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JRuby on Rails

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http://www.railsconsulting.de

Gernot Starke · Stefan Tilkov (Hrsg.)
SOA-Expertenwissen
Methoden, Konzepte und Praxis serviceorientierter Architekturen
dpunkt.verlag

Contents

Why Ruby?

Because it’s different

Because it supports growth

Because it’s expressive

Because it’s concise

Because we can afford it

Because of Rails

Because it’s fun

The World’s Quickest Ruby Intro

Ruby
A Programmer’s Best Friend

Ruby history

- First release: 1995
- Brainchild of Yukihiro "Matz" Matsumoto
- Based on Perl, Smalltalk, Lisp
- Popularized (a little) by the Pragmatic Programmers (Dave Thomas & Andy Hunt) ~2001
- Popularized (a lot) by Ruby on Rails ~2004

Basic Language Characteristics

- Type system:
  - dynamic
  - strong
  - implicit
- Interpreted (mostly ...)
- *Very* dynamic
- Strong metaprogramming support
- Purely object-oriented

Basics

```ruby
puts "Hello World"
num = 5
if num > 4 then
  puts "num > 4"
elsif num <= 4 then
  puts "num <= 4"
else
  puts "WTF?"
end
puts "num is 5" unless num != 5
```

Loops

```
for i in (1..10) do
  puts i
end
i = 0
while i < 10 do
  puts i
  i += 1
end
```

Comments and Heredocs

```
# One line comment
=begin
A comment spanning multiple lines
=end

text << <<-EOT
 A really long text, simply written as is in its literal form.
 Don't worry about any escaping.
EOT
```

Iteration & Blocks

```
# don't do this
array = ["alpha", "beta", "gamma"]
for i in 0..2 do
  puts array[i]
end
# much better
array.each { | elem | puts elem }

1.upto(10) { | x | puts x }
1.upto(10) { | x | puts "Count: #{x}" }
1.upto(10) do | x |
  puts "Count: #{x}"
end
```

Enumerable

```
slist = %w(alpha beta gamma delta epsilon) # => ["alpha", "beta", "gamma", "delta", "epsilon"]
slist.reverse # => ["epsilon", "delta", "gamma", "beta", "alpha"]
slist.map { |elem| elem.reverse } # => ["ahpla", "ateb", "ammag", "atled", "nolispe"]
slist.inject("") { |mush, elem| mush << elem } # => "alphabetagammadeltaepsilon"
slist # => ["alpha", "beta", "gamma", "delta", "epsilon"]
nlist = [1, 2, 3, 4, 5]
nlist.inject { |sum, elem | sum += elem} # => 15
slist # => ["alpha", "beta", "gamma", "delta", "epsilon"]
slist.find { |elem| elem.length > 4} # => "alpha"
slist.collect { |elem| elem.length > 4} # => [true, false, true, true, true]
slist.select { |elem| elem.length > 4} # => ["alpha", "gamma", "delta", "epsilon"]
nlist.max # => 5
slist.max { |a, b| a.length <=> b.length } # => "epsilon"
```

Hashes

```ruby
hash = { "one" => '1', "two" => '2', "three" => '3'}
puts hash["one"]
table = { "p1" => { "last" => "Schulze", "first" => "Hans"},
          "p2" => { "last" => "Meier", "first" => "Klaus"}
        }
puts table["p1"]
puts table["p1"]["first"]
require 'pp'
pp table
pp table["p1"]
```

A Little Bit of Java ...

```java
package com.example;

import java.util.List;
import java.util.Arrays;
import java.util.Collections;
import java.util.Comparator;

public class SortList {
    public static void main(String[] args) {
        List<String> list = Arrays.asList("Shamelessly", "Stolen", "From", "Ola", "Bini");

        Collections.sort(list, new Comparator<String>() {
            public int compare(String first, String second) {
                return first.length() - second.length();
            }
        });

        String sep = "";
        for (String name : list) {
            System.out.print(sep);
            System.out.print(name);
            sep = ", ";
        }

        System.out.println();
    }
}
```

http://youtube.com/watch?v=PfnP-8XbJao

... vs. Ruby

```ruby
list = ["Shamelessly", "Stolen", "From", "Ola", "Bini"]
puts list.sort_by(&:length).join(', ')
```

