

Testing a Ruby gem against different databases and different versions of Rails

Tony Drake

indy.rb, June 2017

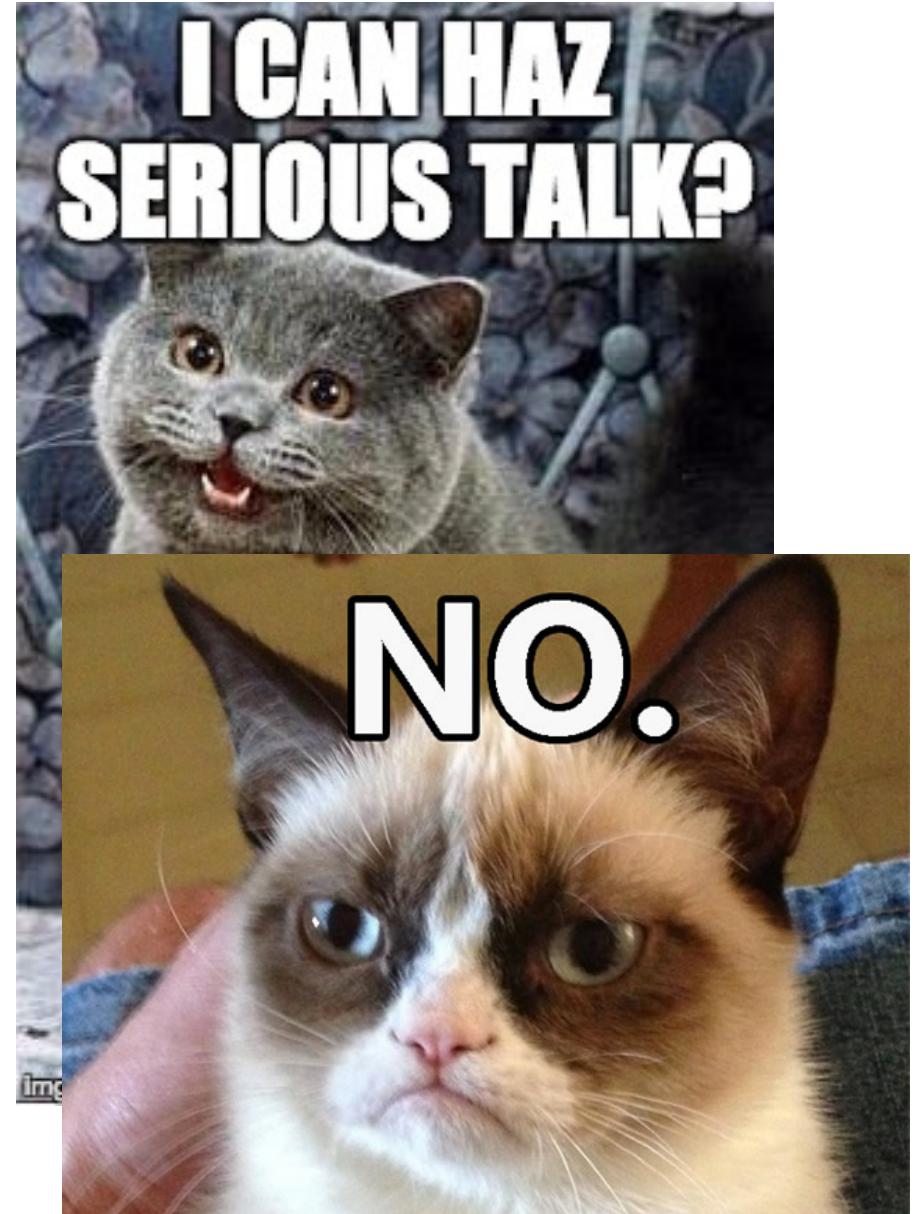
About Me...

