

Ruby - Bug #20604

Performance regression in C++ extensions due to lack of optimization flags by default since Ruby 2.7

07/02/2024 05:18 PM - ntkme (Natsuki Natsume)

<b>Status:</b>	Rejected	
<b>Priority:</b>	Normal	
<b>Assignee:</b>		
<b>Target version:</b>		
<b>ruby -v:</b>	ruby 3.3.3 (2024-06-12 revision f1c7b6f435) [arm64-darwin23]	<b>Backport:</b> 3.1: UNKNOWN, 3.2: UNKNOWN, 3.3: UNKNOWN
<b>Description</b> <p>I found a significant performance regression in sassc gem when comparing Ruby 2.6 and later, that the extension is running more than 10x slower.</p> <p>I have tracked it down to this commit: <a href="https://github.com/ruby/ruby/commit/733aa2f8b578d03bbcb91d2f496b01e3b990c7e8">https://github.com/ruby/ruby/commit/733aa2f8b578d03bbcb91d2f496b01e3b990c7e8</a></p> <p>This commit removed all default CXXFLAGS from RbConfig that were previously set, including \$optflags, which has -O3.</p> <p>Many of the C++ extensions like sassc use extconf/mkmf to compile, and they have assumed optflags are already set for CXXFLAGS. Without -O3 as part of the default, the extensions are compiled without any optimizations and thus become extremely slow.</p> <p>It is difficult for a regular user to find out the reason of the slowness, nor to say figuring out how to override CXXFLAGS for a native extension.</p> <p>I'm not sure what was the reason of the change, but I think we should at least set \$optflags in CXXFLAGS by default.</p>		

History

#1 - 07/08/2024 04:13 PM - ntkme (Natsuki Natsume)

This can be reproduced with the following benchmark script:

```
# frozen_string_literal: true

require 'bundler/inline'

gemfile do
  source 'https://rubygems.org'
  gem 'benchmark-ips'
  gem 'bootstrap', '~> 5.3'
  gem 'sassc'
end

BOOTSTRAP = Gem::Specification.find_by_name('bootstrap').gem_dir + '/assets/stylesheets/_bootstrap.scss'

require 'benchmark/ips'
require 'sassc'

Benchmark.ips do |x|
  x.time = 15

  x.report("CXXFLAGS=#{RbConfig::CONFIG["CXXFLAGS"]}") do
    SassC::Engine.new(File.read(BOOTSTRAP), { style: :compressed, filename: BOOTSTRAP }).render
  end

  x.compare!
end
```

Begin with the default on ruby:3.3 docker container with gcc 12.2.0.

Please make sure to gem uninstall -a sassc before the test to start clean.

```
ruby 3.3.3 (2024-06-12 revision f1c7b6f435) [aarch64-linux]
Warming up -----
      CXXFLAGS=""      1.000 i/100ms
Calculating -----
```

```
CXXFLAGS="" 0.765 (± 0.0%) i/s - 12.000 in 15.684859s
```

Now edit \$RUBYARCHDIR/rbconfig.rb to manually patch the default CXXFLAGS as the following:

```
CONFIG["CXXFLAGS"] = "$(optflags) "
```

Note: This file is read-only by default, and may need to be force overwritten with depends on your editor.

Now we can run the same test again.

Please make sure to gem uninstall -a sassc before the test to start clean.

You can see this is about 7 times faster with \$optflags on linux gcc.

```
ruby 3.3.3 (2024-06-12 revision f1c7b6f435) [aarch64-linux]
Warming up -----
CXXFLAGS="-O3 -fno-fast-math"
1.000 i/100ms
Calculating -----
CXXFLAGS="-O3 -fno-fast-math"
5.483 (± 0.0%) i/s - 83.000 in 15.139519s
```

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I also tested on mac with clang 15 using homebrew ruby 3.3 out of box:

```
ruby 3.3.3 (2024-06-12 revision f1c7b6f435) [arm64-darwin23]
Warming up -----
CXXFLAGS="-fdeclspec"
1.000 i/100ms
Calculating -----
CXXFLAGS="-fdeclspec"
0.517 (± 0.0%) i/s - 8.000 in 15.475395s
```

It's more than 10 times faster with \$optflags with clang 15 on mac:.

```
ruby 3.3.3 (2024-06-12 revision f1c7b6f435) [arm64-darwin23]
Warming up -----
CXXFLAGS="-fdeclspec -O3 -fno-fast-math"
1.000 i/100ms
Calculating -----
CXXFLAGS="-fdeclspec -O3 -fno-fast-math"
5.601 (± 0.0%) i/s - 85.000 in 15.177061s
```

## #2 - 07/11/2024 11:53 PM - shyouhei (Shyouhei Urabe)

- Status changed from Open to Rejected

This is NG. Some OSes (if I remember correctly it was Arch when we found this) ship clang and g++ combination. They happen to have -O3 in common but not everything. It was a wrong idea first place for us to share \$optflags. There's nothing we can do here. Please specify \$CXXFLAGS individually.

## #3 - 07/12/2024 12:15 AM - alanwu (Alan Wu)

Please specify \$CXXFLAGS individually.

Just some additional information about how to do this.

If you maintain a gem, you can add the desired flags to \$CXXFLAGS in your extconf.rb.

As an user, you can install a gem while adding to \$CXXFLAGS using --with-cxxflags without changing the gem. This is an mkmf feature. For example:

```
$ gem install sassc -- --with-cxxflags=-O3
```