GMOペパボ

The details of CI/CD environment for Ruby

The strategy of build for the programming language

Hiroshi SHIBATA / GMO Pepabo, Inc.

2021.09.03 Cloud Native Days CI/CD conference 2021

GMOペパボ



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Agenda

- What is Ruby Core team?
- The test strategy of the Ruby language
- CI environment for the Ruby language development



1. What’s Ruby?

Ruby is designed to make programmers happy.

Yukihiro Matz Matsumoto

Version number and release cycle

We plan to release every Christmas day.

- **2.1.0: 2013/12/25**
- **…**
- **2.6.0: 2018/12/25**
- **2.7.0: 2019/12/25**
- **3.0.0: 2020/12/25**
- **3.1.0: 2021/12/25(TBD)**



What's Ruby Core Team?

Full-time commiters

Akatsuki

- n0kada



Money Forward

- shyouhei



Cookpad

- ko1
- mametter





Speee

- mrkn



Shopify

- Tenderlove



Total 88 people + 2 bots

```
$ cat ~svn/.ssh/authorized_keys | awk '{print $5}' | sort | uniq | wc -l
90
```

Branch maintainers

master known as 3.1

@nurse: Release manager



3.0

@nagachika: Stable branch maintainer



2.7 and 2.6

@unak: Old stable branch maintainer





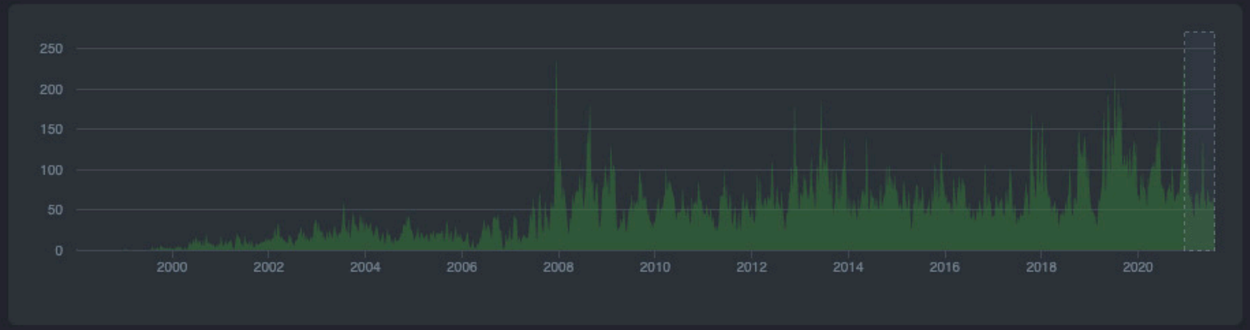
Pulse
Contributors
Community
Traffic
Commits
Code frequency
Dependency graph
Network
Forks

People

Dec 25, 2020 – Aug 11, 2021

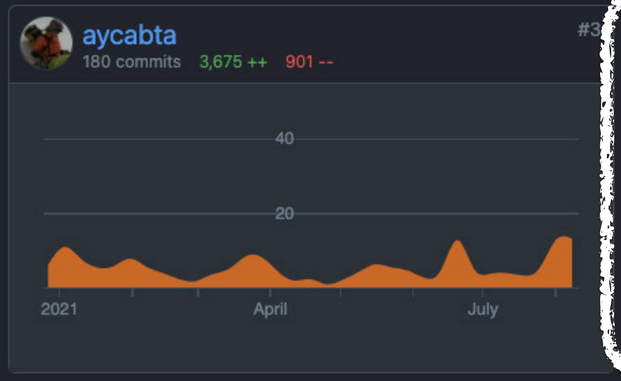
Contributions: Commits

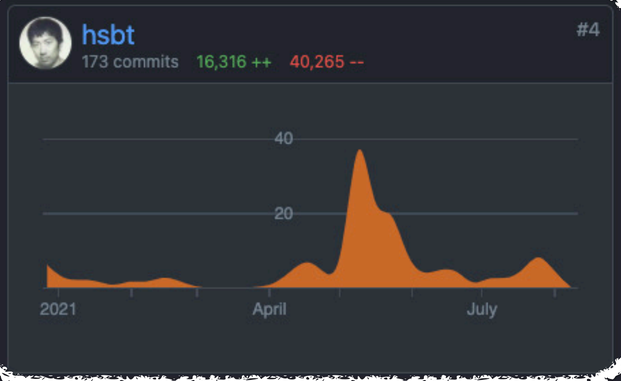
Contributions to master, excluding merge commits and bot accounts













index : ruby.git

The Ruby Programming Language

master switch

summary refs log tree commit diff

log msg search

Branch	Commit message	Author	Age
master	Add comments about testing steps	aycabta	2 hours
ruby_3_0	Bump patchlevel.	nagachika	3 days
ruby_2_7	Fix SortedSet not being sorted the first time when rbtree is used	Jeremy Evans	11 days
ruby_2_6	Fix StartTLS stripping vulnerability	usa	5 weeks
ruby_2_5	Oops, forgotten to add	usa	4 months
ruby_2_4	Bump version to 2.4.10	usa	16 months
ruby_2_3	* ext/openssl: backport changes from openssl 2.1.2.	usa	3 years
ruby_2_2	merge revision(s) 62968:	usa	3 years
ruby_2_1	* 2016-04-22	svn	5 years
ruby_2_0_0	merge revision(s): 53153 and 23405@ruby_1_9_1	usa	6 years

[...]

