

## Ruby master - Feature #9633

### [PATCH]Symbol GC

03/13/2014 07:59 AM - authorNari (Narihiro Nakamura)

|                        |                           |
|------------------------|---------------------------|
| <b>Status:</b>         | Closed                    |
| <b>Priority:</b>       | Normal                    |
| <b>Assignee:</b>       | matz (Yukihiro Matsumoto) |
| <b>Target version:</b> | 2.2.0                     |

#### Description

I've written a patch to collect most symbols.

PATCH: [https://github.com/authorNari/ruby/compare/13834fb3c...symbol\\_gc.patch](https://github.com/authorNari/ruby/compare/13834fb3c...symbol_gc.patch)

#### Summary

- Most symbols in Ruby level are GC-able□generated by #to\_sym, #intern, etc..□
- Exclude a symbol which is translated ID in C-level from GC-able symbols
- Keep Ruby's C extension compatibility
- Pass make test-all

#### Benchmark

A benchmark program is here.

```
obj = Object.new
100_000.times do |i|
  obj.respond_to?("sym#{i}".to_sym)
end
GC.start
puts"symbol : #{Symbol.all_symbols.size}"

% time RBENV_VERSION=ruby-r45059 ruby -v /tmp/a.rb
ruby 2.2.0dev (2014-02-20 trunk 45059) [x86_64-linux]
symbol : 102416
0.24s user 0.01s system 91% cpu 0.272 total

% time RBENV_VERSION=symgc ruby -v /tmp/a.rb
ruby 2.2.0dev (2014-02-20 trunk 45059) [x86_64-linux]
symbol : 2833
0.21s user 0.01s system 90% cpu 0.247 total
```

The total number of symbols is declined.

The total time of symgc version is improved because Full GC pressure has been reduced.

The result of make benchmark.

<https://gist.github.com/authorNari/9359704>

There is no significant slowdown.

(I would welcome to try an additional benchmark and report)

#### Implementation Detail

I classify Dynamic symbol and Static symbol.

- Static symbol
  - Generated by rb\_itnern()
  - A sequential unique number as in the past.
  - Not GC-able

- LSB = 1
- Reserved IDs(147 and below) are exceptional cases

- Dynamic symbol

- Generated by #to\_sym, #intern in Ruby level
- RVALUE
- GC-able
- LSB = 0
- Pin down a dynamic symbol when it translate to ID (e.g. SYM2ID, rb\_intern).
- Pinned dynamic symbols are never collected.
- I'd like to include ID in GC's roots only CRuby internal in order to reduce pinned dynamic symbols.

Please read the patch if you want to know more information.

## Acknowledgment

The idea of this symbol GC is invented by Sasada Koichi in Heroku,inc.  
Thank you.

```
-- ja --
Ruby GC
https://github.com/authorNari/ruby/compare/13834fb3c...symbol\_gc
```

```
[] []
```

- Ruby GC to\_sym,intern
- C ID GC rb\_intern SYM2ID
- C-API
- make test-all

```
[] [] [] [] []
```

```
[] [] [] [] [] [] [] []
```

```
obj = Object.new
100_000.times do |i|
  obj.respond_to?("sym#{i}".to_sym)
end
GC.start
puts"symbol : #{Symbol.all_symbols.size}"

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symbol : 102416
0.24s user 0.01s system 91% cpu 0.272 total
```

```
Full GC symgc
```

```
make benchmark
https://gist.github.com/authorNari/9359704
```

```
[] [] [] [] [] [] [] []
```

```
[] [] [] [] [] [] [] []
```

```
[] [] [] [] [] [] [] []
```

symbol static symbol dynamic symbol

- static symbol

- rb\_intern
- GC
- 147 ID

- dynamic symbol

- Ruby #to\_sym, #intern
- RVALUE
- GC
- 1 0
- C ID SYM2ID pindown GC
- Ruby ID pindown

...

GC Heroku

### History

#1 - 03/13/2014 08:05 AM - authorNari (Narihiro Nakamura)

- Status changed from Open to Closed

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