



# GooTool

Technical Overview

# Scope

Total Physical Source Lines of Code (SLOC)

= 18,012

Development Effort Estimate, Person-Years

= 4.16

Schedule Estimate, Years

= 0.92

Estimated Average Number of Developers (Effort/Schedule)

= 4.52

Total Estimated Cost to Develop

= \$ 562,318

(average salary = \$56,286/year, overhead = 2.40).

Generated using David A. Wheeler's 'SLOCCount'. Verified with:

```
david@netman1: ~/Projects/gootool $ find . -name *java | xargs cat | egrep -v  
'^[[:space:]]*(//|\^*\|\\*|$)' | wc -l  
17934
```

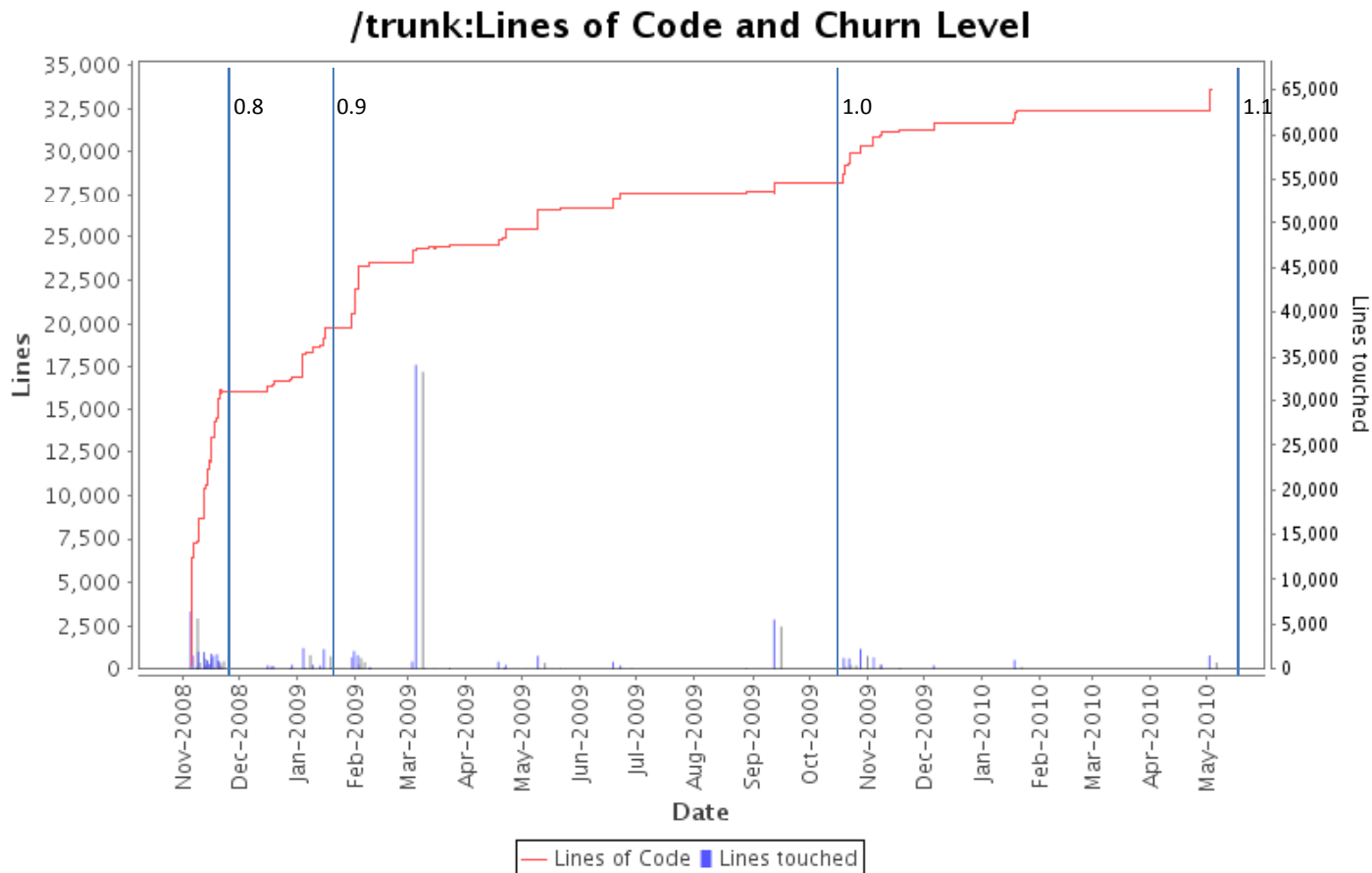


# SCM Procedures

- Subversion: version control.
- Release tags and branches.
- Mantis: issue tracking.
- ANT: build management.
- Script to build, tag and version releases



# SVN Statistics



# Release tags

```
david@netman1: ~$ svn ls -v file:///svn/gootool
400 david Jun 12 10:20 ./
  1 david Nov 05 2008 branches/
378 david Nov 18 2009 tags/
400 david Jun 12 10:20 trunk/
david@netman1: ~$ svn ls -v file:///svn/gootool/tags
378 david Nov 18 2009 ./
194 david Jan 15 2009 Release_0_10_0/
199 david Jan 15 2009 Release_0_10_1/
224 david Feb 09 2009 Release_0_10_2/
256 david Apr 18 2009 Release_0_10_3/
292 david Jun 22 2009 Release_0_10_4/
299 david Jun 28 2009 Release_0_10_5/
 17 david Nov 06 2008 Release_0_8_0/
 31 david Nov 09 2008 Release_0_8_1/
 35 david Nov 09 2008 Release_0_8_2/
 46 david Nov 09 2008 Release_0_9_0/
 66 david Nov 13 2008 Release_0_9_1/
 71 david Nov 13 2008 Release_0_9_2/
 82 david Nov 15 2008 Release_0_9_3/
 92 david Nov 17 2008 Release_0_9_4/
130 david Nov 21 2008 Release_0_9_5/
149 david Dec 19 2008 Release_0_9_6/
154 david Dec 19 2008 Release_0_9_7/
345 david Oct 22 2009 Release_1_0_0/