Tag	Download	Author	Age
v2_7_4	commit a21a3b7d23...	Yusuke Endoh	5 weeks
v2_6_8	commit 768423edc2...	usa	5 weeks
v3_0_2	commit 0db68f0233...	nagachika	5 weeks
v2_7_3	commit 6847ee089d...	nagachika	4 months
v3_0_1	commit 0fb782ee38...	Nobuyoshi Nakada	4 months
v2_6_7	commit 930143880a...	usa	4 months
v2_5_9	commit ee47403ce0...	usa	4 months
v3_0_0	commit 95aff21468...	TAKANO Mitsuhiro	8 months
v3_0_0_rc2	commit a89932799c...	NARUSE, Yui	8 months
v3_0_0_rc1	commit 8680ae9cbd...	Nobuyoshi Nakada	8 months

[...]

Age	Commit message	Author
2 hours	Add comments about testing steps HEAD master	aycabta
2 hours	Put the result of the process into a variable once	aycabta
2 hours	Stop exiting to show "SUCCESS"	aycabta
2 hours	Add logging about Errno::EPIPE	aycabta
2 hours	Write log to stdout immediately	aycabta
2 hours	Stop checking char from "read"	aycabta
2 hours	Break immediately if assertions finished	aycabta
2 hours	Add "START" log	aycabta
3 hours	Term fill in String#{,l,r}strip! even when SHARABLE_MIDDLE_SUBSTRING	Jeremy Evans
4 hours	Get rid of type-punning pointer casts [Bug #18062]	Nobuyoshi Nakada

[...]



Open pull-request

Cron fetch



Ruby CI VM cluster

Direct push

Sync

git

Actions: Linux, macOS

S3: test results

RAILS

Ruby CI: Viewer of results

Appveyor: Windows tests

Travis CI

AIX, arm

Package build

S3: package storage

fastly

Distribute package

How to get the Ruby language?

Binary distribution

- **Windows: RubyInstaller2**
- **Linux: apt/yum/dnf, brightbox/software collection, snap**
- **macOS: System binaries/homebrew/MacPorts**

Source distribution

- **This is maintained by Ruby core team**
- **Package: cache.ruby-lang.org, Source code: git.ruby-lang.org or github**



Official Docker/Binary image

https://hub.docker.com/r/rubylang/ruby

- ruby image of docker have a some of problem
  - Like alpine linux

https://build.snapcraft.io/user/ruby/snap.ruby

- You can use the latest version of Ruby like 3.0.2 without ruby version manager
- You can keep to clean your linux environment.



The test strategy of the Ruby language

Start to test Ruby language

You can invoke language tests with the following instructions:

```
$ git clone https://github.com/ruby/ruby
$ cd ruby
$ autoreconf
$ ./configure —disable-install-doc
$ make -j
$ make check
```



make check

make check depends on the following definitions:

- main
  - Build encodings and extensions.
- test
  - Run btest, test-basic
- test-testframework
  - Run tests for `testunit` and `minitest`
- test-almost
  - Run tests under `test` excluding `testunit` and `minitest`
- test-rubyspec
  - Run mspec with the ruby binary and the latest ruby/spec



`cat bootstraptest/test_class.rb`

```
assert_equal 'true',    %q( class C; end
                            Object.const_defined?(:C) )
assert_equal 'Class',   %q( class C; end
                            C.class )

(snip)

assert_equal 'Class',   %q( class A; end
                            class C < A; end
                            C.class )

(snip)

assert_equal 'M',       %q( module M; end
                            M.name )

(snip)

assert_equal 'A::B',    %q( class A; end
                            class A::B; end
                            A::B )
```

- It tests the first touch of the ruby interpreter.
- The VM or parser developers will care about this.



test-basic

```
a, = nil; test_ok(a == nil)
a, = 1; test_ok(a == 1)
a, = []; test_ok(a == nil)

(snip)

def r; return *[]; end; a = r(); test_ok(a == [])
def r; return *[1]; end; a = r(); test_ok(a == [1])
def r; return *[nil]; end; a = r(); test_ok(a == [nil])

(snip)

f = lambda { |a, b=42, *c| [a,b,c] }
test_ok(f.call(1      ) == [1,42,[  ]] )
test_ok(f.call(1,43   ) == [1,43,[  ]] )
test_ok(f.call(1,43,44) == [1,43,[44]] )

(snip)
```

