

Gnash 0.8.1 Technical Features

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Abstract

Gnash is a robust, lightweight Flash player designed for both the consumer PC market and embedded devices. It is developed with the rapid innovation of an Open Source project, but with the security and technical focus of an enterprise-quality offering. Features such as its small memory footprint and its availability on several operating systems make Gnash an ideal choice for either a stand alone player or a plugin for most popular browsers.

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Introduction

Gnash is a free, independently developed Flash player. Gnash is based on the excellent work done on the public domain program **GameSWF**, which is a graphics library for games that contains the heart of a Flash interpreter. In December 2005, Gnash was forked from **GameSWF** and repackaged in the GNU project style. The objective of Gnash is to create an enterprise-quality Flash player that can be widely deployed.

Operating Systems

The 0.8.1 release of Gnash runs on most common 32-bit operating systems and, in some cases, their 64-bit versions. These systems include:

- UNIX/Linux and variants
- Windows
- Darwin (Mac OS X)
- Irix
- Solaris
- BeOs
- OS/2
- Haiku

It also runs on the following 64-bit systems:

- PowerPC
- Itanium
- UltraSparc
- AMD64

Finally, Gnash may be ported to one-off or custom operating systems.

Currently, Gnash has been tested on the following specific operating system/CPU combinations:

OS	CPU
FreeBSD	Alpha AXP, AMD64, i386, Itanium, PC-98, PowerPC, SPARC64
GNU/Linux	CRIS
GNU/Linux [OLPC]	Geode GX
GNU/Linux ALTlinux	i586
GNU/Linux Arklinux	i586
GNU/Linux Debian	Alpha AXP, AMD64, ARM, hppa, i386, Itanium, MIPS, PowerPC, IBM zSeries (s390), SPARC
GNU/Linux Fedora core	x86-32, x86-64
GNU/Linux Gentoo	AMD64, PowerPC, SPARC, x86
GNU/Linux Maemo 2.1	ARMv5t
GNU/Linux Mandriva 2007	
GNU/Linux Open Zaurus	ARM
GNU/Linux OpenSuSE 10	i586, x86-64
GNU/Linux Red Hat	x86-32, x86-64
GNU/Linux Ubuntu	x86-64 reported working, also x86-32 and UltraSPARC
Haiku	
Irix 6.5	MIPS R10K
MacOS X	PowerPC and x86-32

OS	CPU
NetBSD	many, including VAX
OpenBSD	many, including VAX
OS/2 and eComstation	x86-32
Windows	x86-32

Hardware

Because Gnash is available as source code, it can be compiled and run on nearly any architecture. Both 32- and 64-bit systems have run Gnash, including PPC, x86-64, and others.

One of the goals of Gnash is to make it portable enough to install on small devices. As a result, the hardware requirements are minimal. Gnash has run on an ARM9 at 200 MHz with 64 MB of RAM! (It ran without video support in this case.) While firm minimums have not been established, Gnash has been shown to run successfully with the following:

- 36 MHz processor
- 256 MB RAM
- Video – Gnash will run on anything from a raw frame buffer up to an OpenGL-supporting graphics card.

Browsers

The plugin currently works with any browser that uses the Netscape Server Application Programming Interface (NSAPI). This includes:

- Mozilla
- Firefox
- Galeon
- Epiphany
- Konqueror
- Opera
- OLPC Web Activity

Flash and ActionScript

Gnash supports the majority of Flash opcodes up to Small Web Format (SWF) version 7, and a wide sampling of ActionScript classes for SWF version 7. There are plans to work towards greater support for SWF 8 and beyond. Action Message Format (AMF) support is minimal. Gnash has implemented about 80% of ActionScript 2.0, and has begun implementation of ActionScript 3.0 for the next major release.

Memory Footprint

Gnash has a small memory footprint, especially in comparison to other Flash players. This is one focus of the Gnash project; it is necessary in order to make Gnash convenient for devices that have limited memory such as cell phones and other personal digital equipment.

Runtime memory footprint

The following footprint information was found when testing the newest Gnash version in CVS in March 2007 configured with:

```
--disable-plugin --disable-debugger --enable-sound=no
```

Render GUI	Virtual Memory	Resident Set Size (physical RAM)	Shared Memory (code size)
agg-gtk	33372 KB	14 MBB	8948 KB
agg-sdl	26564 KB	9396 KB	5124 KB

Render GUI	Virtual Memory	Resident Set Size (physical RAM)	Shared Memory (code size)
agg-webkit	24556 KB	8992 KB	4220 KB
cairo-webkit	184 MB	128 MB	4284 KB
cairo-gtk	192 MB	133 MB	8000 KB
cairo-sdl	187 MB	129 MB	5256 KB
opengl-gtk	62620 KB	15 MB	9336 KB
opengl-sdl	54932 KB	10 MB	5324 KB

The most memory-economical combination is AGG-FLTK at 24MB Virtual memory, 9MB swapped in (the current agg-fb, not tested here, should be even smaller.) Cairo virtual memory hovered around 50MB during most of the movie but bloated out to 190MB during the creation and moving of hundreds of small objects. This information was last measured some time before 25 Mar 2007.

Security

Many Flash implementations contain potential security exploits that could compromise a viewer's system. With Gnash, an end-user has the ability to see "what's going on" – what types of data the application accesses, where it is found, and how it is used. Many known Flash exploits are included in the Gnash test suite that is used to check whether a release is ready for the public. The Gnash developers are also in the process of a security review, developing a security layer that will protect an end-user, no matter what operating system they use.

One early security feature is the blacklist/whitelist. Flash movies running in a browser can make outgoing network connections. This can be used, for example, to compromise a network device inside a company firewall via a Flash movie running on an employee's browser. Gnash allows you to blacklist hosts that you know are insecure, or to whitelist hosts you know are secure, by editing a configuration file.

Conclusion

Gnash is a free, flexible Flash player with a small memory footprint. It runs on most operating systems, architectures, hardware, and browsers. It works with the most popular Flash files – those that use ActionScript 2.0 and 3.0. With the work under way to make this the most secure Flash player available, Gnash is an ideal candidate for a personal Flash player, or for adaptation to a custom application.

Contact Information

For further information, please contact one of the following people:

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Additional Resources

- The Gnash Developer's Site <http://www.gnashdev.org>
- The Gnash Developer's Wiki http://www.gnashdev.org/wiki/index.php/Main_Page
- Gnash Developer's Guide <http://www.gnashdev.org/?q=node/26>