Methods

```ruby
def mymethod(a, b, c)
  puts "a = #{a}, b = #{b}, c=#{c}"
end
mymethod(1, 2, 3)
mymethod 1, 2, 3
```

Classes

```ruby
class Person
  @@people_count = 0
  def initialize(first, last)
    @first = first
    @last = last
    @id = @@people_count
    @@people_count += 1
  end

  def to_s
    "#{@last}, #{@first}"
  end
end
p = Person.new("John", "Doe")
puts p
```

Inheritance

```ruby
class Friend < Person
  def initialize(first, last, nick)
    super(first, last)
    @nick = nick
  end

  def drink
    puts "Cheers from #{@nick}"
  end

  def to_s
    "#{super.to_s}, a.k.a. #{@nick}"
  end
end
f = Friend.new("Jack", "Daniels", "Buddy")
puts f
f.drink
```

Modules

```ruby
module M1
  def self.module_method(s)
    puts "Module method: #{s}"
  end

  def mixin
    puts "Value of a: #{@a}"
  end
end
M1.module_method("hello")
class X
  include M1
  def initialize
    @a = 4711
  end
end
x = X.new
x.mixin
```

“Getters” and “Setters”

```
class AttributeHolder
  def name=(n)
    @name = n
  end

  def name
    @name
  end
end

ah = AttributeHolder.new
ah.name = "AH Test"
puts ah.name
```

“Getters” and “Setters” (2)

```
class AttributeHolder2
  def name=(n)
    @name = n
  end

  def name
    @name
  end
  def first_name=(n)
    @first_name = n
  end

  def first_name
    @first_name
  end
end

ah = AttributeHolder2.new
ah.name = "AH Test"
ah.first_name = "AH First"
puts ah.name, ah.first_name
```

Attribute Accessor

```ruby
class AttributeHolder3
  attr_accessor :name, :first_name
end
ah = AttributeHolder3.new
ah.name = "AH Test"
ah.first_name = "AH First"
puts ah.name, ah.first_name
```

Metaprogramming with Ruby

Structures

```
Person = Struct.new "Person", :first_name, :last_name
p1 = Person.new
p1.last_name = "Doe"
p1.first_name = "John"
p1 # => #<struct Struct::Person first_name="John", last_name="Doe">
p2 = Person.new("Jane", "Doe")
p2 # => #<struct Struct::Person first_name="Jane", last_name="Doe">
```

Creating Objects and Classes by Name

```
s = Kernel.const_get('String').new "Teststring" # => "Teststring"
s.class # => String
Test = Class.new # => Test
Test.class_eval do
  def test1
    "test1"
  end
end
Test.new.test1 # => "test1"
Test.class_eval do
  define_method "test2" do
    "test2"
  end
end
Test.new.test2 # => "test2"
```

Individual Object Methods

```
t1 = Test.new
t2 = Test.new
t1.standard_method # => "standard_method; self: #<Test:0x16ee0>"
t2.standard_method # => "standard_method; self: #<Test:0x16e04>"
class << t1
  def object_method
    "object_method; self: #{self}"
  end
end
t1.object_method # => "object_method; self: #<Test:0x16ee0>"
t2.object_method # => NoMethodError: undefined method ‘object_method’
```

Classes & Constants

```
cls = Class.new
cls.class_eval do
  define_method :test_method do
    "test_method"
  end
end
cls.new.test_method # => "test_method"
cls # => #<Class:0x1b2b0>
SomeArbitraryConstant = cls
cls # => SomeArbitraryConstant
```

Runtime Definitions

```ruby
class TestClass
  puts "before definition, self: #{self}"
  def my_instance_method
    puts "my_instance_method, self: #{self}"
  end
  puts "after definition, self: #{self}"
end

# >> before definition, self: TestClass
# >> after definition, self: TestClass
# >> my_instance_method, self: #<TestClass:0x19f00>
```