- It tests the basic feature of Ruby language.
- This test is 1file test. This is not used test-framework.
- After that, We test test framework.



cat `test/logger/test_logger.rb`

```
% cat test/logger/test_logger.rb
# coding: US-ASCII
require 'test/unit'
require 'logger'
require 'tempfile'

class TestLogger < Test::Unit::TestCase

(snip)

 def test_add
    logger = Logger.new(nil)
    logger.progname = "my_progname"
    assert(logger.add(INFO))
    log = log_add(logger, nil, "msg")
    assert_equal("ANY", log.severity)
    assert_equal("my_progname", log.progname)
(snip)
```

- They are for library tests.
- Maybe, most famous for the end users like Ruby/Rails developer.
- It's written by test-unit like framework.



cat `test/-ext-/array/test_resize.rb`

```
% cat ext/-test-/array/resize/resize.c
#include "ruby/ruby.h"

static VALUE
ary_resize(VALUE ary, VALUE len)
{
    rb_ary_resize(ary, NUM2LONG(len));
    return ary;
}

void
Init_resize(void)
{
    rb_define_method(rb_cArray, "__resize__", ary_resize, 1);
}
```

```
require 'test/unit'
require '-test-/array/resize'

class TestArray < Test::Unit::TestCase
  class TestResize < Test::Unit::TestCase
    def test_expand
      feature = '[ruby-dev:42912]'
      ary = [*1..10]
      ary.__resize__(10)
      assert_equal(10, ary.size, feature)
      assert_equal([*1..10], ary, feature)
      ary.__resize__(100)
      assert_equal(100, ary.size, feature)
(snip)
```



cat spec/rubyspec/core/string/append_spec.rb

```
% cat spec/rubyspec/core/string/concat_spec.rb
require File.expand_path('../../../spec_helper', __FILE__)
require File.expand_path('../fixtures/classes', __FILE__)
require File.expand_path('../shared/concat', __FILE__)

describe "String#<<" do
  it_behaves_like :string_concat, :<<
  it_behaves_like :string_concat_encoding, :<<
end
```

```
% cat spec/rubyspec/core/string/shared/concat.rb
describe :string_concat, shared: true do
  it "concatenates the given argument to self and returns self" do
    str = 'hello '
    str.send(@method, 'world').should equal(str)
    str.should == "hello world"
  end

(snip)
```

Please check details: https://github.com/ruby/spec



CI environments
for
the Ruby language development

Our maintenance policy

- We support the platform with our motivation.
  - We are volunteer.
- We develop toolchains for CI with our motivation.
  - So, We are volunteer.

Because some of tool and workflow is abandoned in the past. I and @mame and @k0kubun care them in a few years.



What's target by CI of Ruby

- Not speed, We need wide range of platforms.
  - Linux, macOS, Windows, others
  - Compilers, System libraries
  - Configuration options, executable options.
  - etc.
- We mixed these parameters about CI and test them.





Open pull-request

Cron fetch



Ruby CI VM cluster

Direct push

git

Actions: Linux, macOS

S3: test results

RAILS

Ruby CI: Viewer of results

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Travis CI

AIX, arm

Package build

S3: package storage

fastly

Distribute package

What's Ruby CI

Ruby CI is a CI results collector for alternative platforms

- https://rubyci.org
- https://github.com/ruby/rubyci
- https://github.com/ruby/chkbuild
- https://github.com/ruby/ruby-infra-recipe

Ruby CI goal is entirely supports all of Ruby platform.



