

# RUBY ON RAILS

# 101

PRESENTATION SLIDES FOR A FIVE DAY  
INTRODUCTORY COURSE

by Peter Marklund

**NOTE:** These slides have been updated for Rails 2.3 and are  
available at <http://marklunds.com/rails101>





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The material was developed by Peter Marklund for a five day Ruby on Rails course in June 2007 in Sweden. Please direct any feedback to the author at [peter@marklunds.com](mailto:peter@marklunds.com) or via <http://marklunds.com>.

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# AGENDA

Monday	Tuesday	Wednesday	Thursday	Friday
<ul style="list-style-type: none"><li>•Installation</li><li>•Philosophy and MVC</li><li>•Start an app</li><li>•Files, generators, and scripts</li></ul>	<ul style="list-style-type: none"><li>•Migrations</li><li>•ActiveRecord, ActionController, and ActionView Basics</li></ul>	<ul style="list-style-type: none"><li>•ActiveRecord Associations, Validations, and Callbacks</li><li>•ActionView Forms</li><li>•Filters</li><li>•Caching</li></ul>	<ul style="list-style-type: none"><li>•Routing</li><li>•REST</li><li>•ActionMailer</li><li>•Plugins</li><li>•ActiveSupport</li><li>•Rails 2.0</li></ul>	<ul style="list-style-type: none"><li>•Exercises</li><li>•Working on your app</li></ul>
<ul style="list-style-type: none"><li>•Ruby</li></ul>	<ul style="list-style-type: none"><li>•Testing</li></ul>	<ul style="list-style-type: none"><li>•AJAX</li></ul>	<ul style="list-style-type: none"><li>•Deployment, Security, and Performance</li></ul>	<ul style="list-style-type: none"><li>•Exercises</li><li>•Working on your app</li></ul>



# RAILS

# INTRODUCTION



# KUNG-FU?

“Ruby on Rails is astounding. Using it is like watching a kung-fu movie, where a dozen bad-ass frameworks prepare to beat up the little newcomer only to be handed their asses in a variety of imaginative ways.”

-Nathan Torkington, O'Reilly Program Chair for OSCON

# INSTALLATION

- InstantRails - One-Click install on Windows
- Locomotive - One-Click install on OS X
- Better options for Mac: MacPorts and installing from source
- On Linux: install from source
- Editors: TextMate (OS X), jEdit, SciTE, RadRails, Aptana, NetBeans, vim, Emacs

# RAILS BACKGROUND

- Jason Fried + David Heinemeier Hanson => BaseCamp, Ruby on Rails
- Java, PHP => Ruby
- Hottest Hacker on the Earch, Best Hacker of the year 2005, Jolt Awards
- Getting Real - Less is More
- Dave Thomas and the Pragmatic Programmers



