
Gnash Manual V0.7

Rob Savoye <rob@senecass.com>

This manual describes version 0.7 of Gnash.

Copyright © 2005 Rob Savoye

Permission is granted to copy, distribute and/or modify this document under the terms of the *GNU Free Documentation License*, Version 1.1 or any later version published by the Free Software Foundation with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. You can find a copy of the GFDL at this link [ghelp:fdl] or in the file COPYING-DOCS distributed with this manual.

Many of the names used by companies to distinguish their products and services are claimed as trademarks. Where those names appear in any GNOME documentation, and those trademarks are made aware to the members of the GNOME Documentation Project, the names have been printed in caps or initial caps.

Revision Gnash Manual V0.7

Revision History
December 2005

Rob Savoye <rob@senecass.com>

Free Software Foundation

Table of Contents

Introduction	1
Gnash Overview	2
Gnash Usage	2
Gnash Command Line Options	3
Gnash Interactive Control Keys	4
Code Overview	4
The Libraries	5
The Applications	5
The Plugin	5
Authors	5
A. GNU Free Documentation License	6
0. PREAMBLE	6
1. APPLICABILITY AND DEFINITIONS	6
2. VERBATIM COPYING	7
3. COPYING IN QUANTITY	7
4. MODIFICATIONS	7
5. COMBINING DOCUMENTS	9
6. COLLECTIONS OF DOCUMENTS	9
7. AGGREGATION WITH INDEPENDENT WORKS	9
8. TRANSLATION	9
9. TERMINATION	9
10. FUTURE REVISIONS OF THIS LICENSE	10
Addendum	10

Introduction

Gnash is a Free Flash movie player, which works either standalone, or as a Firefox/Mozilla plugin.

Gnash Overview

Currently Gnash only has working support for the standalone Flash movie player. Development of the plugin is under heavy development at this time. The only difference between the plugin and the standalone player is that one is rendered in the browser window, instead of a separate window.

Gnash currently has two backends for graphic display. The only one currently used by Gnash is the OpenGL one. There is an XBox backend, but as I don't own an XBox, I can't verify if it even works anymore.

The plugin uses the OpenGL backend still, it's just captured within the window allocated for the plugin's display within the browser window. The plugin code is mostly the same as the standalone except for event handling and the drawing window.

Gnash supports the current Shockwave format, version 7. While all the ActionScript classes exist, not all of the methods defined by the SWF format documentation are implemented however, so not all flash movies work 100% if they utilize any of the unimplemented methods. This is one of the areas to work on to achieve full version 7 compliance.

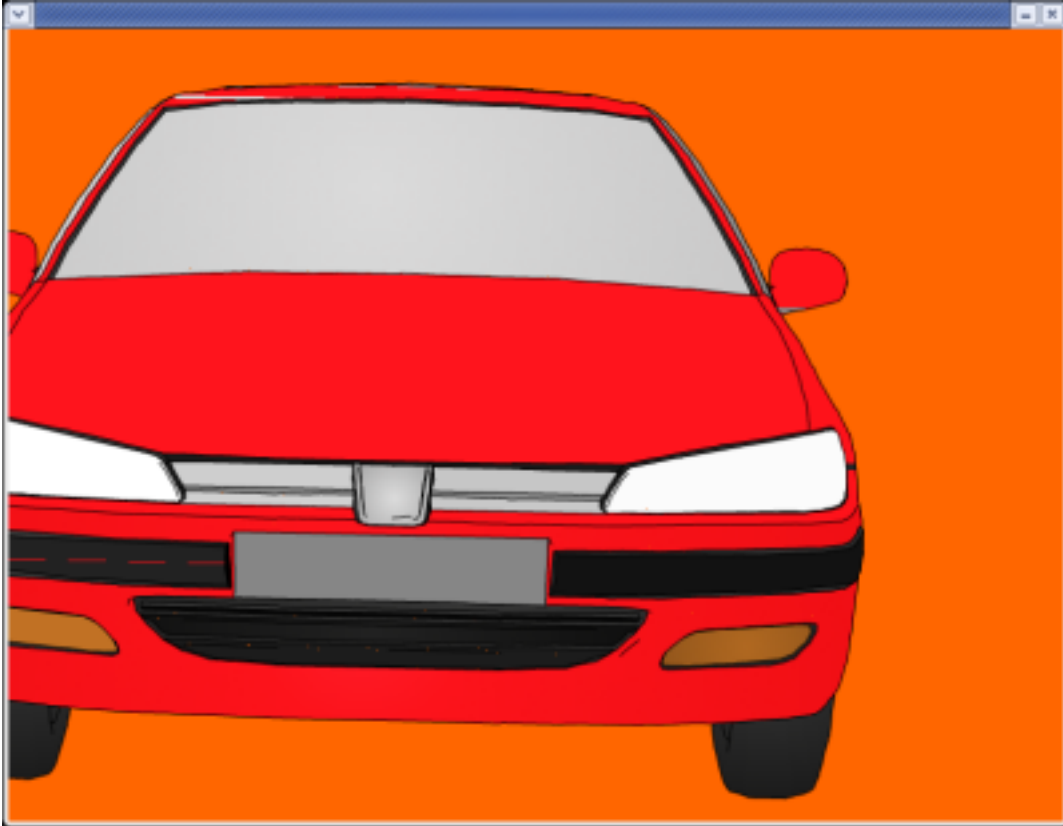
Included in the Gnash is an XML based messaging system, as specified in the Flash specification. This lets a flash movie communicate over a TCP/IP socket, and parse the incoming XML message. This lets a movie be a remote control for other devices or applications.