368 david Nov 08 2009 Release_1_0_1/
378 david Nov 18 2009 Release_1_0_2/
```



# Issue tracking

Logged in as: davidc (administrator) 2010-06-10 11:40 EDT Project: GooTool

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### Summary

By Status	open	resolved	closed	total
new	11	-	-	11
confirmed	14	-	-	14
assigned	2	-	-	2
closed	-	-	26	26

By Date (days)	Opened	Resolved	Balance
1	0	0	0
2	0	0	0
3	0	0	0
7	0	0	0
30	3	0	+3
60	7	1	+6
90	7	1	+6
180	7	1	+6
365	53	26	+27

By Severity	open	resolved	closed	total
feature	7	0	5	12
trivial	1	0	2	3
tweak	2	0	0	2
minor	10	0	4	14
major	6	0	12	18
block	1	0	3	4

By Category	open	resolved	closed	total
addins	12	0	6	18
billboards	0	0	1	1
main	13	0	12	25
options	0	0	3	3
profile	2	0	4	6

Time Stats For Resolved Issues (days)	
Longest open issue	<a href="#">0000188</a>
Longest open	132.90
Average time	53.43
Total time	1,389.29

### Most Active

Issue ID	Score
<a href="#">0000166</a> - Allow profiles tab to show only official levels	7
<a href="#">0000177</a> - Addin dependencies are not being checked thoroughly	6
<a href="#">0000170</a> - Move up/down buttons to reorder addins	6
<a href="#">0000167</a> - Mac image conversion has slight colour shifts due to ColorModel	6
<a href="#">0000172</a> - Dragging addin below last enabled addin should move it to bottom	6
<a href="#">0000171</a> - Restore addin drag-and-drop on Java 1.6	6
<a href="#">0000168</a> - Don't SAVE if unmodified on LAUNCH	5
<a href="#">0000184</a> - Check for new WorldOfGoo releases	5
<a href="#">0000173</a> - Don't jump mods around when en/disabling	5
<a href="#">0000169</a> - Addin author tool: create addin from directory/create addin from wogeditor, create addin from assets	5