# RAILS ELEVATOR PITCH

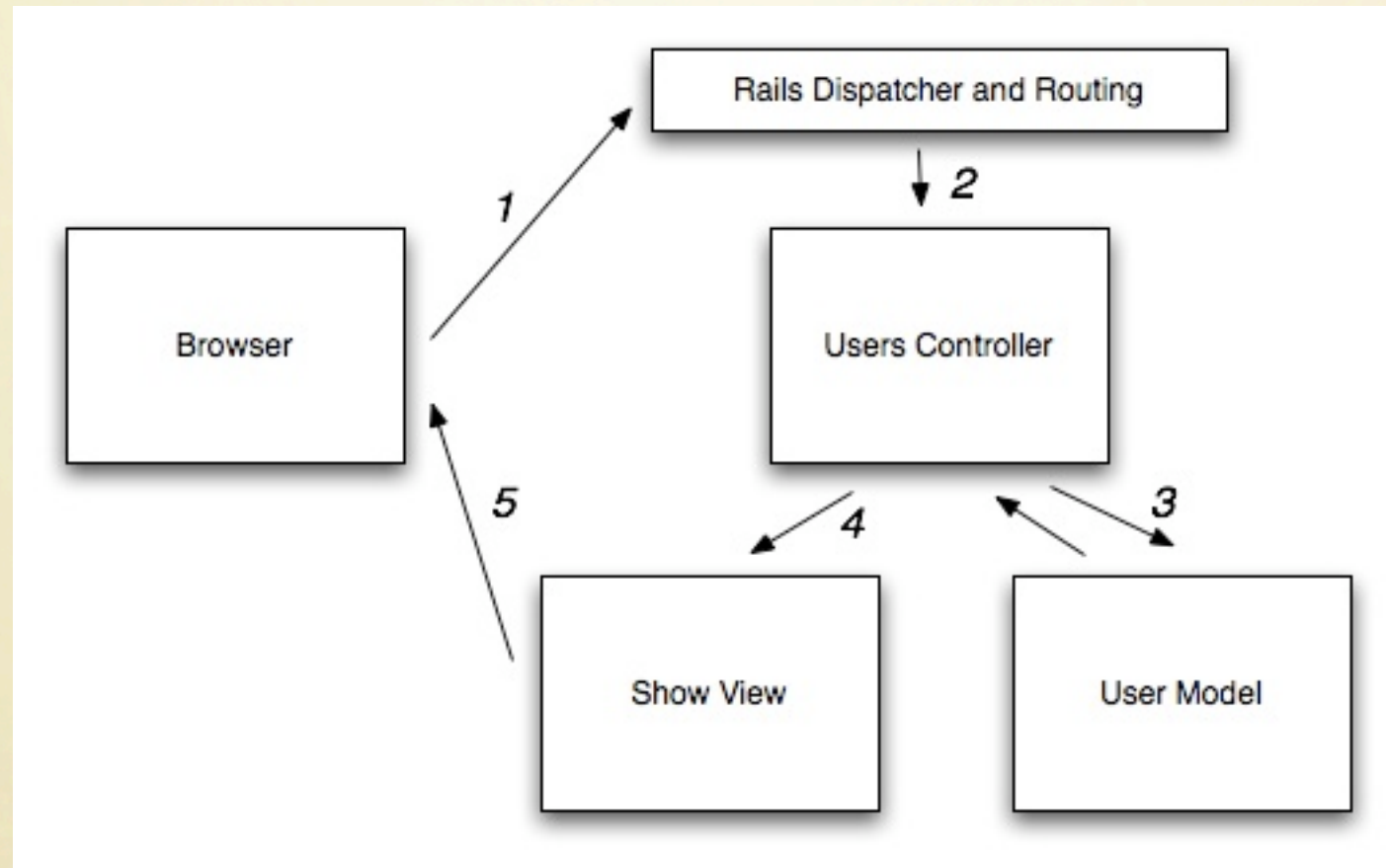
Ruby on Rails is an open-source web framework that's optimized for programmer happiness and sustainable productivity. It lets you write beautiful code by favoring convention over configuration.



# RAILS PHILOSOPHY AND STRENGTHS

- Ruby - less and more readable code, shorter development times, simple but powerful, no compilation cycle
- Convention over configuration => almost no config files, predefined directory structure, naming conventions => less code, easier maintenance
- Best practices: MVC, DRY, Testing
- Almost everything in Rails is Ruby code (SQL and JavaScript are abstracted)
- Integrated AJAX support. Web services with REST.
- Good community, tools, and documentation
- Extracted from a real application

# MVC REQUEST CYCLE





# MVC REQUEST CYCLE

1. A request is made from the browser to the URL <http://localhost:3000/users/show/1>.
2. A Rails server running locally on port 3000 receives the request and the dispatcher is invoked. Rails tries to find a route (in the file config/routes.rb) to match the URI **/users/show/1**. The default route **‘:controller/:action/:id’** matches the URI and the dispatcher instantiates the users controller and invokes its show method with the :id parameter set to 1.
3. The show method in the users controller fetches the user model object from the database with id equal to 1.
4. The show method renders its view (the file show.rhtml) which generates an HTML page with the user info from the user model object.
5. Rails sends the generated HTML from the view back to the browser.