- Rails developer for ~8 years
 - Enjoyer of fine Vodka
 - Connoisseur of Mario Kart
 - Gems maintained:
 - has_config
 - active_reporting
- @t27duck
 - github.com/t27duck



Couple Notes

- Lots of code in these slides
 - Move up if you want to read it!
 - I'll try to talk through them
 - Download the slides later to review if you want
- Remember: "\$" = Done in the terminal
- Danger: There be memes ahead



Let's Build a Gem...

- Get an array of hashes from an ActiveRecord / ActiveRelation query
- Store code on Github
- Use TravisCI
- Test with rspec
- Test with PostgreSQL
- Should work with all supported versions of ActiveRecord
- Should work with databases that Rails supports

Create the Gem

```
$ bundle gem raw_to_a
Creating gem 'raw_to_a'...
  create  raw_to_a/Gemfile
  create  raw_to_a/.gitignore
  create  raw_to_a/lib/raw_to_a.rb
... More files made ...
  create  raw_to_a/.travis.yml
Initializing git repo in /directory/i/am/in/raw_to_a
```



Set Gem Dependencies (raw_to_a.gemspec)

```
Gem::Specification.new do |spec|
```

```
  ... Rest of gemspec file ...
```

```
    spec.add_dependency "activerecord", ">= 4.2.0"
```

```
    spec.add_development_dependency 'pg'
```

```
  ... Rest of gemspec file ...
```

```
end
```

.... and then run "bundle"

Write the Gem Code (lib/raw_to_a.rb)

```
require 'raw_to_a/version'  
require 'active_record'  
  
module RawToA  
  module ActiveRecord  
    def raw_to_a  
      connection.execute(self.all.to_sql).to_a  
    end  
  end  
end  
ActiveRecord::Base.extend(RawToA::ActiveRecord)
```

Write Tests! (spec/spec_helper.rb)

```
require "bundler/setup"
require "raw_to_a"

ActiveRecord::Base.establish_connection(
  adapter: 'postgresql',
  database: 'raw_to_a_test',
  min_messages: 'warning'
)

ActiveRecord::Schema.define do
  self.verbose = false
  create_table :users, force: true do |t|
    t.string :username, null: false
    t.boolean :active, null: false, default: true
    t.timestamps
  end
end
```

```
class User < ActiveRecord::Base
  validates :username, presence: true
end

10.times.each_with_index do |i|
  User.create!(
    username: "user#{i}",
    active: i % 2 == 1
  )
end

RSpec.configure do |config|
  ... More config switches ...
end
```

Write Tests! (spec/raw_to_a.spec)

```
require "spec_helper"

RSpec.shared_examples "#raw_to_a" do |query|
  let(:subject) { query.raw_to_a }
  let(:attributes) { ... Snip ... }

  it "is an array of hashes" do
    expect(subject).to be_an(Array)
    subject.each do |row|
      expect(row).to be_a(Hash)
    end
  end

  ... Snip ...

  it "has same number of elements as the query" do
    expect(subject.size).to eq(query.all.size)
  end
end
```

```
RSpec.describe RawToA do
  ... Snip ...

  context "with a model class" do
    include_examples "#raw_to_a", User
  end

  context "with an ActiveRelation" do
    include_examples "#raw_to_a", User.where(active: true)
  end

  context "when selecting specific columns" do
    include_examples "#raw_to_a", User.select(:username)
  end

  context "when limiting the number of rows" do
    include_examples "#raw_to_a", User.limit(3)
  end
end
```

Run Tests (rake spec)



RawToA

```
has a version number
with a model class
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
with an ActiveRelation
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when selecting specific columns
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when limiting the number of rows
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
```

Finished in 0.03279 seconds (files took 1.56 seconds to load)
13 examples, 0 failures

Set up Travis (.travis.yml)

```
sudo: false
language: ruby
rvm:
  - 2.4.1
before_install:
  - gem install bundler -v 1.14.6
  - psql -c 'create database raw_to_a_test;' -U postgres
```

Commit, Push Up to GitHub...

