

Bug 55522 - -funsafe-math-optimizations is unexpectedly harmful, especially w/ -shared

Status: NEW

Alias: None

Product: gcc

Component: target ([show other bugs](#))

Version: 4.6.3

Importance: P3 major

Target Milestone: ---

Assignee: Not yet assigned to anyone

URL:

Keywords:

Depends on:

Blocks:

Reported: 2012-11-29 00:51 UTC by Andy Lutomirski

Modified: 2021-10-06 01:15 UTC ([History](#))

CC List: 2 users ([show](#))

See Also:

Host:

Target: x86_64-*-*, i?86-*-*

Build:

Known to work:

Known to fail:

Last reconfirmed: 2018-01-26 00:00:00

Attachments

[Add an attachment](#) (proposed patch, testcase, etc.)

Note

You need to [log in](#) before you can comment on or make changes to this bug.

Andy Lutomirski 2012-11-29 00:51:57 UTC

[Description](#)

The docs for `-funsafe-math-optimizations` say:

When used at link-time, it may include libraries or startup files that change the default FPU control word or other similar optimizations.

This is, IMO, really bad. One might naively assume (if you haven't thought about that) that `-ffast-math` and `-funsafe-math-optimizations` merely affect code generation. This is true if you `*compile*` with `-ffast-math`, but if you `*link*` with it, then you end up breaking IEEE754 semantics program-wide. This causes real-life problems.

Please consider some combination of:

1. Making `-funsafe-math-optimizations` illegal when combined with `-shared`.
2. Splitting the inclusion of `crtfastmath.o` into its own option (`-funsafe-math-mode-at-startup`, perhaps) and make `-ffast-math` (and `-Ofast`) not set that one.
3. Mention in the docs just how bad this is in shared libraries.

Andy Lutomirski 2012-11-29 01:48:53 UTC

[Comment 1](#)

I mean IEEE754, of course.

Richard Biener 2012-11-29 08:57:15 UTC

[Comment 2](#)

I think crtfastmath.o should not be used when linking with -shared.

Andy Lutomirski 2012-11-30 01:41:14 UTC

[Comment 3](#)

I'm still unconvinced that it makes sense as part of -funsafe-math-optimizations at all. It's not an "optimization" in the sense that people usually think of when looking at compiler flags.

Orion Poplawski 2015-04-28 18:23:44 UTC

[Comment 4](#)

A recent issue triggered by this: https://bugzilla.redhat.com/show_bug.cgi?id=1127544

Craig Smith 2016-02-02 21:51:37 UTC

[Comment 5](#)

This issue is really, really bad, and has potential to start changing more and more run-time behavior of downstream libraries and apps the longer this bug persists.

For example, on RHEL 7, liblzma.so.5 is linked with -Ofast, which also triggers crtfastmeth.o to be used, corrupting the mxcsr register at library load time. (The bug might be specific to RedHat, because -Ofast is added in the rpm spec.)

For some reason, Open GL libraries (libglapi) depend on libselinux which depends on liblzma.

So ANY open GL app on RHEL will now have its math/IEEE754 semantics broken.

That's terrible.

crtfastmath.o should NEVER be used when linking shared libraries, regardless of options.

Orion Poplawski 2016-02-02 22:09:45 UTC

[Comment 6](#)

(In reply to Craig Smith from [comment #5](#))

> For example, on RHEL 7, liblzma.so.5 is linked with -Ofast, which also
> triggers crtfastmath.o to be used, corrupting the mxcsr register at library
> load time.
> (The bug might be specific to RedHat, because -Ofast is added in the rpm
> spec.)

I don't see any evidence of liblzma.so.5 being linked with -Ofast on RHEL7, can you point to that?

Craig Smith 2016-02-02 22:14:35 UTC

[Comment 7](#)

(In reply to Orion Poplawski from [comment #6](#))

> (In reply to Craig Smith from [comment #5](#))
> > For example, on RHEL 7, liblzma.so.5 is linked with -Ofast, which also
> > triggers crtfastmath.o to be used, corrupting the mxcsr register at library

```
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> > spec.)
>
> I don't see any evidence of liblzma.so.5 being linked with -Ofast on RHEL7,
> can you point to that?
```

The xz.spec file from the xz-5.1.2-0.alpha.1 source RPM includes the following:

```
%build
export CONFIGURE_TOP=`pwd`
mkdir objs
pushd objs
CFLAGS="%{optflags} -Ofast -funroll-loops" \
%configure2_5x
%make
popd
```

Orion Poplawski 2016-02-02 22:18:53 UTC

[Comment 8](#)

That version does not exist in RHEL7. Looks like it was a Mandriva thing:

https://www.rpmfind.net/linux/RPM/mandriva/devel/cooker/x86_64/media/main/release/xz-5.1.2-0.alpha.1.x86_64.html

Andy Lutomirski 2016-02-02 22:21:30 UTC

[Comment 9](#)

I'm changing this from an enhancement to a bug. It's a poor design, no one seems to think it's a good idea, and it's broken more than one thing in real life.

Craig Smith 2016-02-02 23:19:56 UTC

[Comment 10](#)

(In reply to Orion Poplawski from [comment #8](#))

```
> That version does not exist in RHEL7. Looks like it was a Mandriva thing:
> https://www.rpmfind.net/linux/RPM/mandriva/devel/cooker/x86\_64/media/main/
> release/xz-5.1.2-0.alpha.1.x86\_64.html
```

rpm -qi liblzma5 on my RHEL 7 system says that the source RPM is the one I mentioned, with build host 'n2.mandriva.com'. Not sure why this is that case, if a build image got corrupted or someone manually installed an rpm from Mandriva on this system without my knowledge.

In any case, the GCC bug is causing real issues, even if possibly not on RHEL 7. I'll find another RHEL 7 system and check.

Ilya Konstantinov 2021-10-06 01:15:28 UTC

[Comment 11](#)

Another manifestation of 'crtfastmath.o considered harmful':

<https://github.com/gevent/gevent/pull/1820>