### Longest open

Issue ID	Days
<a href="#">0000166</a> - Allow profiles tab to show only official levels	347
<a href="#">0000167</a> - Mac image conversion has slight colour shifts due to ColorModel	347





## GooTool Technical Overview





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# World of Goo

- Windows, Linux, Mac OS X, Wii.
- Future iPhone/iPad versions.
- Highly XML data-driven design.
- Data encrypted with a static AES key (Windows/Linux), or trivial rotating XOR (Mac OS X).



# Example level XML

```
<level allowskip="true" autobounds="true" ballsrequired="32" letterboxed="false" strandgeom="false" textcolor="255,255,255" texteffects="true"
  timebugprobability="0.2" visualdebug="false">
  <camera aspect="normal" endpos="0,450" endzoom="0.8">
    <poi pause="1" pos="600,300" travelttime="0" zoom="1.2"/>
    <poi pause="2" pos="0,480" travelttime="3" zoom="0.58"/>
    <poi pause="0.2" pos="0,450" travelttime="1.5" zoom="0.8"/>
  </camera>
  <camera aspect="widescreen" endpos="0,450" endzoom="0.8">
    <poi pause="1" pos="600,300" travelttime="0" zoom="1.2"/>
    <poi pause="2" pos="0,480" travelttime="3" zoom="0.58"/>
    <poi pause="0.2" pos="0,450" travelttime="1.5" zoom="0.8"/>
  </camera>
  <music id="SOUND_LEVEL_JINGLEBALLS_MUSIC"/>
  <loopsound id="SOUND_LEVEL_JINGLEBALLS_LOOP_FIRE"/>
  <fire depth="0" particles="fireStackSquat" radius="160" x="600.0" y="200.0"/>
  <signpost alpha="1" colorize="255,255,255" depth="-3" image="IMAGE_SCENE_JINGLEBALLS_SIGNPOST_BROWN" name="signpost1" rotation="30" scalex="0.823"
    scaley="0.912" text="SIGNPOST_JINGLEBALLS_1" x="388.111284079" y="334.105844329"/>
  <signpost alpha="1" colorize="255,255,255" depth="-4" image="IMAGE_SCENE_JINGLEBALLS_SIGNPOST_BROWN" name="signpost2" rotation="10" scalex="0.823"
    scaley="0.912" text="SIGNPOST_JINGLEBALLS_2" x="-560.244872613" y="228.939833117"/>
  <signpost alpha="1" colorize="255,255,255" depth="-1" image="IMAGE_SCENE_JINGLEBALLS_SIGNPOST_BROWN" name="signpost3" rotation="80" scalex="0.823"
    scaley="0.912" text="SIGNPOST_JINGLEBALLS_3" x="675.628540002" y="1407.09558077"/>
  <pipe depth="0" id="0">
    <Vertex x="600" y="1320"/>
    <Vertex x="600" y="2000"/>
  </pipe>
  <levelexit filter="" id="theExit" pos="600,1320" radius="75"/>
  <BallInstance angle="0" id="giftbox" type="XmasGift" x="-500" y="235"/>
  <BallInstance angle="0" id="0" type="AnchorFriendly" x="0" y="880"/>
  <BallInstance angle="0" id="1" type="XmasBomb" x="0" y="750"/>
  <BallInstance angle="0" id="2" type="XmasIvy" x="-52.0" y="710.0"/>
  <BallInstance angle="0" id="3" type="XmasIvy" x="1.1935483871" y="627.483870968"/>
  <BallInstance angle="0" id="4" type="XmasIvy" x="56.0" y="711.0"/>
  <BallInstance angle="0" id="5" type="XmasIvy" x="-117.052696774" y="609.624516129"/>
</level>
```



# Design Goals

- Allow expansion of the game.
- Cross-platform (both host and target).
- Never touch the original installed game.
- Be forward compatible.
- Make it easy to install and upgrade addins.
- Provide information on user's achievements.
- Allow access to hidden game options (resolution, language, etc).