t27duck / raw_to_a  build passing

Current Branches Build History Pull Requests More options 

✓ master	Init commit	-o #1 passed	⌚ 1 min 4 sec	
 Tony Drake		 bfe57a1	⌚ less than a minute ago	

Build Gem, Push to RubyGems.org

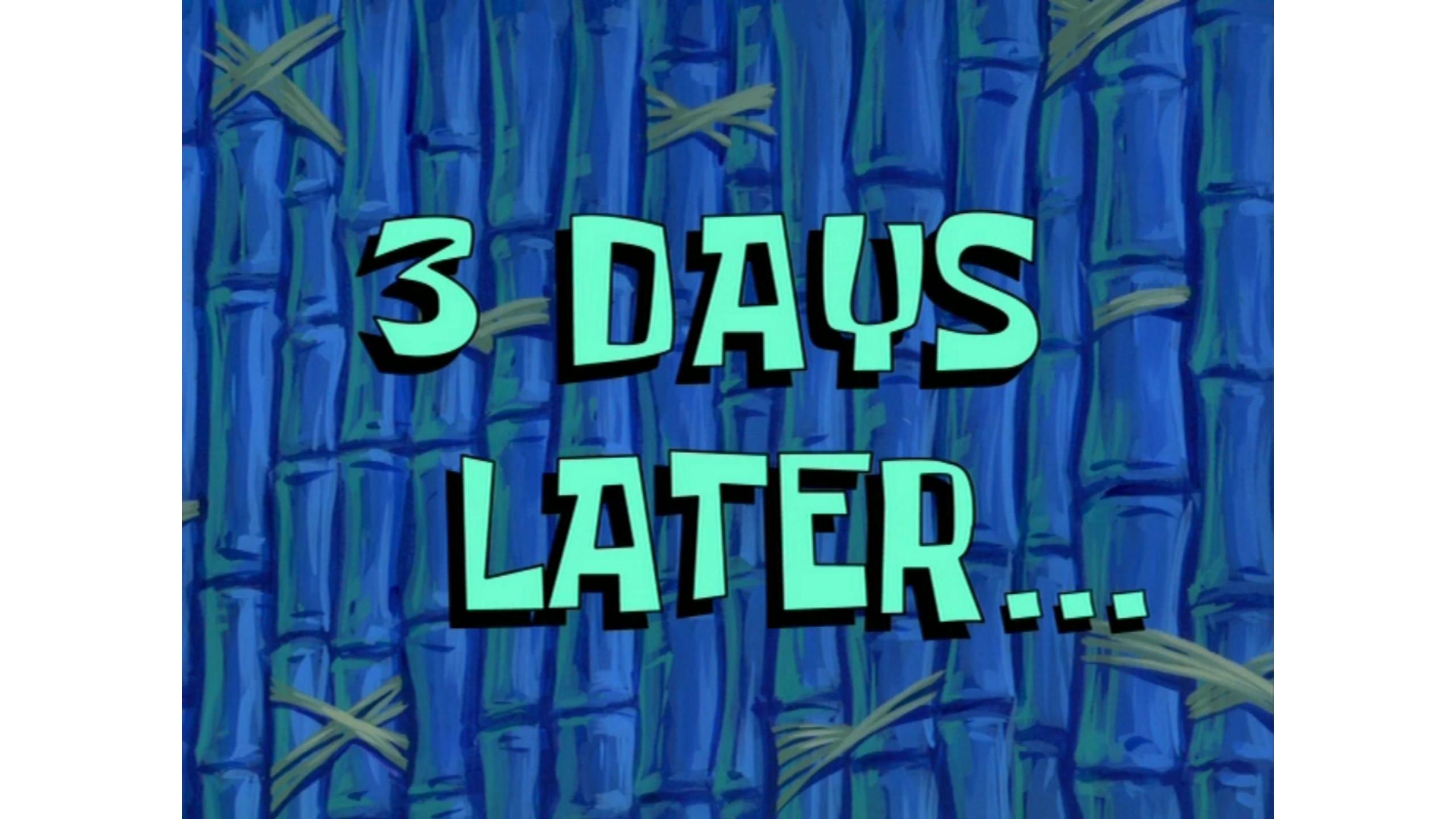
\$ rake release

.... A git tag is made for this version

.... "Magic" Happens

"Successfully pushed to RubyGems.org"