Server	Datetime	Branch	Option	Revision	test	test-all	rubyspec	Summary	Diff
Debian 9.0 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Debian 10.3 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Debian 11.0(testing) x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Ubuntu 18.04 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Ubuntu 18.04 aarch64	08-11 16:00	master		c59da370a5d				4W success	diff:src,test-all,...
Ubuntu 20.04 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Ubuntu 21.04 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Funtoo	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
CentOS 7.6(1810) x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,pflags,t...
RHEL 8.1 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,pflags,t...
Fedora 31 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Fedora 32 x86_64	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
Amazon Linux 2018.03 x64	08-11 13:30	master		a0a8f2abf53				4W success	diff:src,test-all,...
Amazon Linux 2	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
ArchLinux	08-11 15:00	master		c59da370a5d				9W success	diff:src,test-all,...
ArchLinux+clang	08-11 14:35	master		c59da370a5d				6W success	diff:src,test-all,...
OpenSUSE leap 15	08-11 15:30	master		c59da370a5d				4W success	diff:src,test-all,...
RHEL 7.1 s390x	08-11 14:33	master		c59da370a5d				18W success	diff:src,pflags,t...
OpenBSD 6.9	08-11 11:30	master		7560bf6f470				8W success	diff:src,minirub...
FreeBSD 12.2 x64	08-11 15:30	master		c59da370a5d				5W success	diff:src,configu...
macOS High Sierra	08-11 14:45	master		c59da370a5d				6W success	diff:src,configu...
macOS Catalina	08-11 12:45	master		a0a8f2abf53				6W success	diff:src,configu...
macOS Big Sur (ARM)	08-11 14:45	master		c59da370a5d				8W success	diff:src,configu...
icc 2021.2 x64	08-11 16:00	master		c59da370a5d				4W success	diff:src,test-all,...
SPARC Solaris 10 (sunc)	08-11 12:00	master		7560bf6f470				16W success	no diff
SPARC Solaris 10 (gcc)	08-11 15:00	master		c59da370a5d				17W success	no diff
SPARC Solaris 11 (sunc)	08-11 12:00	master		7560bf6f470				53W success	diff:src,pflags,...
SPARC Solaris 11 (gcc)	08-11 15:00	master		c59da370a5d				25W success	diff:src,pflags,...
ppc64le (Ubuntu)	08-11 12:00	master		7560bf6f470				4W success	diff:src,test-all,...
WSL2 (Ubuntu)	08-11 13:00	master		a0a8f2abf53				4W success	diff:src,memor...
riscv64 (Debian)	08-11 09:00	master		28d03ee776a				4W success	diff:test-all,dist
i386 (Debian)	08-11 11:00	master		7560bf6f470				4W success	diff:src,test-all,...
Raspbian 10 (arm)	08-11 08:53	master		28d03ee776a				4W success	diff:cpu-info,bt...
Raspbian 10 (arm64) (beta)	08-11 10:55	master		7560bf6f470				4W success	diff:src,test-all,...
Debian 9.0 x86_64	08-11 15:47	3.0		3922394c85b				10W success	diff:test-all,dist
Debian 10.3 x86_64	08-11 15:47	3.0		3922394c85b				10W success	diff:test-all,dist
Debian 11.0(testing) x86_64	08-11 15:48	3.0		3922394c85b				10W success	diff:test-all,dist
Ubuntu 18.04 x86_64	08-11 15:47	3.0		3922394c85b				16W success	diff:test-all,dist
Ubuntu 18.04 aarch64	08-11 14:21	3.0		3922394c85b				16W success	diff:test-all,dist
Ubuntu 20.04 x86_64	08-11 15:49	3.0		3922394c85b				15W success	diff:test-all,dist
Ubuntu 21.04 x86_64	08-11 15:57	3.0		3922394c85b				12W success	diff:test-all,dist

What's chkbuild?

- Summarize the test results of ruby test suite
- Check `make dist` with volatile enviroment
- Check duplicate task with OS level



ruby-master build summary (debian9)

