Why Ruby On Rails?

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There's something special going on with Ruby and Rails. Never before has there been such coordinated community efforts to efficiently produce reusable code (aka gems) in such open and social fashions. Coding is fun again. We want to introduce that reality to the IBM i platform.
Ruby… a dynamic, open source programming language with a focus on simplicity and productivity. It has an elegant syntax that is natural to read and easy to write.

Matz desired a language which he himself enjoyed using, by minimizing programmer work and possible confusion - enter Ruby.

```
hello_world.rb
puts "Hello World"
```

Invoke in PASE:

```
$ ruby hello_world.rb
Hello World
```

- Est 1995 by Yukihiro "Matz" Matsumoto
- Mass acceptance 2006
- Very active and well organized community

**Features:**
- variable declarations are unnecessary
- variables are not statically typed
- syntax is simple and consistent
- everything is an object
- classes, methods, inheritance, etc.
- can be written in procedural fashion

ruby-lang.org – Home website
ruby-doc.org/docs/ProgrammingRuby - Traditional learning
codecademy.com - Learn Ruby in the browser for free
amzn.to/1apcrse - Metaprogramming Ruby: Program Like the Ruby Pros
RubyGems... simplify the process of installing, removing, updating and managing Ruby libraries and their dependencies.

Ruby is a great language, but the Ruby community wanted to start modularizing and sharing code - enter RubyGems.

- Est 2001
- server for hosting and distribution of gems, rubygems.org
- manage gem dependencies
- manage multiple versions of the same library easily
- included in Ruby as of 1.9.3
- Rails and Bundler are gem themselves.

"There's a gem for that"
- every Ruby business programmer

```bash
-bash-4.2$ gem install will_paginate
Fetching: will_paginate-3.0.5.gem (100%)
Successfully installed will_paginate-3.0.5
Installing ri documentation for will_paginate-3.0.5
1 gem installed
-bash-4.2$
```

rubygems.org - Home website
linuxjournal.com/article/8967 – RubyGem history
Bundler maintains a consistent environment for ruby applications. It tracks an application's code and the rubygems it needs to run, so that an application will always have the exact gems (and versions) that it needs to run.

RubyGems made sharing of code so easy that organizing them soon became hard to manage for an application maintainer - enter Bundler.

**myapp/Gemfile contents:**

```ruby
source 'https://rubygems.org'
gem 'rails', '4.0.0'
gem 'ibm_db'
gem 'jquery-rails'
gem 'turbolinks'
gem 'jbuilder', '~> 1.2'
gem 'thin'
```

- Est 2008 by [Yehuda Katz](https://www.yehudakatz.com)
- Application dependencies declared in **Gemfile**
- Command `bundle install` downloads all gems in Gemfile and also their dependencies.
- Included in Rails as of 3.0
Invented by Linus Torvalds (creator of Linux), in 2004, maintained at git-scm.com, intro video here.

Frictionless Context Switching. Create a branch to try out an idea, commit a few times, switch back to where you branched from, apply a patch, switch back to where you are experimenting, and merge it in.

Feature Based Workflow. Create new branches for each new feature you're working on so you can seamlessly switch back and forth between them, then delete each branch when that feature gets merged into your main line.

Disposable Experimentation. Create a branch to experiment in, realize it's not going to work, and just delete it - abandoning the work—with nobody else ever seeing it (even if you've pushed other branches in the meantime).

Try Git from the browser: try.github.io

Git is included with PowerRuby’s IBM i install.
GitHub is a web-based hosting service for software development projects that use the Git revision control system. Their fork and pull request features have revolutionized social coding.

**Fork** - Desire to contribute to someone else's project, or would like to use someone's project as the starting point for your own.

**Pull Request** - Pull requests let you tell others about changes you've pushed to a GitHub repository. Once a pull request is sent, interested parties can review the set of changes, discuss potential modifications, and even push follow-up commits if necessary.