The background of the image is a vibrant, abstract painting of a city skyline at night. The buildings are rendered in various shades of blue, green, and yellow, creating a textured, layered effect. In the foreground, several palm trees with long, thin fronds are visible, their silhouettes contrasting against the bright, glowing city lights.

**3 DAYS
LATER....**

Doesn't seem to work with MySQL #1

! Open

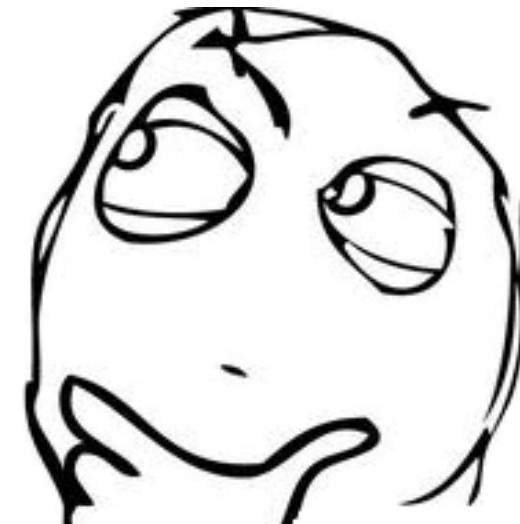
mileszs opened this issue 2 hours ago · 0 comments



mileszs commented 2 hours ago



Sup dawg. Your gem is off da hook! Only problem is, I'm using MySQL and instead of an array of hashes, I'm getting just an array of arrays back! Mind helping a brother out?



But.... the tests passed....



RawToA

```
has a version number
with a model class
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
with an ActiveRelation
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when selecting specific columns
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when limiting the number of rows
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
```

```
Finished in 0.03279 seconds (files took 1.56 seconds to load)
13 examples, 0 failures
```

The Road to Reproduction

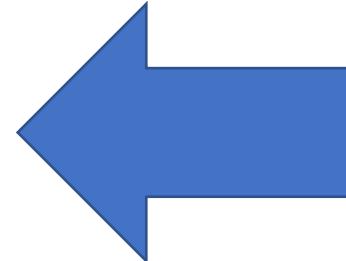
(Setup)

- [STEPS TO INSTALL AND CONFIGURE MYSQL LOCALLY HERE]
 - You're on your own for this one
 - Create a database called raw_to_a_test with appropriate permissions



The Road to Reproduction (raw_to_a.gemspec)

```
Gem::Specification.new do |spec|  
  ....  
  spec.add_dependency "activerecord", ">= 4.2.0"  
  spec.add_development_dependency "pg"  
  spec.add_development_dependency "mysql2"  
  ...  
end
```

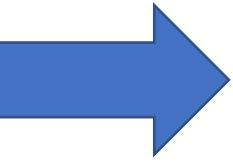


.... and then run "bundle"

The Road to Reproduction

(spec_helper.rb)

```
ActiveRecord::Base.  
  establish_connection(  
    adapter: 'postgresql',  
    database: 'raw_to_a_test',  
    min_messages: 'warning'  
)
```



```
ActiveRecord::Base.  
  establish_connection(  
    adapter: 'mysql2',  
    database: 'raw_to_a_test',  
    encoding: 'utf8'  
)
```

The Road to Reproduction (rake spec)

Failures:

- 1) RawToA with a model class is an array of hashes

Failure/Error: expect(row).to be_a(Hash)

expected [1, "user0", 0, 2017-06-04 21:46:31.000000000 +0000, 2017-06-04 21:46:31.000000000 +0000] to be a kind of Hash