# Addin File Format (.goomod)

- Needed to be simple to use for non-technical designers, but offer advanced options.
- ZIP format container selected.
  - Simple to release: zip, rename, upload.
- Fully documented at <http://goofans.com/developers>
- Over 300 user-created addins now available.
- Supporting Drupal modules built for distribution.



http://goofans.com/download/level/jingle-balls

GooFans World of Goo GooTool World of Goo Addins Developers

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## Jingle Balls

Level Fri, 03/20/2009 - 23:08

Twas the night before Christmas, when all through the house  
 Not a creature was stirring, not even a mouse.  
 The Goo Balls were nestled all snug by the fire.  
 In hope of avoiding the Sign Painter's ire.

Fat chance.

### Credits

Level design: David Croft (davidc)  
 Graphic art: Sébastien Kerguen (xanax)  
 Music composition: Cosmin Mirza

Thanks to spazturtle for the original Santa ball.


Thanks to the translators: Altom, Manray, Nicosmus, Vials, Elvis, Thorin, Herminator and Souttaker and others.

Thanks also to the beta-testers: Vials, Mincus, Herminator, Decar.

And thanks of course to 2D Boy. Enjoy your nap!

Happy Christmas to all, and to all a good-night!

### Jingle Balls



0 of 32 ratings

» Videos » Stats  
 » Screenshots » Comments  
 » Downloads

Authors: davidc, xanax, CosminMirza  
 Total downloads: 21,502  
 Latest version: 1.2  
 Release date: 12/22/2008 - 20:32

**Install Now**  
with GooTool

How do I install a goomod?


Overall rating  
 Average:  
 ★★★★★  
 Your rating: 5 Average: 4.3 (51 votes)

Difficulty rating  
 Average (Difficulty):  
 ★★★★★  
 Your rating: 3 Average: 3.4 (24 votes)

» Videos » Screenshots » Downloads » Stats

Trailer for Jingle Balls - a new World of Goo L...

Trailer for Jingle Balls - a new World of Goo L...



davidc

- » New Site Page
- » New Book Page
- » New Story
- » New FAQ
- » Books
- » Forum
- » Administer
- » My account
- » My backups
- » Leaderboards
- » Issue Tracker
- » Recent posts
- » Log out

Search GooFans

Search

Who's online

There are currently 3 users and 12 guests online.