# BUILDING A DEMO APPLICATION

- Installing plugins with `script/plugin install`
- Code generation with `script/generate model | scaffold`
- Migrations
- The MVC request cycle
- Rails command line - `script/console`
- Testing with rake
- Routes - `:controller/:action/:id`



# DIRECTORY STRUCTURE

- app**
  - controllers*
  - helpers*
  - models*
  - views*
  - layouts*
- config**
  - environment.rb**
  - routes.rb**
- db**
  - database.yml**
  - migrations**
- lib**
- log**
- public**
- script**
- test**
- vendor**
  - plugins**
  - rails**

# RAKE

- Rake lets you define a dependency tree of tasks to be executed.
- Rake tasks are loaded from the file Rakefile
- Rails rake tasks are under railties/lib/tasks
- Put your custom tasks under lib/tasks



# USEFUL RAKE TASKS

- `db:migrate`
- `db:sessions:create`
- `doc:app`
- `doc:rails`
- `log:clear`
- `rails:freeze:gems`
- `rails:freeze:edge`
- `rails:update`
- `:test` (default task)
- `:stats`

# SCRIPT/★

- about
- breakpointer
- **console**
- **generate**
- **plugin**
- runner
- **server**
- script/igoruby/clear\_sessions



# ENVIRONMENTS

- Every environment has a database connection in `config/database.yml` and a configuration file under `config/environments`.
- It's easy to add custom environments, i.e. for a staging server
- Rails always runs in only one environment, dictated by `ENV['RAILS_ENV']` (same as `RAILS_ENV`)

# CONFIG/ENVIRONMENT.RB

- log level
- how sessions are stored
- schema format
- pluralization rules
- Load custom libraries that you need here



# DEBUGGING

- `raise @object.inspect`
- `raise User.instance_methods(false).sort.join(", ")`
- `<%= debug @object %>`
- `script/console`
- The error log
- `script/breakpointer`



RUBY



“I always thought Smalltalk would beat Java. I just didn’t know it would be called ‘Ruby’ when it did”

- Kent Beck

# THE RUBY LANGUAGE

- Generic, interpreted, reflective, with garbage collection
- Optimized for people rather than computers
- More powerful than Perl, more object oriented than Python
- Everything is an object. There are no primitive types.
- Strong dynamic typing



# EVERYTHING IN RUBY IS:

- Assignment - binding names to objects
- Control structures - if/else, while, case
- Sending messages to objects - methods

# RUBY IS LINE ORIENTED

- Statements are separated by line breaks
- You can put several statements on one line if you separate them by semicolon
- For long statements you can escape the line break with backslash
- After an operator, comma, or the dot in a method invocation you can have a line break and Ruby will know that the statement continues on the next line
- You can have line breaks in strings



# DEFINING A CLASS AND INSTANTIATING AN OBJECT

```
class Person
  # Constructor - invoked by Person.new
  def initialize(name)
    # Instance variables start with @
    @name = name
  end

  def say_hi # Instance method
    puts "#{@name} says hi"
  end
end

andreas = Person.new("Andreas")
andreas.say_hi
```

# CLASS INHERITANCE

```
# Programmer "is a" Person and extends it
# with additional characteristics
class Programmer < Person
  def initialize(name, favorite_ide)
    super(name)
    @favorite_ide = favorite_ide
  end

  # We are overriding say_hi in Person
  def say_hi
    super
    puts "Favorite IDE is #{@favorite_ide}"
  end
end

peter = Programmer.new("Peter", "TextMate")
peter.say_hi
```



# GETTER- AND SETTTER METHODS

```
class Person
  def initialize(name)
    self.name = name
  end

  def name
    @name
  end

  def name=(name)
    @name = name
  end
end

person = Person.new("Andreas")
puts person.name
person.name = "David"
puts person.name
```

# ATTR\_ACCESSOR

```
class Person
  attr_accessor :name

  def initialize(name)
    self.name = name
  end
end

person = Person.new("Andreas")
puts person.name
person.name = "David"
puts person.name
```



# VARIABLE/METHOD AMBIGUITY GOTCHA

```
class Person
  attr_writer :paid

  def initialize
    @paid = false
  end

  def paid?
    @paid
  end

  def make_payment
    ... code that makes payment ...
    paid = true # Indicate payment is done
  end
end

person = Person.new
person.make_payment
puts person.paid?
```