**Social coding:**
- invites more people to the table
- many developers providing input from many industries
- brings open source projects to fruition faster
- eliminate bugs sooner
- Ruby and Rails community makes extensive use of GitHub

[github.com](http://github.com) - Home site
[youtube.com/watch?v=-CpllxXPsvw](http://youtube.com/watch?v=-CpllxXPsvw) - intro to Forks and Pull Requests
[youtube.com/user/GitHubGuides](http://youtube.com/user/GitHubGuides) - best place to learn
… an open-source web framework written in the Ruby language that's optimized for programmer happiness and sustainable productivity. It lets you write beautiful code by favoring convention over configuration.

Programming 5250 green screens with RPG was very efficient. Ruby On Rails (aka Rails) accomplishes the same, but in the modern web world.

- Est 2004 by David Heinemeier Hansson, in 2006 Apple ships with OSX 10.5 “Leopard”
- Separation of concern (model-view-controller, “helpers”, mailers, presenters)
- Generate application components with custom gems and configurations.
- Multiple environments (i.e. dev, test, prod, <custom>)
- ActiveRecord pattern
- i18n features (internationalization) by default when using rails command.
- Includes Rake, a task management tool (i.e. rake db:migrate)
- Unit testing
- Asset pipeline

Really, too many features and benefits to list.

RubyOnRails.org – Framework home
Guides.RubyOnRails.org/getting_started.html – Quick learning, formal documentation
RailsCasts.com - Excellent video resource for learning about all things Rails
TeamTreehouse.com - Comprehensive Ruby/Rails/HTML/CSS/JavaScript training

"Rails", "Ruby on Rails", and the Rails logo are registered trademarks of David Heinemeier Hansson. All rights reserved.
Many open source choices

With the crazy amount of community participation to projects that might do the same or similar things, you might be wondering how to make the right pick.

Start at the ruby-toolbox.com

The Ruby Toolbox is a comprehensive catalog of Ruby and Rails plug-ins, gems, tools and resources for Ruby developers with popularity ratings based on Github watchers and Gem downloads.
Notable people with quotes

“Rails is the most well thought-out web development framework I’ve ever used. And that’s in a decade of doing web applications for a living. I’ve built my own frameworks, helped develop the Servlet API, and have created more than a few web servers from scratch. Nobody has done it like this before.”

- James Duncan Davidson, Creator of Apache Tomcat and Ant

“After researching the market, Ruby on Rails stood out as the best choice. We have been very happy with that decision. We will continue building on Rails and consider it a key business advantage.”

- Evan Williams, Creator of Blogger, ODEO, and Twitter

“Having scaled multiple rails sites, a couple to millions and another to billions of PV/month, the runtime performance of the interpreter is never the slowest. Scaling a site is about architecture, databases, caching, event queues, disk IO, CDNs, etc. With a few exceptions, the runtime or framework doesn’t crack the top 5. Most important of all, Rails is the most efficient framework right now to build your app quickly and effectively. Stop worrying and start building. Less than 1% of sites on the internet get to enough traffic to even care about performance.... but if you have performance problems, rejoice! That means you built something people use!”

- Aaron Batalion, CTO & Co-Founder, LivingSocial

Why is RubyOnRails Hot? BusinessInsider explains well…
businessinsider.com/heres-why-ruby-on-rails-is-hot-2011-5
Who uses Ruby On Rails?

**builtwith.com and rubyonrails.org used for references**
Open Source Rails Websites

opensourcerails.com
your resource for the most popular and up to date open source rails based sites.
What is PowerRuby?

- Freely available and commercially supported port of the Ruby language
- Includes supporting infrastructure (i.e. Rails) for running Ruby web applications on IBM i
- Available for download from PowerRuby.com
- Includes native DB2 database driver – MySQL not necessary
- Integrates with XMLSERVICE for access to IBM i programs and objects

Components

- Ruby 2.1.0, 2.0.0, and 1.9.3 (MRI implementation, a.k.a CRuby)
- ibm_db (IBM supported - rubyforge.org/projects/rubyibm/)
- xmlservice (IBM supported - youngiprofessionals.com/wiki/index.php/XMLService)
- Apache + Thin ← the web server stack (more Ruby app servers options coming)
- Rails 3.2.x and 4.0.x (server-side asset compilation support in the works)