Gnash Usage

Currently only the standalone player is fully operational. You can execute any flash movie from the command line by just supplying the file name. No command line options are required to just play the movie using the default actions. So if you type:

```
gnash samples/car_smash.swf
```

It'll create a window and play this movie. In this case it's a simple animation of a car driving and swerving and finally crashing.



Gnash Command Line Options

While by default no options are necessary, there are options that can be used to change `gnash`'s basic behavior.

`gnash [options] file`

<code>-h</code>	Print usage info.
<code>-s factor</code>	Scale the movie up/down by the specified factor.
<code>-c</code>	Produce a core file instead of letting SDL trap it. By default, SDL traps all signals, but sometimes a core file is desired to assist with debugging.
<code>-d num</code>	Number of milli-seconds to delay in main loop. The main loop polls continuously with a delay to adjust how long <code>gnash</code> sleeps between iterations of the loop. The smaller the number, the higher the CPU load gets, and of course, you get more iterations of the main command loop.
<code>-p</code>	Run full speed (no sleep) and log frame rate.
<code>-a</code>	Turn anti-aliasing on/off. (obsolete)
<code>-v</code>	Be verbose; i.e. print debug messages to stdout
<code>-va</code>	Be verbose about movie Actions.
<code>-vp</code>	Be verbose about parsing the movie. Warning, this can generate a lot of text, and can affect the performance of the movie you are playing.

-ml bias	Specify the texture LOD bias (float, default is -1) This effects the fuzziness of small objects, especially small text.
-e	Use SDL Event thread. This uses a separate thread to make the event loop more event driven than polling. This can improve performance for some types of movies.
-l	Play once; exit when/if movie reaches the last frame. This is the default.
-r [0 1 2]	0 disables rendering and sound (good for batch tests) 1 enables rendering and sound (default setting) 2 enables rendering and disables sound.
-t sec	Timeout and exit after the specified number of seconds. This is useful for movies that repeat themselves.
-b bits	Bit depth of output window (16 or 32, default is 16)

Gnash Interactive Control Keys

While a movie is playing, there are several control keys. These can be used to step through frames, pause the playing, and other actions.

CTRL-Q	Quit/Exit
CTRL-W	Quit/Exit
ESC	Quit/Exit
CTRL-P	Toggle Pause
CTRL-R	Restart the movie
CTRL-[or kp-	Step back one frame
CTRL-] or kp+	Step forward one frame
CTRL-A	Toggle anti-aliasing (doesn't work)
CTRL-T	Debug. Test the set_variable() function
CTRL-G	Debug. Test the get_variable() function
CTRL-M	Debug. Test the call_method() function
CTRL-B	Toggle background color

Code Overview

The top level of Gnash has three libraries, `libbase`, `libgeometry`, and `libserver`. There are two utility programs included for debug parsing and processing of Flash movie files to test the Actionscript interpreter. There is also a standalone flash movie player.

The Libraries

libbase

Libbase contains support classes used by the rest of the code. Among these classes is a small and efficient STL library clone that uses smart pointers. This helps isolate the problems that arise when using non GNU C Compilers that aren't compliant with the ANSI C++ standard.

Gnash makes heavy use of smart pointers, so memory allocations are freed up automatically by the interpreter.

libgeometry

Libgeometry contains code for device independant graphics routines.

libserver

Libserver is the guts of the interpreter itself. This is where all the new ActionScript classes get defined, and the main code for the interpreter lives.

The Applications

There are currently a few standalone programs in Gnash to assist with Gnash development, and to play a flash movie.

Gnash

This is the standalone OpenGL backend used to play movies. There are several command line options and keyboard control keys used by Gnash that are documented here.