Runtime Definitions (2)

```
TestClass.new.my_instance_method
class TestClass
  def self.my_class_method
    puts "my_class_method, self: #{self}"
  end

  my_class_method
end
# >> my_class_method, self: TestClass
```

Methods Adding Methods

```ruby
class Meta
  def initialize(value)
    @value = value
  end

  def self.add_multiplier(factor)
    define_method "times#{factor}" do
      @value * factor
    end
  end
  add_multiplier 5
end
Meta.new(3).times5 # => 15
```

Methods Adding Methods (2)

```ruby
module Multiplication
  module ClassMethods
    def new_class_m
      puts "new_class_m - self: #{self}"
    end

    def add_multiplier(factor)
      define_method "times#{factor}" do
        @value * factor
      end
    end

  end
  def self.included(clazz)
    clazz.extend(ClassMethods)
  end
end
```

```ruby
class MultiplyTest
  include Multiplication

  def initialize(value)
    @value = value
  end

  add_multiplier 3
end
MultiplyTest.new(3).times3 # => 15
```

(Re-)Opening Classes

```ruby
def to_label(s)
  (s.split '_' ).map {|c| c.capitalize}.join ' '
end
to_label("LONG_UNREADBLE_CONSTANT") # => "Long Unreadble Constant"
to_label("unwieldy_name") # => "Unwieldy Name"
class String
  def to_label
    (self.split '_' ).map {|c| c.capitalize}.join ' '
  end
end
"LONG_UNREADBLE_CONSTANT".to_label # => "Long Unreadble Constant"
"unwieldy_name".to_label # => "Unwieldy Name"
```

(Re-)Opening Classes (2)

```
def array_shuffle!(array)
  0.upto(array.length-1) do |i|
    r = (rand * array.length).to_i
    array[i], array[r] = array[r], array[i]
  end
  array
end

array = %w(7 8 9 10 B D K A)
array_shuffle!(array) # => ["A", "D", "9", "7", "10", "8", "K", "B"]
```

```
class Array
  def shuffle!
    0.upto(length-1) do |i|
      r = (rand * length).to_i
      self[i], self[r] = self[r], self[i]
    end
    self
  end
end
array = %w(7 8 9 10 B D K A)
array.shuffle!
# => ["9", "B", "K", "A", "8", "10", "7", "D"]
```

method_missing

```
class Recorder
  def method_missing(name, *args)
    @calls ||= []
    @calls << { :name => name, :args => args}
  end

  def print_calls
    @calls.each do |call|
      puts "#{call[:name]}(#{call[:args].join(', ')})"
    end
  end
end
r = Recorder.new
r.first_call 1, 2, 3
r.second_call "Hello"
r.third_call :bumm
r.print_calls
# =>
# >> first_call(1, 2, 3)
# >> second_call(Hello)
# >> third_call(bumm)
```

Metaprogramming Examples

Rails ActiveRecord

```ruby
class Project < ActiveRecord::Base
    belongs_to :portfolio
    has_one :project_manager
    has_many :milestones
    has_and_belongs_to_many :categories
end
```

Generated Methods

```ruby
class Project < ActiveRecord::Base
```

belongs_to :portfolio	Project.portfolio Project.portfolio=(portfolio) Project.portfolio.nil?
has_one :project_manager	Project.project_manager, Project.project_manager=(project_manager) Project.project_manager.nil?
has_many :milestones	Project.milestones.empty? Project.milestones.size Project.milestones Project.milestones<<(milestone) Project.milestones.delete(milestone) Project.milestones.find(milestone_id) Project.milestones.find(:all, options) Project.milestones.build, Project.milestones.create
has_and_belongs_to_many :categories	Project.categories.empty? Project.categories.size Project.categories Project.categories<<(category1) Project.categories.delete(category1)

```ruby
end
```

acts_as_state_machine

```
class Cat < ActiveRecord::Base
   acts_as_state_machine :initial => :sheltered, :column => 'status'
   state :sheltered #Initial state - Cat is at the shelter being cared for
   state :incare # Cat is with a shelter appointed carer
   state :returned # Owner located and cat returned
   state :housed # New owner is found for cat
   event :shelter do
     transitions :to => :sheltered, :from => :incare
   end
   event :care do
     transitions :to => :incare, :from => :sheltered
   end
   event :return do
     transitions :to => :returned, :from => :sheltered
     transitions :to => :returned, :from => :incare
   end
   event :house do
     transitions :to => :housed, :from => :sheltered
     transitions :to => :housed, :from => :incare
   end
end
```