chkbuild

20200303T033003Z(success) 485ef0bdc1c ruby (debian9) (no diff)
20200303T063002Z(failure) aa9a38c0ed1 ruby (debian9) failed(btest) (diff:src,process-status,btest,test-all,dist,success)
20200303T093002Z(success) a8c5b9a2fd2 ruby (debian9) 1W (diff:src,process-status,btest,test-all,dist,success)
20200303T123003Z(success) 43ed4eb6d1c ruby (debian9) (diff:src,start,memory-info,process-status,test-all,dist)
20200303T153002Z(failure) 14dd377e514 ruby (debian9) failed(btest) (diff:src,process-status,btest,test-all,dist,success)
20200303T183003Z(failure) 14dd377e514 ruby (debian9) failed(btest) (diff:process-status,test-all)
20200303T213003Z(success) 14dd377e514 ruby (debian9) (diff:process-status,btest,test-all,success)
20200304T003002Z(success) 14dd377e514 ruby (debian9) (diff:process-status,test-all,dist)
20200304T033002Z(success) ce586107d8d ruby (debian9) (diff:src,start,memory-info,process-status,test-all,dist)
20200304T063003Z(failure) 16415fefc14 ruby (debian9) failed(btest) (diff:src,process-status,btest,test-all,dist,success)
20200304T093002Z(failure) 633a1f15d82 ruby (debian9) failed(btest) (diff:src,process-status,test-all,dist)
20200304T123002Z(success) 502d9bcd36a ruby (debian9) (diff:src,process-status,btest,test-all,dist,success)
20200304T153003Z(success) f08cd708b11 ruby (debian9) (diff:src,process-status,test-all,dist)
20200304T183002Z(success) f08cd708b11 ruby (debian9) (diff:process-status,test-all)
20200304T213002Z(success) f08cd708b11 ruby (debian9) (diff:process-status,test-all)
20200305T003002Z(success) f08cd708b11 ruby (debian9) (diff:process-status,test-all,dist)
20200305T033002Z(success) 43a3c88187d ruby (debian9) (diff:src,process-status,make,test-all,dist)
20200305T063002Z(failure) e4a9e926f0f ruby (debian9) failed(btest) (diff:src,memory-info,process-status,btest,test-all,dist,success)
20200305T093002Z(success) 17d5efa4fef ruby (debian9) (diff:src,process-status,btest,test-all,dist,success)
20200305T123003Z(success) 17d5efa4fef ruby (debian9) (diff:memory-info,process-status,test-all)
20200305T153002Z(success) 17d5efa4fef ruby (debian9) (diff:process-status,test-all)
20200305T183002Z(success) 17d5efa4fef ruby (debian9) (diff:process-status,test-all)
20200305T213002Z(failure) 17d5efa4fef ruby (debian9) failed(btest) (diff:process-status,btest,test-all,success)
20200306T003002Z(success) 2630757fb53 ruby (debian9) (diff:src,start,process-status,btest,test-all,dist,success)
20200306T033002Z(success) 2630757fb53 ruby (debian9) (diff:process-status,test-all)
20200306T063002Z(success) 2630757fb53 ruby (debian9) (diff:start,process-status,test-all)
20200306T093002Z(success) 2630757fb53 ruby (debian9) (diff:start,process-status,test-all)
20200306T123002Z(success) baaf6815704 ruby (debian9) (diff:src,start,process-status,make,test-all,dist)
20200306T153002Z(success) 0256e4f0f5e ruby (debian9) (diff:src,process-status,test-all,dist)
20200306T183002Z(success) 44462d32068 ruby (debian9) (diff:src,process-status,test-all,dist)
20200306T213002Z(failure) f991340e07e ruby (debian9) failed(btest) (diff:src,process-status,btest,test-all,dist,success)
20200307T003002Z(success) f991340e07e ruby (debian9) (diff:process-status,btest,test-all,dist,success)
20200307T033002Z(failure) f991340e07e ruby (debian9) failed(btest) (diff:process-status,btest,test-all,success)
20200307T063002Z(failure) fcd605020b5 ruby (debian9) failed(btest) (diff:src,process-status,test-all,rubyspec,dist)
20200307T093002Z(failure) f9f3510e64c ruby (debian9) failed(dist) (diff:src,process-status,btest,test-all,dist)
20200307T123002Z(success) 47a1872cd8b ruby (debian9) (diff:src,process-status,test-all,dist,success)
20200307T153002Z(success) 47a1872cd8b ruby (debian9) (diff:process-status,test-all)
20200307T183002Z(success) 47a1872cd8b ruby (debian9) (diff:process-status,test-all)
20200307T213002Z(success) 47a1872cd8b ruby (debian9) (diff:process-status,test-all)
20200308T003002Z(success) 47a1872cd8b ruby (debian9) (diff:process-status,test-all,dist)

Ruby CI resources

Ruby CI goal is entirely supports all of Ruby platform. Ruby CI built by a lot of cloud platforms (20-30 VMs)

- AWS
- on-premise servers(macOS)

We provision them with mitame and its recipe. And We have an advantage for easily provides debug environment with ssh.