Learn more

- PowerRuby.com for downloads, updates, and news
- twitter.com/rubyonpower
Ruby Integration with i - XMLSERVICE

- DB2 for i – SQL and Native
- Program call
- Procedure call
- Data Area
- Data Queue
- Message Queue
- Commands
- System values
- Spool files

- Delivered with OS as of IBM i 7.1: TR5 and also included with PowerRuby
- Similar to IBM ToolBox for Java, but better in many ways
- Great for re-use of existing RPG code
- Author: Tony Cairns, IBM Rochester

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YoungiProfessionals.com/wiki/XMLSERVICE (a.k.a. YiPs)

More open source at YoungiProfessionals.com/wiki
XMLSERVICE - RPG program to call

MYLIB/PGM1

D  INCHARA    S       1a
D  INDEC1     S       7p 4

C    *Entry    PLIST
C        PARM       INCHARA
C        PARM       INDEC1

/free

INCHARA = 'C';
INDEC1 = 321.1234;
return;

/end-free

Much more complex program calls are also supported and even go beyond the PCML/Java Toolbox limitations with data structures, sub-procedure return values, and date/time data types.
XMLSERVICE - Ruby invoking RPG

- The call to Ruby method `establish_connection` omits the use of parentheses - another feature of Ruby to lessen the amount of code and make it easier/quicker to visually scan code. The same is true for `puts`.
- Ruby's left shift operator (i.e. `'<<'`) is used to append parameters to the call.
- Line `pgm1.xmlservice` makes the

```ruby
require 'xmlservice'

ActiveXMLService::Base.establish_connection connection: 'ActiveRecord'
pgm1 = XMLService::I_PGM.new("PGM1", 'MYLIB') <<
  XMLService::I_a.new('inchara',1,'a') <<
  XMLService::I_p.new('indecl',7,4,11.1111)

pgm1.xmlservice

puts "pgm1.xml_PARM3.xml_indecl: #{pgm1.xml_PARM1.xml_indecl}"```
PowerRuby Install

Download zip with *SAVF objects from PowerRuby.com

CRTSAVF FILE(QGPL/PRUBY_BASE)
CRTSAVF FILE(QGPL/PRUBY_0001)
CRTSAVF FILE(QGPL/PRUBY_0002)
CRTSAVF FILE(QGPL/PRUBY_0003)

RSTLICPGM LICPGM(1PRUBY1) DEV(*SAVF) LNG(2924) SAVF(QGPL/PRUBY_BASE)
RSTLICPGM LICPGM(1PRUBY1) DEV(*SAVF) LNG(2924) OPTION(1) SAVF(QGPL/PRUBY_0001)
RSTLICPGM LICPGM(1PRUBY1) DEV(*SAVF) LNG(2924) OPTION(2) SAVF(QGPL/PRUBY_0002)
RSTLICPGM LICPGM(1PRUBY1) DEV(*SAVF) LNG(2924) OPTION(3) SAVF(QGPL/PRUBY_0003)

---- QSYS.LIB ----
POWER_RUBY - Contains commands like RAILSNEW and RAILSSVR to create new projects and administer the Rails application server respectively.

---- IFS Root ----
/PowerRuby/prV2R1M0 Various Ruby versions
/PowerRuby/prV2R1M0/lib/ruby/gems Precompiled gems including Rails, Thin, ibm_db
/PowerRuby/oss/bin Open source tools including bash, git, joe
New App From Scratch

The RAILSNEW command creates a new Rails application, including bundling necessary gems.

RAILSNEW

VRM(*V200) -- version of PowerRuby
PLACE(*WWW) -- *WWW or *HOME
RAILSAPP(A2222) -- Name of Rails app. /www/A2222/htdocs/ A2222
DBUSR(A2222) -- CRTUSRPRF A2222 with below DBPASS
DBPASS(A2222)
DBROOT(A2222) -- Run SQL: CREATE COLLECTION A2222_D; CREATE COLLECTION A2222_T
HTTPSRV(A2222) -- /www/A2222
EXTPORT(2222) -- /www/A2222/conf/httpd.conf Listen *:2222
INTPORT(2202) -- thin start -p 2202

Command bundle install --local is run so all gems are resolved and the Gemfile.lock file is created.

It also runs the following commands to start Apache and Thin

STRTCPSVR HTTPSVR(A2222) SERVER(*HTTP)
RAILSSVR ACTION(*START)

APP('/www/A2222/htdocs/A2222')
VRM(*V200)
PORT(2202)

Try your app in the browser!
Database config

/www/A2222/htdocs/A2222/config/database.yml

development:
  adapter: ibm_db
  username: A2222
  password: A2222
  database: '*LOCAL'
  schema: A2222_D

test:
  adapter: ibm_db
  username: A2222
  password: A2222
  database: '*LOCAL'
  schema: A2222_T

File database.yml stores the database connection information.

*LOCAL declares the Rails app is running on this machine.

There are additional options to do encryption of the clear-text password.
Task: Create a new model named Post with two properties, title and text.

app/models/post.rb

