 -vframes 1 -y -f
mjpeg"
    }
```

Streaming Video In Grails

```
    ffprobe {
        path="/usr/bin/ffprobe" // finds length of movie
        params=""
    }
    flowplayer {
        version = "3.1.2" // use empty string for no
version on file
    }
    swfobject {
        version = "" // used for jw-flv player
    }
    qtfaststart {
        path= "/usr/sbin/qtfaststart" // if type == mp4
rearrage metadata
    }
```

```
    // these are defaults, taglib params override
    player.height = '260'
    player.width =  '320'
}
```

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Streaming Video In Grails

Demo

Flowplayer Plugins

http://flowplayer.org/documentation/api/index.html

Flowplayer supports various plugins to give special effects, enhanced control. They are checked into github project called 'flowplayer-flash' and are broken up between flash and javascript plugins.

More info here:
http://code.google.com/p/flowplayer-plugins/

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JW Player Plugins

http://www.longtailvideo.com/addons/

JW Player supports various plug-ins to give special effects, enhanced control and skins. Many are free for any use and some restricted to non-commercial without license. There are hundreds available.

More info here:

http://www.longtailvideo.com/addons/

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Streaming Video In Grails

You Can Help

Need to revamp code for taglib to use current scheme of invoking flowplayer (currently uses old version style)

RTMP and Flowplayer 5 support

Change how taglibs render player embed tags (use GSP includes instead of spitting out Javascript)

Enhance Movie domain objects to support AWS S3 store

Enhance Movie domain objects store output file in DB

Could also use RabbitMQ implementation to swap for Quartz

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More Information

https://github.com/rvanderwerf/grails-video

http://terracotta.org/downloads/open-source/catalog

http://flowplayer.org/

http://www.longtailvideo.com/players/jw-flv-player/

http://ffmpeg.org/

https://github.com/flowplayer/flash

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