Shared Example Group: "#raw_to_a" called from ./spec/raw_to_a_spec.rb:37

./spec/raw_to_a_spec.rb:16:in `block (3 levels) in <top (required)>'

./spec/raw_to_a_spec.rb:15:in `each'

./spec/raw_to_a_spec.rb:15:in `block (2 levels) in <top (required)>'

- 2) RawToA with a model class has the same columns as the query

Failure/Error: expect(row.keys.sort).to eq(attributes)



Yep, that's an array

NoMethodError:

undefined method `keys' for [1, "user0", 0, 2017-06-04 21:46:31 UTC, 2017-06-04 21:46:31 UTC]:Array

Shared Example Group: "#raw_to_a" called from ./spec/raw_to_a_spec.rb:37

./spec/raw_to_a_spec.rb:22:in `block (3 levels) in <top (required)>'

./spec/raw_to_a_spec.rb:21:in `each'

./spec/raw_to_a_spec.rb:21:in `block (2 levels) in <top (required)>'

- 3) RawToA with an ActiveRelation is an array of hashes

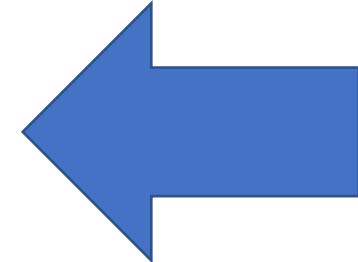
Failure/Error: expect(row).to be_a(Hash)

expected [2, "user1", 1, 2017-06-04 21:46:31.000000000 +0000, 2017-06-04 21:46:31.000000000 +0000] to be a kind of Hash

Shared Example Group: "#raw_to_a" called from ./spec/raw_to_a_spec.rb:41

Implement a fix...

```
require 'raw_to_a/version'  
require 'active_record'  
  
module RawToA  
  module ActiveRecord  
    def raw_to_a  
      connection.exec_query(self.all.to_sql).to_a  
    end  
  end  
end  
ActiveRecord::Base.extend(RawToA::ActiveRecord)
```



Tests work?



For sake of time:
Yes, switching the connection
adaptor back to PostgreSQL and
running the tests again still work.

```
RawToA
has a version number
with a model class
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
with an ActiveRelation
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when selecting specific columns
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when limiting the number of rows
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query

Finished in 0.01435 seconds (files took 0.96711 seconds to load)
13 examples, 0 failures
```

Not done yet!

- Can't keep manually changing the connection configuration
 - Is there a way to specify which database to use at runtime?
- The gemspec now has both mysql and pg gems as dev dependencies
- What about other versions of ActiveRecord?
- What we need:
 - Ability to select which database driver to use and which version of ActiveRecord we want to use for tests

How Do We Swap out Gems?

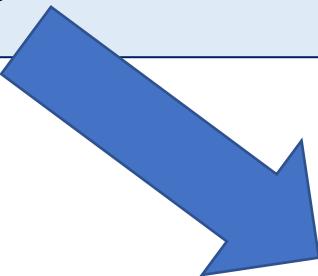
- Short Answer: On boot up
- `bundle exec` locks Ruby process to the context of a Gemfile

What Does a Gem's Gemfile Look Like?