Online users

thB  
davidc  
Daft as Brush

Who's new

Fungus  
kengserver  
saadibras  
spykid242  
tower up

## GooTool Technical Overview

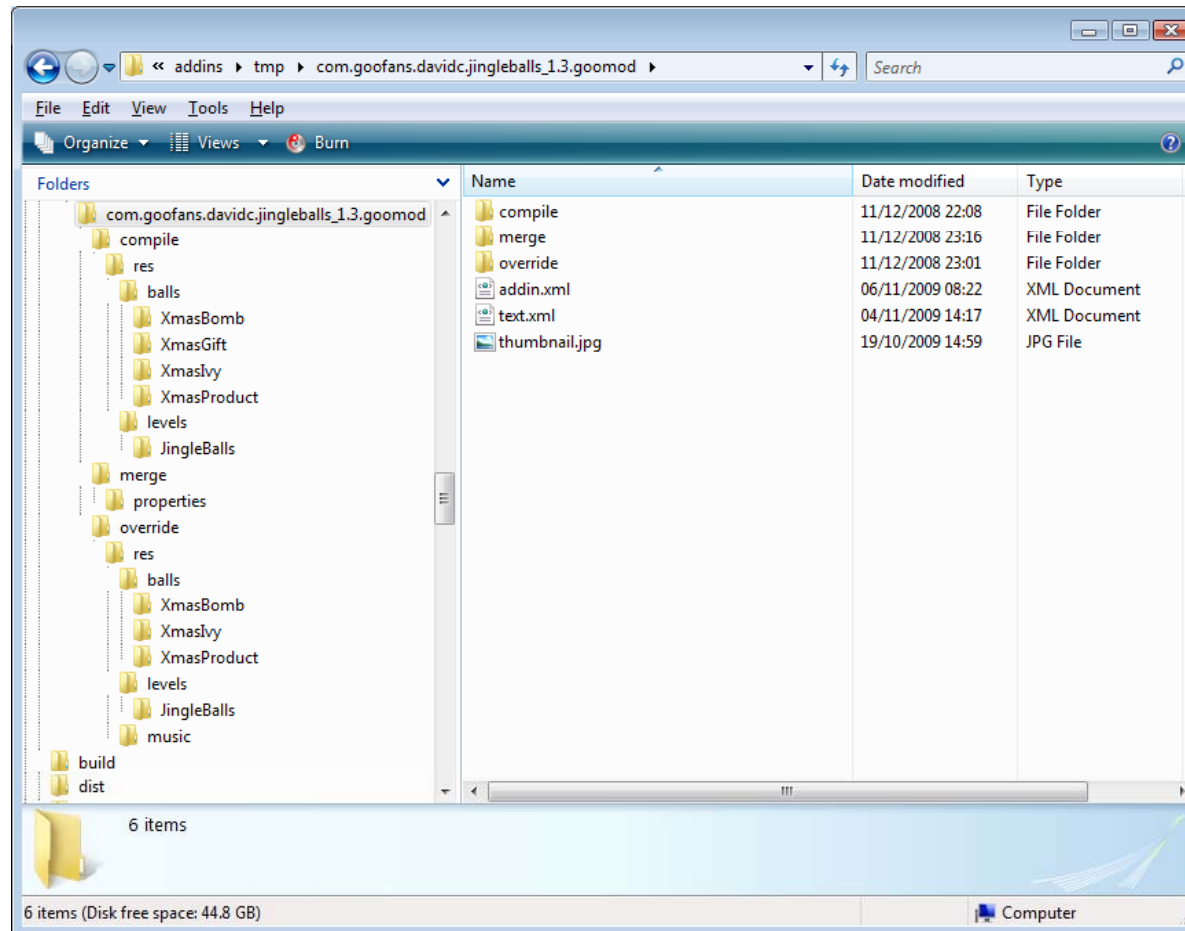


# Addin File Format (.goomod)

- XML manifest at /addin.xml
- Text strings at /text.xml
- Optional thumbnail image.
- Files for encryption under /compile/
  - e.g. XML files for new levels.
- Overridden files under /override/
  - e.g. new images.
- XSL-manipulated files under /merge/
  - e.g. modifications to existing levels or balls.



# Jingle Balls extracted goomod



# Jingle Balls manifest file

```
<addin spec-version="1.1">
  <id>com.goofans.davidc.jingleballs</id>
  <name>Jingle Balls</name>
  <type>level</type>
  <version>1.3</version>
  <thumbnail type="image/jpeg" width="200" height="150">thumbnail.jpg</thumbnail>
  <description><![CDATA[
  <html>
  <p>The night before Christmas. The Goo Balls are nestled all snug by the fire, but Ebenezer Sign Painter has other ideas...</p>
  <p>Translated into German, Russian, Spanish, Dutch and French.</p>

  <ul>
  <li>Level design: David Croft (davidc)</li>
  <li>Graphics: Séacute;bastien Kerguen (xanax)</li>
  <li>Music: Cosmin Mirza</li>
  </ul>

  <p>Many thanks to the translators and beta-testers.</p>
  </html>
  ]]></description>
  <author>davidc/xanax/cosminmirza</author>

  <levels>
  <level>
  <dir>JingleBalls</dir>
  <name text="Jingle Balls"
  ru="Рождественские бубенцы"/>
  <subtitle text="goo balls roasting on an open fire"
  de="Die Goo-Bälle rösten über dem Feuer"
  ru="шарики, поджаривающиеся на открытом огне"
  es="las bolas de goo tocan a fuego"
  nl="goo-ballen bij de open haard"
  fr="boules de goo rôtissant sur un feu ouvert"/>
  <ocd>balls,57</ocd>
  </level>
  </levels>
</addin>
```