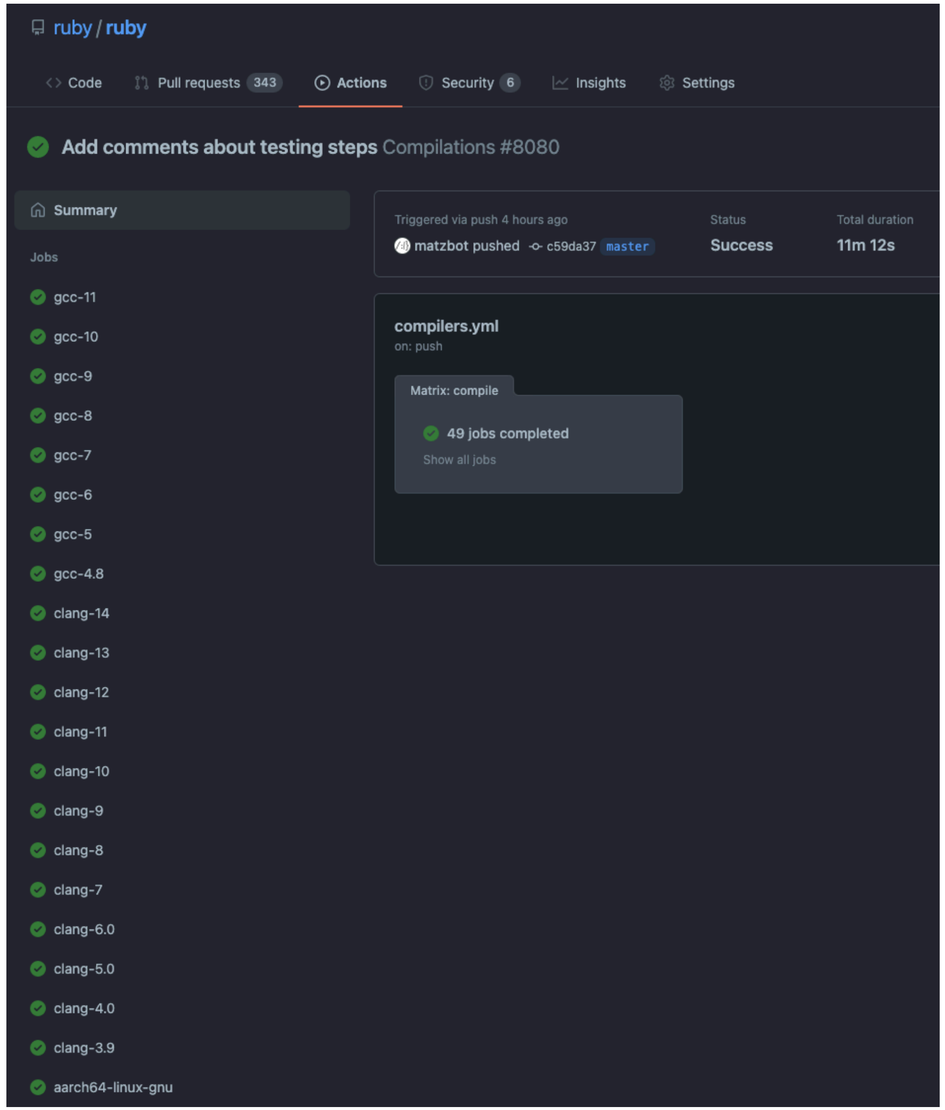
Sponsors of the Ruby language

- heroku:
  Provide the free Enterprise account
- Fastly:
  OSS plan of CDN for *.ruby-lang.org
- NaCl:
  Network and Compute resources for website
- Ruby Association:
  Grant of development for cloud resources
- Nihon Ruby no Kai:
  Grant of development for hardware



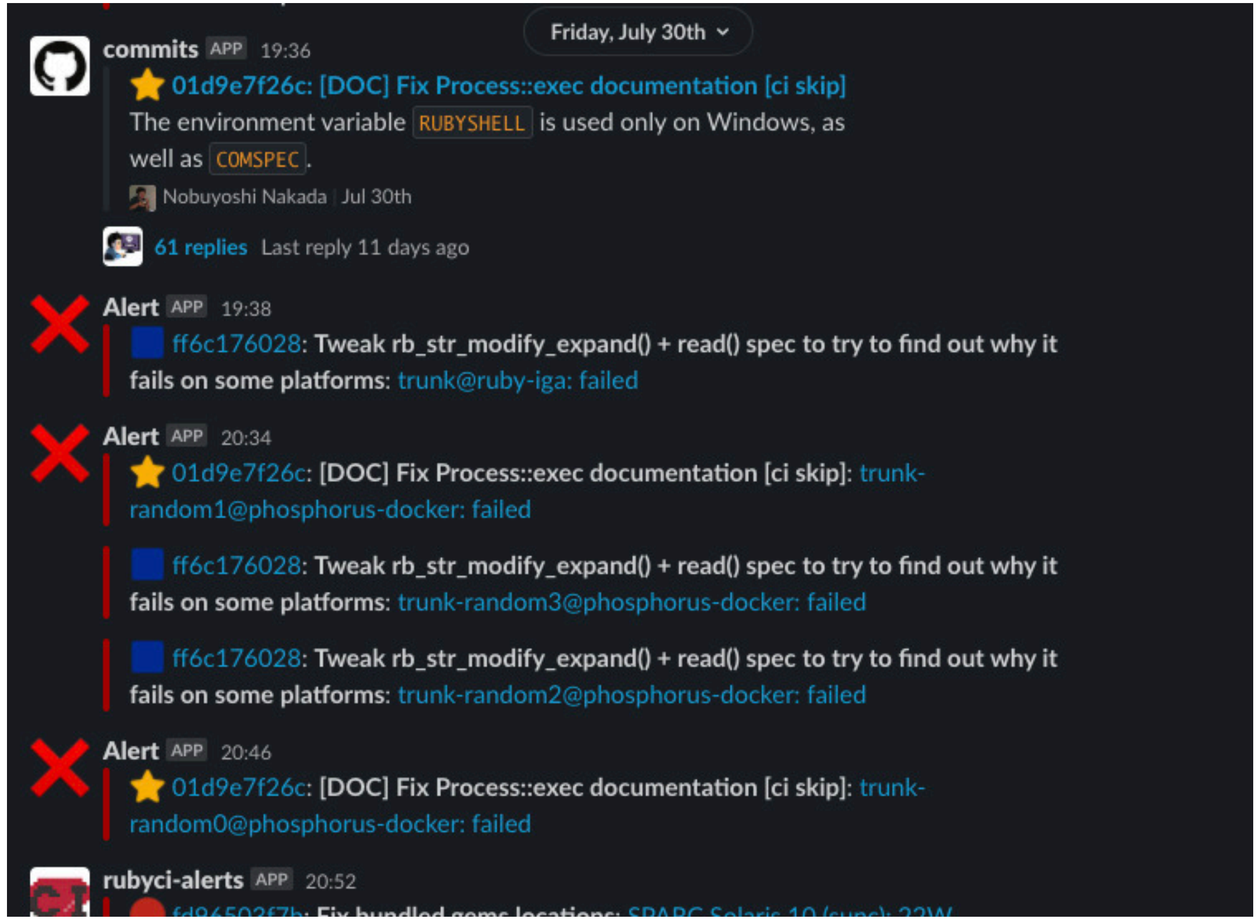
How use GitHub Actions/Travis CI/Appveyer