Gemfile

```
source 'https://rubygems.org'
```

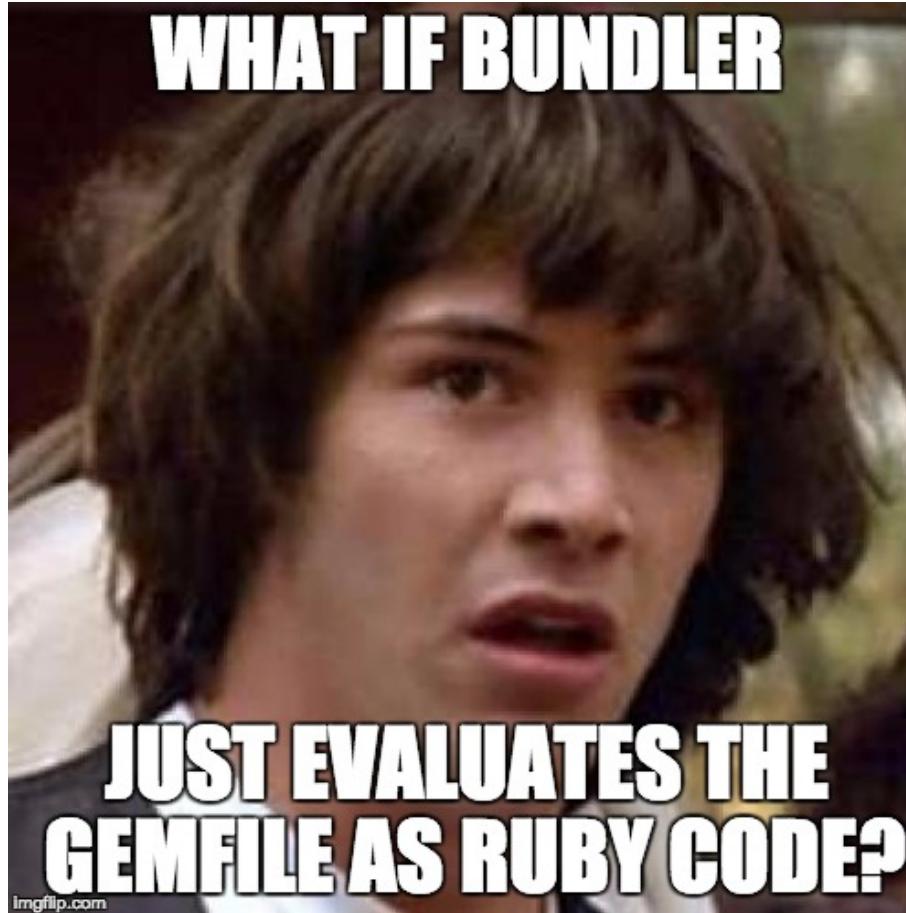
```
# Specify your gem's dependencies in raw_to_a.gemspec  
gemspec
```



raw_to_a.gemspec

```
spec.add_dependency "activerecord", ">= 4.2.0"  
spec.add_development_dependency 'pg'  
spec.add_development_dependency 'mysql2'  
spec.add_development_dependency "bundler", "~> 1.14"  
spec.add_development_dependency "rake", "~> 10.0"  
spec.add_development_dependency "rspec", "~> 3.0"
```

How do we get bundler to load only the gems we want?



Spoiler: That's precisely what bundler does!

Let's make the Gemfile "smarter"

```
source 'https://rubygems.org'  
gemspec  
  
case ENV['AR'] || '4-2'  
  when '5-0' then gem('activerecord', '~> 5.0.0')  
  when '5-1' then gem('activerecord', '~> 5.1.0')  
  else gem('activerecord', '~> 4.2.0')  
end  
  
case ENV['DB'] || 'pg'  
  when 'mysql' then gem('mysql2')  
  else gem('pg')  
end
```

Also:

Remove the gems as dev dependencies in the gemspec

Install/Update With:

\$ bundle update

\$ DB=mysql bundle update

\$ AR=5-0 DB=mysql bundle update

Let's make the spec helper "smarter"

```
db = ENV['DB'] || 'pg'  
ar = ENV['AR'] || '4-2'  
  
puts "TESTING WITH: ActiveRecord: #{ar} | Database: #{db}"  
  
case db  
  when 'mysql'  
    ActiveRecord::Base.establish_connection(  
      adapter: 'mysql2', ....  
    )  
  else  
    ActiveRecord::Base.establish_connection(  
      adapter: 'postgresql', ....  
    )  
end
```