# XSL transforms for advanced use

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<xsl:transform version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

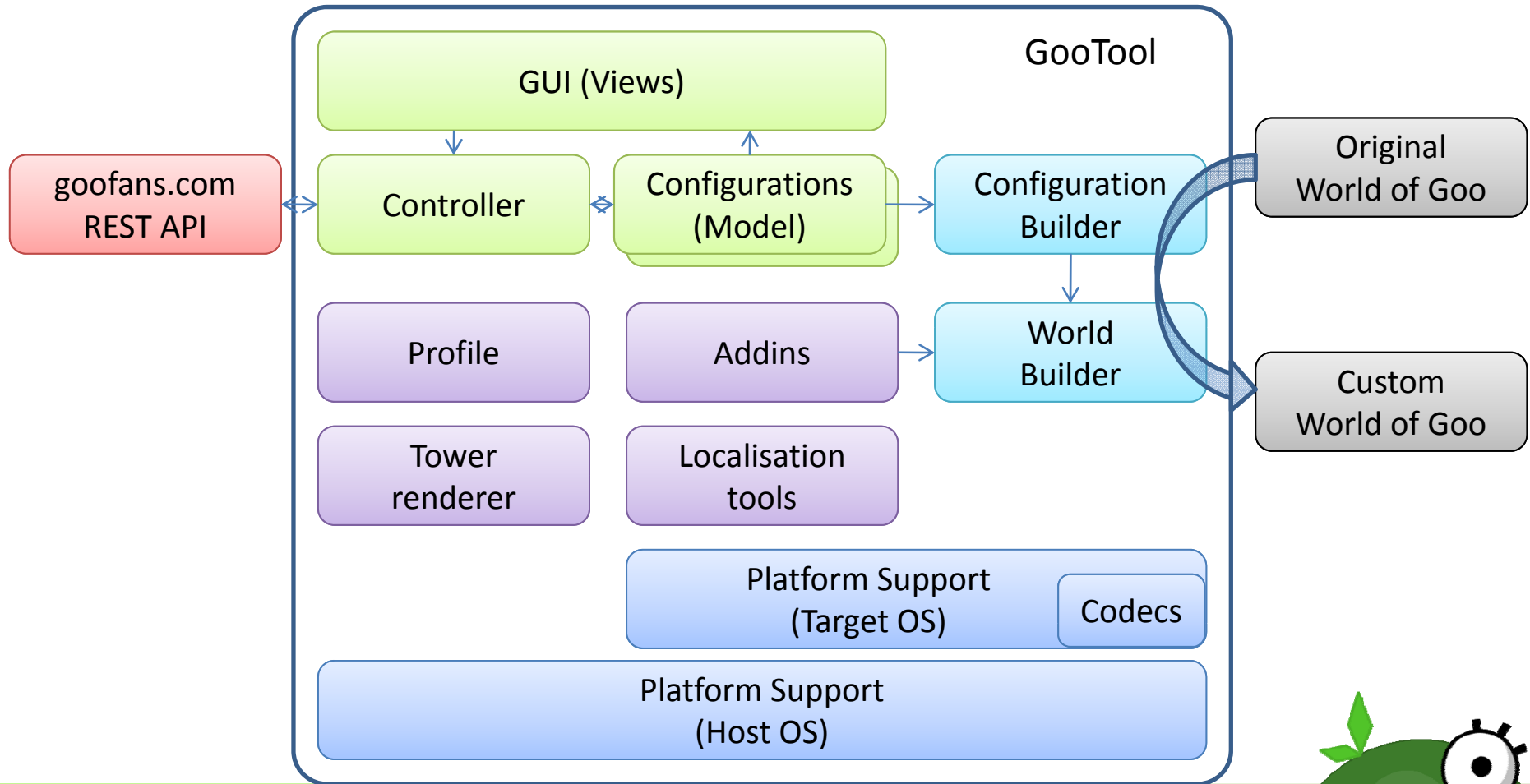
  <!-- Copy everything not matched by another rule -->
  <xsl:template match="*" | comment()">
    <xsl:copy>
      <xsl:copy-of select="@*/>
      <xsl:apply-templates/>
    </xsl:copy>
  </xsl:template>