- We detect test failure of each commits with GitHub Actions, Travis CI and AppVeyer.
- We test many of compilers, macOS and Ubuntu distributions with Actions.
- We also test s390 and arm with Travis, windows with Appveyer.



How use slack for Ruby development

- We integrate the all of test results to 1 slack channel.
- We marked color icons to each commits.
- We use thread reply for failing commits and test results.
- https://techlife.cookpad.com/entry/2020/09/08/090000



How speed-up test suite and CI environment?

Delete code.

Gemification of Ruby

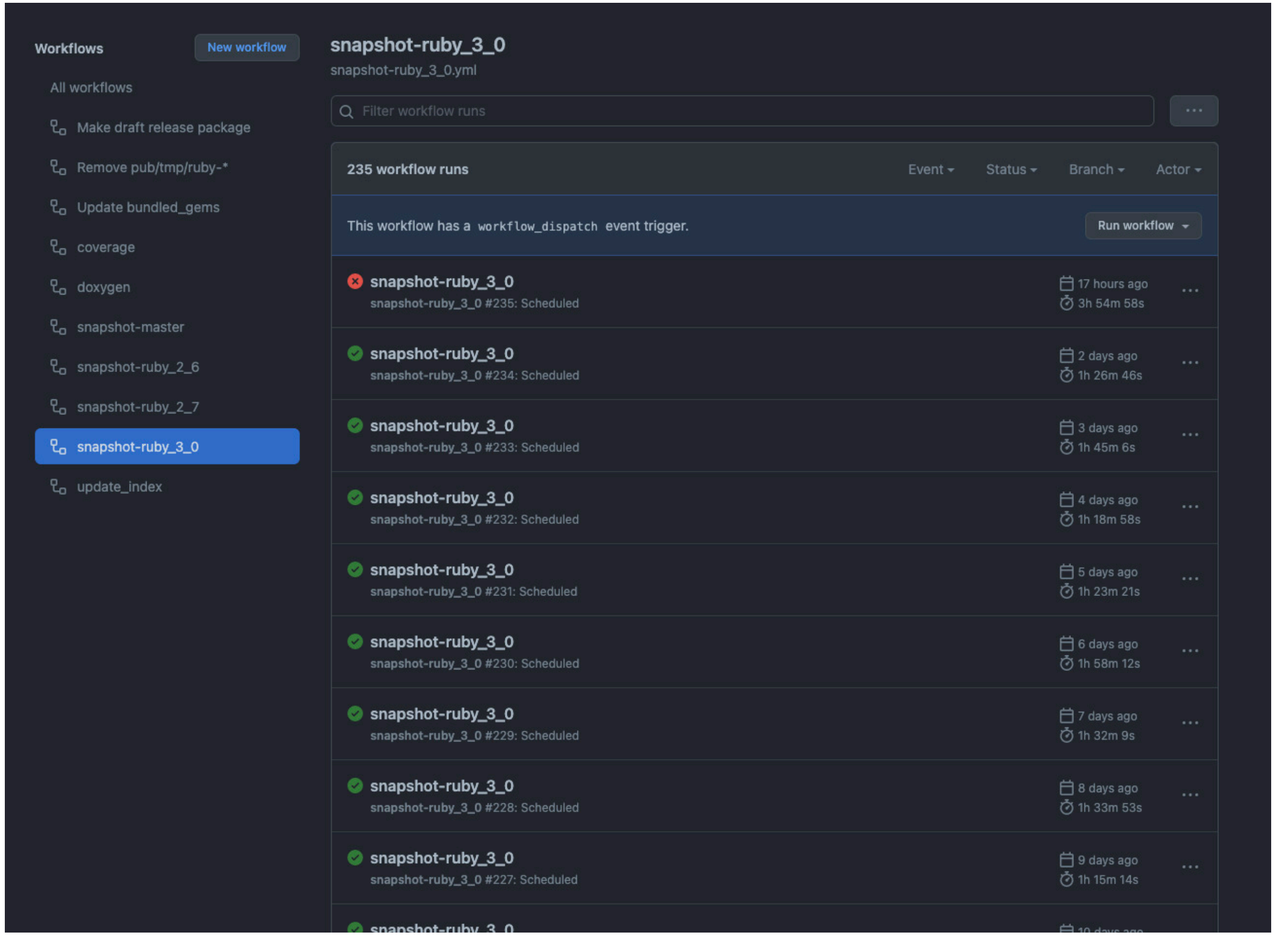
This matrix shows number of standard libraries and their classifications in Ruby 3.1(TBD).