How to run our tests locally

Command	ActiveRecord	Database
\$ bundle exec rake spec	4.2	PostgreSQL
\$ AR=5-0 bundle exec rake spec	5.0	PostgreSQL
\$ DB=mysql bundle exec rake spec	4.2	MySQL
\$ AR=5-1 DB=mysql bundle exec rake spec	5.1	MySQL
\$ AR=5-0 DB=pg bundle exec rake spec	5.0	PostgreSQL

- "bundle exec" is required to force specific gems to load
- "bundle update" (with the environment variables set) may be required between each run of the tests

How to run our tests locally

```
$ AR=5-0 bundle exec rake spec
/Users/tony/.rbenv/versions/2.4.1/bin/ruby -I/Users/tony/.rbenv/
versions/2.4.1/lib/ruby/gems/2.4.0/gems/rspec-core-3.6.0/lib:/Us
ers/tony/.rbenv/versions/2.4.1/lib/ruby/gems/2.4.0/gems/rspec-su
pport-3.6.0/lib /Users/tony/.rbenv/versions/2.4.1/lib/ruby/gems/
2.4.0/gems/rspec-core-3.6.0/exe/rspec --pattern spec/\*\*\{,\*\*
\*\*\}/\*_spec.rb
TESTING WITH: ActiveRecord: 5-0 | Database: pg
```

```
RawToA
has a version number
with a model class
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
with an ActiveRelation
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when selecting specific columns
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when limiting the number of rows
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
```

```
Finished in 0.01277 seconds (files took 0.6592 seconds to load)
13 examples, 0 failures
```

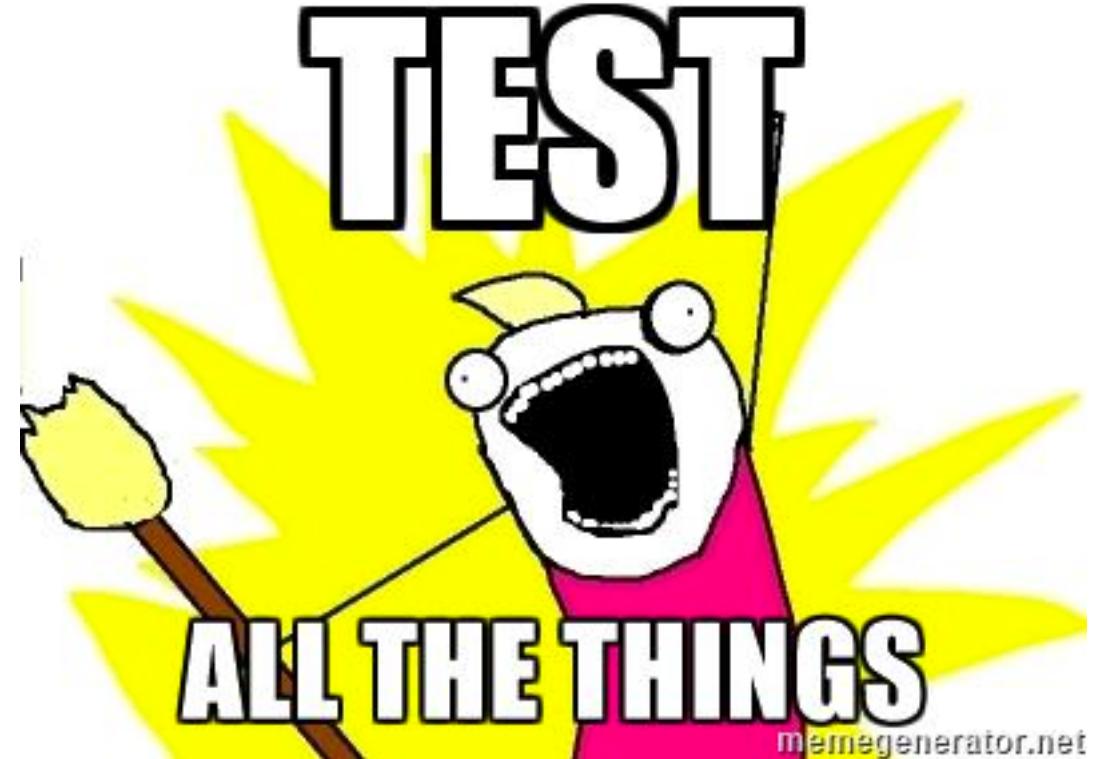
```
$ AR=5-0 DB=mysql bundle exec rake spec
/Users/tony/.rbenv/versions/2.4.1/bin/ruby -I/Users/tony/.rbenv/
versions/2.4.1/lib/ruby/gems/2.4.0/gems/rspec-core-3.6.0/lib:/Us
ers/tony/.rbenv/versions/2.4.1/lib/ruby/gems/2.4.0/gems/rspec-su
pport-3.6.0/lib /Users/tony/.rbenv/versions/2.4.1/lib/ruby/gems/
2.4.0/gems/rspec-core-3.6.0/exe/rspec --pattern spec/\*\*\{,\*\*
\*\*\}/\*_spec.rb
TESTING WITH: ActiveRecord: 5-0 | Database: mysql
```

```
RawToA
has a version number
with a model class
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
with an ActiveRelation
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when selecting specific columns
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
when limiting the number of rows
  is an array of hashes
  has the same columns as the query
  has the same number of elements as the query
```

```
Finished in 0.02299 seconds (files took 0.56859 seconds to load)
13 examples, 0 failures
```