```ruby
class Post < ActiveRecord::Base
end
```

app/db/migrate/20131031191936_create_posts.rb

```ruby
class CreatePosts < ActiveRecord::Migration
  def change
    create_table :posts do |t|
      t.string :title
      t.text :text
      t.timestamps
    end
  end
end
```

A Rails model object is used to interact with a DB2 table and store business logic.

NOTE: The DB2 table does not yet exist.
Database migrations

The `rake db:migrate` command queries table A2222_D/SCHEMA_MIGRATIONS (SCHEM00001 below) to learn the most recent migration run against this schema (aka library). Recognizes 20131031191936_create_posts.rb hasn’t been run and invokes it.

```
CREATE TABLE A2222_D.posts(
  id int NOT NULL
  GENERATED ALWAYS AS IDENTITY
  (START WITH 1 INCREMENT BY 1),
  title varchar(255),
  text varchar(255),
  PRIMARY KEY(id)
)
```

It is a Rails convention to name tables the plural of the model they represent.
Generating controller and views

The `rails g scaffold_controller` command creates stubbed out files as shown below. Many assumptions are made in generating the controller (**i.e. that a model named Post exists**). Once generation is completed you can modify to suit your needs. Easily saves hours of programming!

Learn more about the `rails generate` command [here](#).

Did you discover your own commonly used pattern? Learn how to create your own generator [here](#).
Routing requests

Before you can display the application there needs to be an entry added to the `routes.rb` file so the Rails application knows you want to expose all actions (index, edit, show, new).

Learn more about Rails routing [here](#).

```ruby
app/config/routes.rb
A2233::Application.routes.draw do
  resources :posts
end
```
### app/views/posts/index.html.erb

```html
<h1>Listing posts</h1>
<table>
  <thead>
    <tr>
      <th>Title</th><th>Text</th><th></th><th></th><th></th><th></th>
    </tr>
  </thead>
  <tbody>
    <% @posts.each do |post| %>
      <tr>
        <td><%= post.title %></td>
        <td><%= post.text %></td>
        <td><%= link_to 'Show', post %></td>
        <td><%= link_to 'Edit', edit_post_path(post) %></td>
        <td><%= link_to 'Destroy', post, method: :delete, data: { confirm: 'Are you sure?' } %></td>
      </tr>
    <% end %>
  </tbody>
</table>
<br>
<%= link_to 'New Post', new_post_path %>
```

### app/controllers/posts_controller.rb

```ruby
class PostsController < ApplicationController
  def index
    @posts = Post.all
  end
end
```

### app/models/post.rb