# METHODS

- When invoking a method argument parenthesis are optional
- Methods **always** have a receiver. The implicit receiver is **self**.
- Methods are identified by their name only. No overloading on argument signatures.
- There are class methods and instance methods
- Methods can be public, protected, or private
- The last evaluated expression in a method is the return value
- Arguments can have default values: `def my_method(a, b = {})`



# DEFINING CLASS METHODS

```
class Person
  def self.class_method
    puts "class method invoked"
  end
```

```
  class << self
    def class_method2; puts "class_method2"; end
    def class_method3; puts "class_method3"; end
  end
end
```

```
class << User
  def class_method4; puts "class_method4"; end
end
```

# SINGLETON CLASSES AND METHODS

```
# Every object has two classes: the class of which  
# it is an instance, and a singleton class. Methods  
# of the singleton class are called singleton methods  
# and can only be invoked on that particular object.
```

```
andreas = Person.new("Andreas")
```

```
def andreas.andreas_says_hi
```

```
  "Andreas says hi"
```

```
end
```

```
andreas.andreas_says_hi
```

```
# Class methods are singleton methods on the class
```

```
# object and can be defined like this:
```

```
def Person.count
```

```
  @@count
```

```
end
```



# NAMING CONVENTIONS

- MyClass
- method\_name, dangerous\_method!, question\_method?, setter\_method=
- MY\_CONSTANT = 3.14
- local\_variable = 3.14
- @instance\_variable
- @@class\_variable
- \$global\_variable

# BOOLEAN EXPRESSIONS

- All objects evaluate to true except false and nil
- false and true are the only instances of FalseClass and TrueClass
- Boolean expressions return the last evaluated object
- $a \text{ and } b \text{ or } c \iff (a \text{ and } b) \text{ or } c$
- $a = b \text{ and } c \iff (a = b) \text{ and } c$
- $a = b \ \&\& \ c \iff a = (b \ \&\& \ c)$
- puts a if a = b # Using assignments in boolean expressions
- $a = \text{true}; b = \text{false}; a \text{ and } b \text{ and } c() \not\Rightarrow c()$  is never inoked



# ASSIGNMENT

- $a, b = b, a$  # swapping values
- $a = 1; b = 1$
- $a = b = 1$
- $a += 1$  #  $a = a + 1$
- $a, b = [1, 2]$
- $a = b || c$
- $a || = b$

# IDIOM: ASSIGNMENT WITH BOOLEAN EXPRESSION

# Overly verbose:

```
user_id = nil
if comments
  if comments.first
    if comments.first.user
      user_id = comments.first.user.id
    end
  end
end
```

# Idiomatic:

```
user_id = comments && comments.first &&
comments.first.user && comments.first.user.id
```



# MODULES

# Mixins - instead of multiple inheritance

```
module FullName
  def full_name
    "#{first_name} #{last_name}"
  end
end
```

```
class Person
  include FullName
end
```

```
Person.new("Peter", "Marklund").full_name
```

# Namespaces - to avoid name collisions

```
module MyApp
  class Person
    attr_accessor :name
    def initialize(name)
      self.name = name
    end
  end
end
```

```
MyApp::Person.new("Peter Marklund")
```

# MODULES VS CLASSES

- Modules model characteristics or properties of entities or things. Modules can't be instantiated. Module names tend to be adjectives (Comparable, Enumerable etc.). A class can mix in several modules.
- Classes model entities or things. Class names tend to be nouns. A class can only have one super class (Enumeration, Item etc.).