	Standard Libraries	Default Gems	Bundled Gems
Pure Ruby	3	46	14
C extensions	6	20	0

With ruby/ruby repository

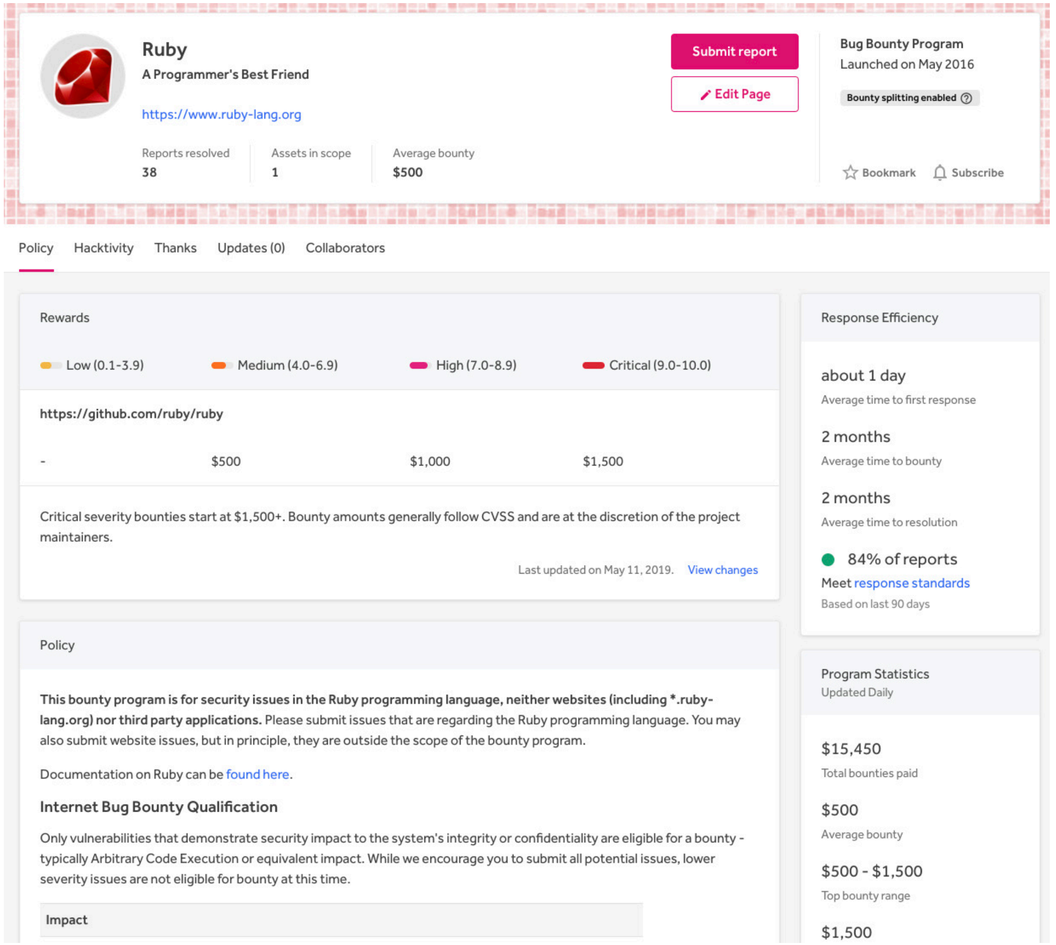
Our CI without testing

- Package builder by GitHub Actions
  - Finally we migrate the package build to GitHub Actions from manual workflow.
  - https://github.com/ruby/actions



CI for vulnerability issue

- CI is not friendly with vulnerability issue
  - Because we have a discussion channel with hackerone.
  - We need to review code without GitHub. So, We couldn’t use CI like GH Actions.
- Sometimes, We handle multiple issues at same time.
  - It easily broke the CI status.



Conclusion

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- I introduced Ruby Core team and their release workflow.
- The test strategy of the Ruby language is complex.
- CI environments for the Ruby language development are also complex and have a bit of differences from Web application.

Let’s join to #ci of ruby-jp slack and talk about them.