  <!-- Append our particle generator to the end -->
  <xsl:template match="/effects">
    <xsl:copy>
      <xsl:copy-of select="@*/>
      <xsl:apply-templates/>

      <particleeffect name="snowStormWindow" maxparticles="60" rate="0.05">
        <particle image="IMAGE_FX_SNOWFLAKE1"
          rotspeed="-2,2"
          rotation="-180,180"
          scale="0.3,1"
          fade="true"
          directed="false"
          additive="false"
          lifespan="2.0,2.5"
          speed="3.0,5.0"
          movedir="-90"
          movedirvar="30"
          acceleration="0,0">
          <axialsinoffset amp="5,25" freq="0.5,4" phaseshift="0.2,0.4" axis="x"/>
        </particle>
      </particleeffect>
    </xsl:copy>
  </xsl:template>
</xsl:transform>
```



# GooTool Architecture

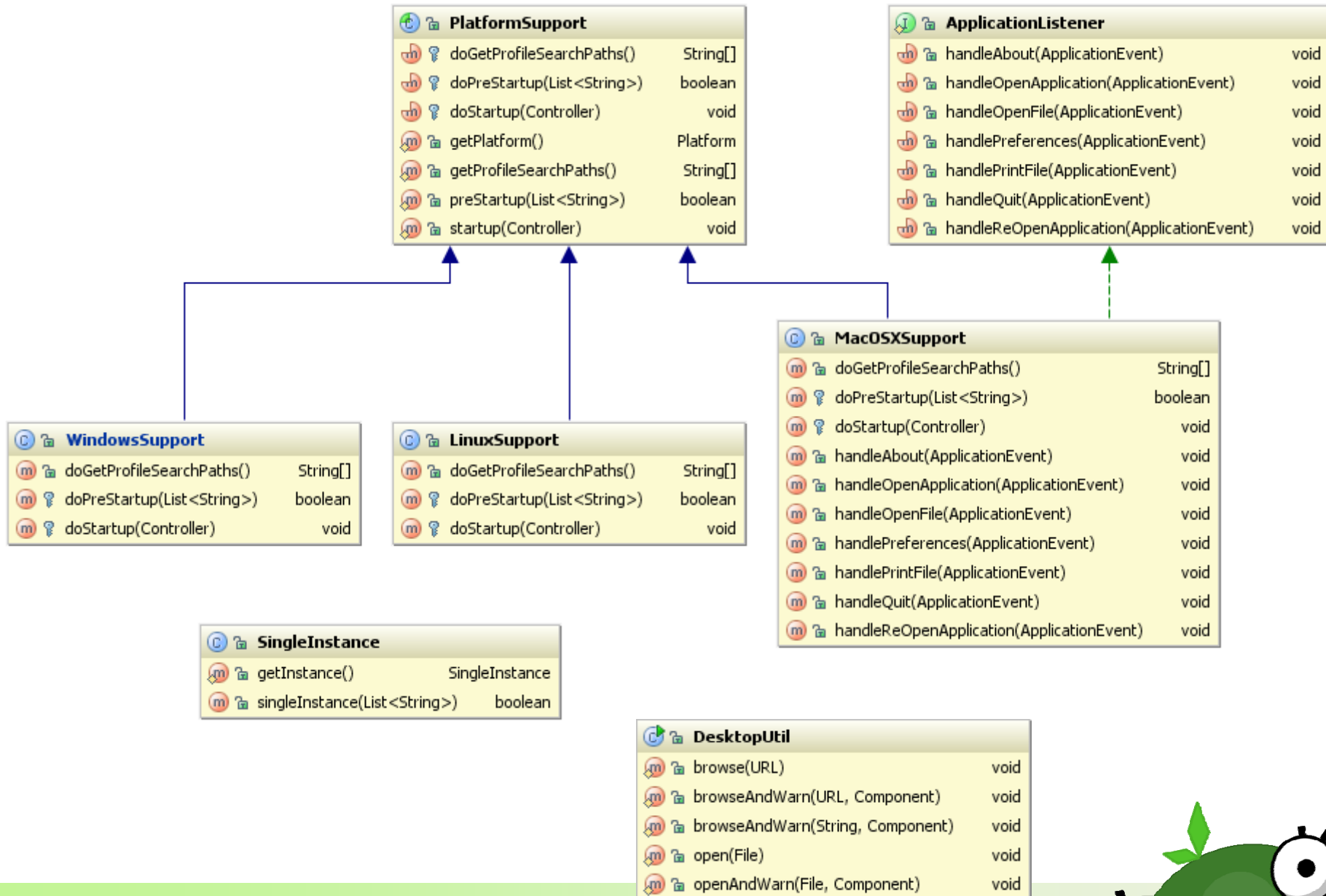


# Platform Support (Host OS)

- Platform-specific startup methods.
- Platform-specific game file locations.
- Auto-detect but allow override with “-Dgootool.platform” for testing.
- Handles the “-preferences” command-line argument, to use our Preferences SPI.
- Cross-platform opening of files and URLs.



com.apple.eawt



# PlatformSupport

- `preStartup()`
  - Are we allowed to start up?
  - Must refuse if GooTool is already running.
- `startup()`
  - We are going to start up.
- `getProfileSearchPaths()`
  - Returns game file locations for this platform.
  - Expands environment variables like `%USERPROFILE%`.



# MacOSXSupport

- Mac OS X already ensures only a single instance of the application is running.
- `preStartup()` therefore does nothing.
- `startup()` adds an “About” menu item and registers an `ApplicationListener`.
- Implements Apple’s `ApplicationListener` to handle About and Quit requests.