# EVERYTHING IS AN OBJECT

- $2 + 2$  is equivalent to  $2+(2)$  and  $2.send(:+, 2)$
- `2.hours.ago`
- `2.class # => Fixnum`
- `2.class.methods - Object.methods`
- `“andreas”.capitalize`

# CONSTANTS

- Constants defined in a class/module are available within that class/module and outside the class with the scope operator ::
- Constants defined outside any class/module can be accessed anywhere
- Constants cannot be defined in methods



# INTROSPECTION

```
andreas = Person.new("Andreas")  
andreas.inspect
```

```
andreas.class # => Person  
andreas.class.superclass # => Object  
andreas.class.superclass.superclass # => nil
```

```
andreas.ancestors # lists Modules
```

```
Person.instance_methods(false)  
puts Kernel.methods.join("\n")
```

# ARITHMETIC AND CONVERSIONS

```
2.class == Fixnum  
Fixnum.superclass == Integer  
Integer.superclass == Numeric
```

```
3.0.class == Float  
Float.superclass == Numeric
```

```
2/3 == 0  
2/3.0 # => 0.6666667  
2 + 3.0 == 5.0  
"2".to_i + "3.0".to_f == 5.0
```

```
10000000000.class == Bignum  
Bignum.superclass == Integer
```

```
2 + "3" # => TypeError: String can't be coerced into Fixnum
```



# STRING CLASS

```
"ruby".upcase + " " + "rails".capitalize
```

```
"time is: #{Time.now}\n second line"
```

```
'no interpolation "here" #{Time.now}'
```

```
"I" << "Go" << "Ruby"
```

```
%Q("C" och "Java") # "\"C\" och \"Java\""
```

```
%q{single 'quoted'} # 'single \'quoted\''
```

```
<<-END
```

```
  A here
```

```
  document at #{Time.now}
```

```
END
```

# ARRAY CLASS

```
a = ["Ruby", 99, 3.14]
```

```
a[1] == 99
```

```
a << "Rails"
```

```
['C', 'Java', 'Ruby'] == %w{C Java Ruby}
```

```
[1, 2, 3].map { |x| x**2 }.join(", ")
```

```
[1, 2, 3].select { |x| x % 2 == 0 }
```

```
[1, 2, 3].reject { |x| x < 3 }
```

```
[1, 2, 3].inject { |sum, i| sum + i }
```

```
[1, [2, 3]].flatten! # => [1, 2, 3]
```

```
raise "Invalid language" if !%w{C Java Ruby}.include?(language)
```

```
fruits = ['apple', 'banana']
```

```
fruits += ['apple'] unless fruits.include?('apple')
```

```
fruits -= ['apple']
```



# HASH CLASS

```
h = { :lang => 'Ruby', :framework => 'Rails' }  
h[:lang] == 'Ruby'  
h[:perl] == nil  
ENV = { "USER" => "peter", "SHELL" => "/bin/bash" }  
ENV.each { |k, v| puts "#{k}=#v" }
```

# SYMBOLS

# Symbols start with a colon

```
:action.class == Symbol
```

```
:action.to_s == "action"
```

```
:action == "action".to_sym
```

# There is only one instance of every symbol

```
:action.equal?(:action) # => true
```

```
'action'.equal?('action') # => false
```

# Symbols are typically used as keys in hashes

```
link_to "Home", :controller => "home"
```



# MORE ABOUT METHODS

- Arbitrary number of arguments: `def my_methods(*args)`
- Converting Array to arguments: `my_method([a, b]*)`
- Dynamic method invocation: `object.send(:method_name)`
- Duck typing: `object.respond_to?(:method_name)`
- If the last argument is a Hash, the braces can be omitted:  
`link_to "Home", :controller => 'home'`

# RANGE CLASS

```
# Two dots is inclusive, i.e. 1 to 5  
(1..5).each { |x| puts x**2 }
```

```
# Three dots excludes the last item,  
# i.e. 1 to 4  
(1...5).each { |x| puts x }
```

```
(1..3).to_a == [1, 2, 3]
```



# STRUCTS

```
Rating = Struct.new(:name, :ratings)
rating = Rating.new("Rails", [ 10, 10, 9.5, 10 ])

puts rating.name
puts rating.ratings
```

# IF, UNLESS AND THE ? OPERATOR

```
message = if count > 10  
    "Try again"  
elseif tries == 3  
    "You lose"  
else  
    "Enter command"  
end
```

```
raise "Unauthorized" if !current_user.admin?  
raise "Unauthorized" unless current_user.admin?
```

```
status = input > 10 ? "Number too big" : "ok"
```