Gparser

Gparser use the Gnash parser to dissamble the flash movie, and dumps the object types, the depth, and other information to make sure Gnash is parsing the file correctly.

Gprocessor

Gprocessor is used to print out the actions (using the -va option) or the parsing (using the -vp option) of a flash movie. It is also used to produce the .gsc files that Gnash uses to cache data, thereby speeding up the loading of files.

The Plugin

The plugin is designed to work within Mozilla or Firefox. It currently doesn't use the latest plugin API additions, so it should work in older versions as well. The plugin uses the Mozilla plugin API to be cross platform, and portable.

One future thought for the plugin is to use the new Firefox 1.5 or greater version of Firefox. This version has added a drawable canvas window that support hardware acceleration, and is desgined to support things like rendering diretly into the canvas without needing OpenGL.

Authors

Gnash is maintained by Rob Savoye <rob@senecass.com>. Please send all comments, suggestions, and bug reports to <gnash@gnu.org>, or use the Bug Tracking system on The Free Software Foundation's [<http://www.fsf.org>] Savannah host. <http://savannah.gnu.org/projects/gnash> [<http://savannah.gnu.org/projects/gnash>]

I am available for consulting on a variety of renewable energy and open source technologies. More details at <http://www.senecass.com>

The following people all contributed code to GameSWF, which was the original code base for Gnash. I was also a GameSWF contributor. The primary author of GameSWF is Thatcher Ulrich <tu@tulrich.com>. Other individuals that contributed code are: Mike Shaver, Thierry Berger-Perrin, Ignacio Castaño, Willem Kokke, Vitaly Alexeev, Alexander Streit.

GNU Free Documentation License

0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other written document “free” in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondly, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of “copyleft”, which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. The “Document”, below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as “you”.

A “Modified Version” of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A “Secondary Section” is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (For example, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The “Invariant Sections” are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License.

The “Cover Texts” are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License.

A “Transparent” copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, whose contents can be viewed and edited directly and straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup has been designed to thwart or discourage subsequent modification by readers is not Transparent. A copy that is not

“Transparent” is called “Opaque”.

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML designed for human modification. Opaque formats include PostScript, PDF, proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML produced by some word processors for output purposes only.

The “Title Page” means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, “Title Page” means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies of the Document numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a publicly-accessible computer-network location containing a complete Transparent copy of the Document, free of added material, which the general network-using public has access to download anonymously at no charge using public-standard network protocols. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

- **A.** Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
- **B.** List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has less than five).
- **C.** State on the Title Page the name of the publisher of the Modified Version, as the publisher.
- **D.** Preserve all the copyright notices of the Document.
- **E.** Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
- **F.** Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
- **G.** Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
- **H.** Include an unaltered copy of this License.
- **I.** Preserve the section entitled "History", and its title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
- **J.** Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
- **K.** In any section entitled "Acknowledgements" or "Dedications", preserve the section's title, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
- **L.** Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
- **M.** Delete any section entitled "Endorsements". Such a section may not be included in the Modified Version.
- **N.** Do not retitle any existing section as "Endorsements" or to conflict in title with any Invariant Section.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties—for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the

previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version .

5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections entitled “History” in the various original documents, forming one section entitled “History”; likewise combine any sections entitled “Acknowledgements”, and any sections entitled “Dedications”. You must delete all sections entitled “Endorsements.”

6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, does not as a whole count as a Modified Version of the Document, provided no compilation copyright is claimed for the compilation. Such a compilation is called an “aggregate”, and this License does not apply to the other self-contained works thus compiled with the Document , on account of their being thus compiled, if they are not themselves derivative works of the Document. If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one quarter of the entire aggregate, the Document's Cover Texts may be placed on covers that surround only the Document within the aggregate. Otherwise they must appear on covers around the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License provided that you also include the original English version of this License. In case of a disagreement between the translation and the original English version of this License, the original English version will prevail.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation [<http://www.gnu.org/fsf/fsf.html>] may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See <http://www.gnu.org/copyleft/> [<http://www.gnu.org/copyleft/>].

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License “or any later version” applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

Addendum

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

Copyright © YEAR YOUR NAME.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with the Invariant Sections being LIST THEIR TITLES, with the Front-Cover Texts being LIST, and with the Back-Cover Texts being LIST. A copy of the license is included in the section entitled “GNU Free Documentation License”.

If you have no Invariant Sections, write “with no Invariant Sections” instead of saying which ones are invariant. If you have no Front-Cover Texts, write “no Front-Cover Texts” instead of “Front-Cover Texts being LIST”; likewise for Back-Cover Texts.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License [<http://www.gnu.org/copyleft/gpl.html>], to permit their use in free software.