Atom with XML Builder

```
xml.instruct! 'xml-stylesheet', :href=>'/stylesheets/atom.css', :type=>'text/css'
xml.feed :xmlns=>'http://www.w3.org/2005/Atom' do
  xml.div :xmlns=>'http://www.w3.org/1999/xhtml', :class=>'info' do
   xml << <<-EOF
     This is an Atom formatted XML site feed.
     It is intended to be viewed in a Newsreader or syndicated to another site.
     Please visit <a href="http://www.atomenabled.org/">atomenabled.org</a> for more info.
  EOF
  end
  xml.title   'Sam Ruby'
  xml.link    :rel=>'self',
    :href=>url_for(:only_path=>false, :action=>'posts', :path=>['index.atom'])
  xml.link    :href=>url_for(:action=>'posts', :path=>nil)
  xml.id      :href=>url_for(:only_path=>false, :action=>'posts', :path=>nil)
  xml.updated Time.now.iso8601
  xml.author  { xml.name 'Sam Ruby' }
  @entries.unshift @parent if @parent
  @entries.each do |entry|
    xml.entry do
      xml.title   entry.title
      xml.link    :href=>url_for(entry.by_date)
      xml.id      entry.atomid
      xml.updated entry.updated.iso8601
      xml.author  { xml.name entry.author.name } if entry.author
      xml.summary do
        xml.div :xmlns=>'http://www.w3.org/1999/xhtml' do
          xml << entry.summary
        end
      end if entry.summary
      xml.content do
        xml.div :xmlns=>'http://www.w3.org/1999/xhtml' do
          xml << entry.content
        end
      end
    end
  end
end
```

see: http://intertwingly.net/stories/2005/09/21/app/views/blog/atom.rxml

Ruby Language Implementations

Baseline: MRI and YARV

- MRI (“Matz’s Ruby Interpreter”)
  - interpreted
  - implemented in C
  - Used until Ruby 1.8.7 (current stable version)
  - rather slow
- YARV (“Yet Another Ruby VM”)
  - bytecode VM
  - implemented in C
  - used for Ruby >= 1.9
    (currently considered unstable)
  - significant speed improvement

Ruby
A Programmer’s Best Friend

Rubinius

- “Ruby in Ruby”
- Ambitious open source project to create next generation Ruby VM
- Based on knowledge, research & technology from Smalltalk
- Not complete yet
- *Very* fast

JRuby

- “Ruby in Java”
- Ruby interpreter/compiler for the JVM
- Sponsored by Sun
- Seamless, bi-directional integration with Java
- *Very* fast (!)

The World’s Quickest Rails Intro

Web development that doesn’t hurt.

Ruby on Rails is an open-source web framework that’s optimized for programmer happiness and sustainable productivity. It lets you write beautiful code by favoring convention over configuration.