# ITERATORS: WHILE, UNTIL, AND FOR. KEYWORDS: BREAK AND NEXT

```
while count < 100
  puts count
  count += 1
end
```

```
# Statement modifier version of while
payment.make_request while (payment.failure? and payment.tries < 3)
```

```
for user in @users
  next if user.admin?
  if user.paid?
    puts user
    break
  end
end
```

```
until count > 5
  puts count
  count += 1
end
```

```
# Statement modifier version of until
puts(count += 1) until count > 5
```

# CASE

```
case x
when 0
when 1, 2..5
  puts "Second branch"
when 6..10
  puts "Third branch"
when *[11, 12]
  puts "Fourth branch"
when String: puts "Fifth branch"
when /\d+\.\d+/
  puts "Sixth branch"
when x.downcase == "peter"
  puts "Seventh branch"
else
  puts "Eight branch"
end
```



# BLOCKS, CLOSURES, AND PROC OBJECTS

```
def invoke_block  
  puts "before block"  
  yield 5  
  puts "after block"  
end
```

```
name = "Ruby"  
invoke_block { |n| puts "In block with #{name}, received #{n}" }
```

```
my_proc = Proc.new { |n| puts "In proc, received #{n}" }  
my_proc.call 2  
invoke_block &my_proc
```

# BLOCKS - USAGE

## EXAMPLES

# Iteration

```
[1, 2, 3].each { |item| puts item }
```

# Resource Management

```
file_contents = open(file_name) { |f| f.read }
```

# Callbacks

```
widget.on_button_press do  
  puts "Got button press"  
end
```

# Convention: one-line blocks use {...} and multiline

# blocks use do...end



# COMMON STRING OPERATIONS

```
“ “.blank? == true
my_string.each_with_index { |line, i| puts “#{i}: #{line}” }
“abc”.scan(/./).each { |char| puts char }
“we split words”.split.join(“ ”)
“ strip space “.strip
sprintf(“value of %s is %.2f”, “PI”, 3.1416)
“I Go Ruby”[2, 2] == “I Go Ruby”[2..3] == “Go”
```

# USING THE DUP METHOD ON METHOD ARGUMENTS

# Methods that change their receiver end with an exclamation mark by convention.  
# If you need to invoke an exclamation mark method on a method argument and you want  
# to avoid the object from being changed, you can duplicate the object first  
# with the Object#dup method. Core classes such as String, Hash, and Array all have  
# meaningful implementations of the dup method. Here is an example from Rails:

```
class ActiveRecord::Base
  ...
  def attributes=(new_attributes)
    return if new_attributes.nil?
    attributes = new_attributes.dup # duplicate argument to avoid changing it
    attributes.stringify_keys! # modify the duplicated object

    multi_parameter_attributes = []
    remove_attributes_protected_from_mass_assignment(attributes).each do |k, v|
      k.include?("(") ? multi_parameter_attributes << [ k, v ] : send(k + "=", v)
    end

    assign_multiparameter_attributes(multi_parameter_attributes)
  end
end
```



# REGULAR EXPRESSIONS

```
puts "matches" if "Ruby" =~ /^(ruby|python)$/i
"Go\nRuby" =~ /Go\s+(\w+)/m; $1 == "Ruby"
"I Go Ruby" =~ /go/i; $& == "Go"; $` == "I "; $' == " Ruby"
pattern = "."; Regexp.new(Regexp.escape(pattern))
"I Go Ruby"[/ (go)/i, 1] == "Go"
"I Go Ruby".gsub(%r{Ruby}, '\0 or I go bananas')
"I Go Ruby".gsub(/ruby/i) { |lang| lang.upcase }
line = "I Go Ruby"
m, who, verb, what = *line.match(/^( \w+) \s+ ( \w+) \s+ ( \w+) $/)
# \s, \d, [0-9], \w - space, digit, and word character classes
# ?, *, +, {m, n}, {m,}, {m} - repetition
```