```ruby
class Post < ActiveRecord::Base
end
```
Add a record

Add record functionality generated by default.

Obviously you’d want to create some custom CSS to better the look and feel of the view layer - these are just defaults to get infrastructure in place.
Interactive Ruby (irb)

... IRB (Interactive Ruby Shell) is an interactive environment where you can enter Ruby syntax and have it immediately be run. (see below where “rails c” is starting the Rails Console and inherently invoking IRB)

Great for learning Ruby and Rails, testing ActiveRecord queries (as shown below), among many other things.

Existing utilities like STRSQL still work on the newly created tables.

BIG TIME SAVER!

Normally, to run a quick bit of code you’d create a file, enter the code, and run it in the browser. This gets you right into testing the code!
What’s running?

- A2222 entries are Apache jobs
- RAILSSVR is a Thin job

Work with Active Jobs

<table>
<thead>
<tr>
<th>Opt</th>
<th>Subsystem/Job</th>
<th>User</th>
<th>Type</th>
<th>CPU %</th>
<th>Function</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>QHTTPSVR</td>
<td>QSYS</td>
<td>SBS</td>
<td>0.0</td>
<td></td>
<td>DEQW</td>
</tr>
<tr>
<td>A2222</td>
<td>QTMHHTTP</td>
<td>BCH</td>
<td>.0</td>
<td>PGM-QZHBM</td>
<td>SIGW</td>
<td></td>
</tr>
<tr>
<td>A2222</td>
<td>QTMHHTTP</td>
<td>BCI</td>
<td>.0</td>
<td>PGM-QZSRLOG</td>
<td>SIGW</td>
<td></td>
</tr>
<tr>
<td>A2222</td>
<td>QTMHHTTP</td>
<td>BCI</td>
<td>12.3</td>
<td>PGM-QZSRHTTP</td>
<td>SIGW</td>
<td></td>
</tr>
<tr>
<td>QSYSWK</td>
<td>QSYS</td>
<td>SBS</td>
<td>.0</td>
<td></td>
<td>DEQW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RAILSSVR</td>
<td>AARON</td>
<td>BCH</td>
<td>.0</td>
<td>PGM-ruby</td>
<td>SELW</td>
</tr>
</tbody>
</table>

CPU %: 17.6  Elapsed time: 00:00:00  Active jobs: 196
Stopping and Starting

Start Apache
STRTCPSVR SERVER(*HTTP) HTTPSVR(A2222)

End Apache
ENDTCPSVR SERVER(*HTTP) HTTPSVR(A2222)

Start Thin
RAILSSVR ACTION(*START)
    APP('/www/A2222/htdocs/A2222') VRM(*V200) PORT(2202)

End Thin
RAILSSVR ACTION(*END) APP('/www/A2222/htdocs/A2222')
Logs

Locations to look for logs and/or errors:

WRKSP LF <profile that used RAILSSVR>

WRKSP LF QTMHHTTP <---- Apache job logs

/www/A2222/htdocs/A2222/logs/development.log <---- Rails log

Started GET "/posts" for at 2014-01-20 22:22:57 +0000

Processing by PostsController#index as HTML

  [1m[35mPost Load (0.2ms)[0m  SELECT "posts".* FROM "posts"
  Rendered posts/index.html.erb within layouts/application (183.4ms)

Completed 200 OK in 280ms (Views: 230.7ms | ActiveRecord: 9.7ms)

Started GET "/postss" for at 2014-01-21 00:36:49 +0000

ActionController::RoutingError (No route matches [GET] "postss"): 
  actionpack (4.0.0) lib/action_dispatch/middleware/debug_exceptions.rb:21:in `call'
  actionpack (4.0.0) lib/action_dispatch/middleware/show_exceptions.rb:30:in `call'
  railties (4.0.0) lib/rails/rack/logger.rb:38:in `call_app'
  railties (4.0.0) lib/rails/rack/logger.rb:21:in `block in call'
...
Rake

... a software task management tool similar to “make”. It allows you to specify tasks and describe dependencies as well as to group tasks in a namespace.

- Est 2005 by Jim Weirich
- Syntax is completely defined in Ruby
- “Prerequisites” allow for things like the Rails :environment be loaded before the task is invoked, giving full access to all models and other application code.
- One could think of it as “The CL of Ruby”

---my_app/lib/tasks/set_pay_in_full.rake---

task :set_pay_in_full => :environment do
  Enrollment.all.each do |e|
    e.pay_in_full = e.term.pay_in_full
    e.save!
  end
end

Invoke via PASE command line:

$ rake set_pay_in_full

github.com/jimweirich/rake – Home website
railscasts.com/episodes/66-custom-rake-tasks – Video tutorial overview
We Have Reached The End!

PowerRuby
Go big.

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