Can we get CI to run all the things? (.travis.yml)

```
sudo: false
language: ruby
rvm:
  - 2.2.7
  - 2.3.4
  - 2.4.1
env:
  - AR=5-1 DB=pg
  - AR=5-1 DB=mysql
  - AR=5-0 DB=pg
  - AR=5-0 DB=mysql
  - AR=4-2 DB=pg
  - AR=4-2 DB=mysql
before_script:
  - psql -c 'create database raw_to_a_test;' -U postgres
  - mysql -e 'create database raw_to_a_test collate utf8_general_ci;'
```



Can we get CI to run all the things? (.travis.yml)

Build Jobs

✓ # 2.1		</> Ruby: 2.2.7	AR=5-1 DB=pg	1 min 3 sec	
✓ # 2.2		</> Ruby: 2.2.7	AR=5-1 DB=mysql	58 sec	
✓ # 2.3		</> Ruby: 2.2.7	AR=5-0 DB=pg	1 min 1 sec	
✓ # 2.4		</> Ruby: 2.2.7	AR=5-0 DB=mysql	59 sec	
✓ # 2.5		</> Ruby: 2.2.7	AR=4-2 DB=pg	1 min 3 sec	
✓ # 2.6		</> Ruby: 2.2.7	AR=4-2 DB=mysql	59 sec	
✓ # 2.7		</> Ruby: 2.3.4	AR=5-1 DB=pg	1 min 3 sec	
✓ # 2.8		</> Ruby: 2.3.4	AR=5-1 DB=mysql	59 sec	
✓ # 2.9		</> Ruby: 2.3.4	AR=5-0 DB=pg	1 min 1 sec	
✓ # 2.10		</> Ruby: 2.3.4	AR=5-0 DB=mysql	1 min 59 sec	

Finish it up...

- Bump the version number
- Write a changelog (maybe?)
- Commit and push...
- \$ rake release
- Close the issue
- Celebrate



Alternative Options

- Gemfile for each permutation of ActiveRecord / DB combo
 - Set BUNDLE_GEMFILE environment variable
 - Natively supported by TravisCI

The End

- Slides: <https://github.com/t27duck/showandtell>
- The actual gem: https://github.com/t27duck/raw_to_a
- "Find me" at: @t27duck
- Memes powered by:
 - imgflip.com
 - memecrunch.com
 - memegenerator.net