# EXCEPTIONS

```
begin
  raise(ArgumentError, "No file_name provided") if !file_name
  content = load_blog_data(file_name)
  raise "Content is nil" if !content
rescue BlogDataNotFound
  STDERR.puts "File #{file_name} not found"
rescue BlogDataConnectError
  @connect_tries ||= 1
  @connect_tries += 1
  retry if @connect_tries < 3
  STDERR.puts "Invalid blog data in #{file_name}"
rescue Exception => exc
  STDERR.puts "Error loading #{file_name}: #{exc.message}"
  raise
end
```



# INVOKING EXTERNAL PROGRAMS

```
system("ls -l")  
puts $? .exitstatus if !$.success?  
puts `ls -l`
```

# RUBY SCRIPTS WITH RDoc AND OPTION PARSING

```
#!/usr/bin/env ruby
# == Synopsis
# This script takes photographs living locally on my desktop or laptop
# and publishes them to my homepage at http://marklunds.com.
#
# == Usage
#
# Copy config file publish-photos.yml.template to publish-photos.yml
# and edit as appropriate.
#
# ruby publish-photos [ -h | --help ] <photo_dir1> ... <photo_dirN>

# Load the Rails environment
require File.dirname(__FILE__) + '/../config/environment'
require 'optparse'
require 'rdoc/usage'

opts = OptionParser.new
opts.on("-h", "--help") { RDoc::usage('usage') }
opts.on("-q", "--quiet") { Log::Logger.verbose = false }
opts.parse!(ARGV) rescue RDoc::usage('usage')

Photos::Publisher(ARGV)
```



# RUBY ON THE COMMAND LINE

# Query and replace

```
ruby -pi.bak -e "gsub(/Perl/, 'Ruby')" *.txt
```

# Grep

```
ruby -n -e "print if /Ruby/" *.txt
```

```
ruby -e "puts ARGF.grep(/Ruby/)" *.txt
```

# OPEN CLASS DEFINITIONS AND METHOD ALIASING

```
class Peter
  def say_hi
    puts "Hi"
  end
end
```

```
class Peter
  alias_method :say_hi_orig, :say_hi

  def say_hi
    puts "Before say hi"
    say_hi_orig
    puts "After say hi"
  end
end
```



# CORE CLASSES ARE ALSO OPEN

```
class Integer
  def even?
    (self % 2) == 0
  end
end
```

```
p (1..10).select { |n| n.even? }
# => [2, 4, 6, 8, 10]
```

# METHOD\_MISSING: A VCR

```
class VCR
  def initialize
    @messages = []
  end

  def method_missing(method, *args, &block)
    @messages << [method, args, block]
  end

  def play_back_to(obj)
    @messages.each do |method, args, block|
      obj.send(method, *args, &block)
    end
  end
end
```



# USING THE VCR

```
vcr = VCR.new  
vcr.gsub! /Ruby/, "Crazy"  
vcr.upcase!  
object = "I Go Ruby"  
vcr.play_back_to(object)  
puts object
```

# CONST\_MISSING - FOR AUTO LOADING CLASSES

```
def Object.const_missing(name)
  @looked_for ||= {}
  str_name = name.to_s
  raise "Class not found: #{name}" if @looked_for[str_name]
  @looked_for[str_name] = 1
  file = str_name.downcase
  require file
  klass = const_get(name)
  return klass if klass
  raise "Class not found: #{name}"
end
```



# EVAL, BINDING

```
def evaluate_code(code, binding)
  a = 2
  eval code, binding
end
```

```
a = 1
evaluate_code("puts a", binding) # => 1
```

# INSTANCE\_EVAL

```
andreas = Person.new("Andreas")  
name = andreas.instance_eval { @name }
```



# CLASS\_EVAL/ MODULE\_EVAL

```
class Person
  def add_method(method)
    class_eval %Q{
      def #{method}
        puts "method #{method} invoked"
      end
    }
  end

  add_method(:say_hi)
end

person = Person.new.say_hi
```

# DEFINE\_METHOD

```
class Array
  {:second => 1, :third => 2}.each do |method,element|
    define_method(method) do
      self[element]
    end
  end
end
```

```
array = %w(A B C)
puts array.first
puts array.second
puts array.third
```