http://rubyonrails.org

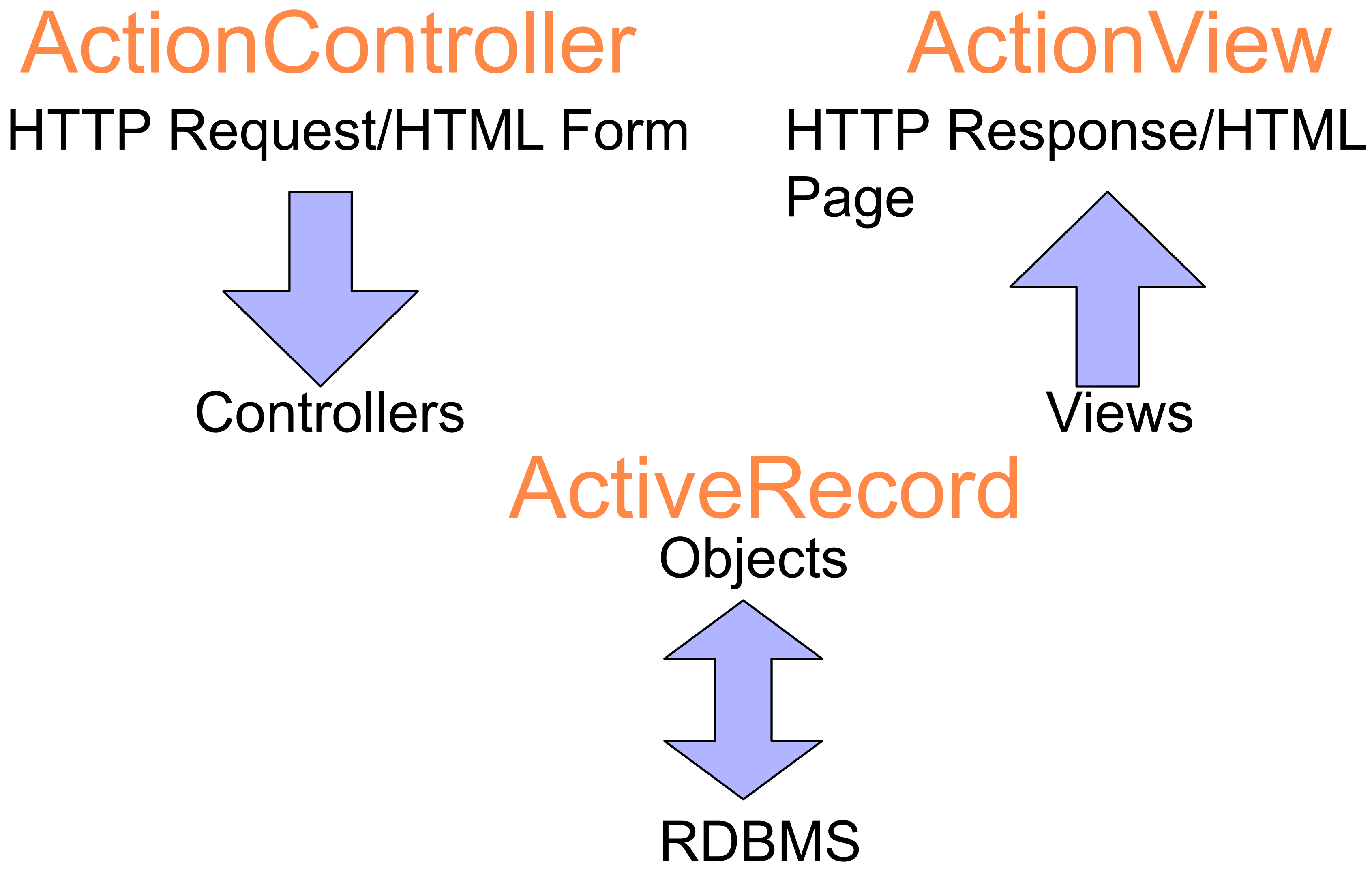
Ruby on Rails

- Created by David Heinemeier Hansson
- Built for building apps, not for impressing your friends
- Comprehensive framework for developing database-backed Web apps
- Very productive
- Hugely popular (read: hyped)

Rails Core Principles

- Opinionated Software
- DRY (Don’t Repeat Yourself)
- Convention over Configuration
- One Language for Everything
- Expressiveness through Metaprogramming

MVC in Rails


ActionController
HTTP Request/HTML Form
Controllers
ActionView
HTTP Response/HTML Page
Views
ActiveRecord
Objects
RDBMS

Demo

JVM + Ruby + Rails: JRuby on Rails

- JRuby runs Rails
- Standalone mode using Webrick or Mongrel
- Integration in Servlet containers via Goldspike
- DB access via JDBC
- Packaging via Warble
- Multi-threaded, highly scalable deployment in JBoss, Jetty, Glassfish, BEA, ...
- Seamless integration with existing Java EE code

Ruby
vs.
Groovy, Python, Jython, Perl, ...