# WindowsSupport, LinuxSupport

- Application must itself ensure only a single instance runs.
- Subsequent instances do not start up, but must pass command-line arguments along.
- A cross-platform approach is preferred, so we avoid Windows mutexes or Linux named pipes.
- New SingleInstance class.



# SingleInstance

- Make sure the user's temp directory is writable.
- Try to lock the lockfile.
- Use OS-level file locking to ensure atomicity and cleanup on shutdown.
- If lock obtained, this is the primary instance.
- Otherwise, this is a secondary instance.





# Primary Instance

- Add a shutdown hook to release the lockfile.
- Set up a socket bound to localhost.
- Write the port number to the temp directory.
- Start a thread to listen to this socket for arguments from new instances.
- Queue incoming arguments for the event dispatch thread to handle once startup is complete.



# Secondary Instances

- Locate the port number of the primary instance.
- Send it the command-line arguments.
- Return false to indicate the caller should now exit.



# DesktopUtil

- “Browse to URL” method.
- “Open file on the desktop” method.
- Java 1.6 added `java.awt.Desktop`.
- Surrogate to allow same functionality under previous JRE versions.
- Access all classes by reflection only.



# DesktopUtil methodology

- Where available, use `java.awt.Desktop`.
- Under JRE 1.5 and earlier, use OS-specific methods:
  - Mac OS X: use `com.apple.eio.FileManager`.
  - Windows: `Runtime.exec()` `rundll32`.
  - UNIX: locate suitable command using ``which`` and `Runtime.exec()` it.
    - `www-browser`, `run-mailcap` with some fallbacks.



[code]





# GooTool

Download at:

<http://goofans.com/gootool>

Source code on USB flash drive.



David Croft

Amsterdam, 14.06.2010