Ruby vs. Groovy, Python, Jython, Perl, ...

- Perl
  - most extensive set of libraries
  - “write only” reputation, whether merited or not
  - weak (or weird?) OO features
  - very fast
- Python
  - great community
  - extensive libraries
  - extremely fast

Ruby vs. Groovy, Python, Jython, Perl, … (2)

- Jython
  - JVM version of Python
  - neglected for a long time
  - now supported by Sun
- Groovy
  - designed for the JVM
  - supposedly easier for Java developers

Java vs. Groovy vs. Ruby

```
private static < T > List< List< T >> subn(int n, List< T > li) {
  List< List< T > > ret = new ArrayList< List< T >>();
  if (n  0) {
      ret.add(new ArrayList< T >());
      return ret;
  }
  if (li.isEmpty()) {
      return ret;
  }
  T x = li.get(0);
  List< T> xs = li.subList(1, li.size());
  for (List< T> sub : subn(n-1, xs)) {
      sub.add(0, x);
      ret.add(sub);
  }
  ret.addAll(subn(n, xs));
  return ret;

}
```

http://www.glenstampoultzis.net/blog/?p=61

Groovy

```
def subn(n, list) {
    if (n  0) return [[]];
    if (list.isEmpty()) return [];

    def remainder = list.subList(1, list.size());
    return subn(n-1, remainder).collect { [list[ 0 ]] + it } + subn(n, remainder);

}
```

(J)Ruby

```
def subn(n, list)
    return [[]] if n == 0
    return [] if list.empty?

    remainder = list[1..-1]
    subn(n-1, remainder).collect {|it| [list[0]] + it } + subn(n, remainder)
end
```

http://headius.blogspot.com/2008/04/converting-groovy-to-ruby.html

Calling Java from JRuby:

```
require 'java'

JFrame = javax.swing.JFrame
JLabel = javax.swing.JLabel

frame = JFrame.new
frame.getContentPane().add(JLabel.new("Hello from JRuby!"))
frame.pack
frame.setVisible true
frame.show
```

Calling JRuby from Java: JSR 223

```java
import javax.script.ScriptContext;
import javax.script.ScriptEngine;
import javax.script.ScriptEngineManager;
import javax.script.ScriptException;

// ...

ScriptEngineManager m = new ScriptEngineManager();
ScriptEngine rubyEngine = m.getEngineByName("jruby");
ScriptContext context = rubyEngine.getContext();

context.setAttribute("label", new Integer(4), ScriptContext.ENGINE_SCOPE);

try {
    rubyEngine.eval("puts 2 + $label", context);
} catch (ScriptException e) {
    e.printStackTrace();
}
```

Calling JRuby from Java: BSF

```
import org.jruby.Ruby.*;
import org.jruby.*;
import org.jruby.javasupport.bsf.*;
import org.apache.bsf.BSFException;
import org.apache.bsf.BSFManager;
{...}
JLabel mylabel = new JLabel();
BSFManager.registerScriptingEngine("ruby",
                                   "org.jruby.javasupport.bsf.JRubyEngine",
                                   new String[] { "rb" });

BSFManager manager = new BSFManager();

/* Import an object using declareBean then you can access it in JRuby with $<name> */

manager.declareBean("label", mylabel, JFrame.class);
manager.exec("ruby", "(java)", 1, 1, "$label.setText(\"This is a test.\")");
```

Resources

- http://ruby-lang.org/
- http://jruby.codehaus.org/
- http://rubyonrails.org/
- http://wiki.jruby.org/wiki/Warbler
- http://ihate.rubyforge.org/profligacy/
- https://scripting.dev.java.net/
- http://jakarta.apache.org/bsf/
- http://www.infoq.com
- http://railsconsulting.de
- http://www.innoq.com

Summary

- Ruby: a nice, concise, object-oriented language
- Killer feature: metaprogramming support
- Killer framework: Ruby on Rails
- You know about the JVM
- Use them together ...

Have fun!

Thank you!
Any questions?

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Architectural Consulting

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