# OBJECT SPACE

```
ObjectSpace.each_object(Numeric) { |x| p x }
```

# CLASS REFLECTION

```
# Using Class#superclass
klass = Fixnum
begin
  print klass
  klass = klass.superclass
end while klass
# => Fixnum < Integer < Numeric < Object
```

```
# Using Class#ancestors
p Fixnum.ancestors
# => Fixnum, Integer, Precision, Numeric, Comparable, Object, Kernel
```

```
# Inspecting methods and variables
Fixnum.public_instance_methods(false)
Fixnum.class_variables
Fixnum.constants
1.instance_variables
```



# SYSTEM HOOKS:

## CLASS#INHERITED

```
class ActiveRecord::Base
  # Invoked when a new class is created that extends this
  # class
  def self.inherited(child)
    @@subclasses[self] ||= []
    @@subclasses[self] << child
  end
end
```

# RUBY LOAD PATH AND AUTO LOADING IN RAILS

- The Ruby load path is stored in `$:` and is used when you require code
- Models, views, controllers, and helpers under the `app` dir are loaded automatically
- Classes under `lib` are also loaded automatically
- You can add load paths in `config/environment.rb`
- Class and module names must correspond to the file path where they are defined for auto loading to work



# MIGRATIONS



# MIGRATIONS

- A way to evolve your database schema over time
- Migrations use a database independent Ruby API
- `script/generate migration`
- Migration files are numbered in a sequence starting with 001
- Migration classes extend `ActiveRecord::Migration` and have an `up` and a `down` method
- `rake db:migrate VERSION=X`



# MIGRATIONS: MANAGING TABLES AND COLUMNS

- create\_table, add\_column, change\_column, rename\_column, rename\_table, add\_index
- Column types: binary, boolean, date, **datetime**, decimal, **float**, **integer**, **string**, **text**, time, timestamp
- Column options: :null, :limit, :default
- Table options: :primary\_key, :id, :force, :options
- Execute SQL with execute(“drop table my\_table”)

# MIGRATIONS: THINGS TO BE AWARE OF

- You can use ActiveRecord classes, but this is fragile as the class definitions might change over time
- Foreign keys you have to create yourself. You can use a helper module for this.
- Good practice is to backup your production data before you run a migration
- You can see the schema definition in db/schema.rb or db/development\_structure.rb if `config.active_record.schema_format = :sql`



# TWO SPECIAL COLUMNS

**created\_at** and **updated\_at** are maintained automatically by Rails and keep track of when a record was created and last updated

# MIGRATION EXAMPLE

```
create_table "users", :force => true do |t|
  t.column :login,           :string
  t.column :email,           :string
  t.column :crypted_password, :string, :limit => 40
  t.column :salt,            :string, :limit => 40
  t.column :created_at,      :datetime
  t.column :updated_at,      :datetime
  t.column :remember_token,  :string
  t.column :remember_token_expires_at, :datetime
end
```



# LET'S BRING SEXY BACK

# Note: this is only available in Edge Rails, \*not\*  
# in Rails 1.2.3

```
create_table "users", :force => true do |t|  
  t.string :login, :email, :remember_token  
  t.string :salt, :crypted_password, :limit => 40  
  t.timestamps  
  t.datetime :remember_token_expires_at  
end
```



# ACTIVE RECORD BASICS



# FUNDAMENTALS

- One database table maps to one Ruby class
- Ruby classes live under `app/models` and extend `ActiveRecord::Base`
- Table names are plural and class names are singular
- Database columns map to attributes, i.e. `get` and `set` methods, in the model class
- All tables have an integer primary key called `id`
- Database tables are created with migrations

# OVERRIDING NAMING CONVENTIONS

- `self.table_name = 'my_legacy_table'`
- `self.primary_key = 'my_id'`
- `self.pluralize_table_names = false`
- `self.table_name_prefix = 'my_app'`



# CRUD

- Create: create, new
- Read: find, find\_by\_<attr>
- Update: save, update\_attributes
- Delete: destroy

# CREATE = NEW + SAVE

```
user = User.new
user.first_name = "Dave"
user.last_name = "Thomas"
user.new_record? # true
user.save
user.new_record? # false
```

```
user = User.new(
  :first_name => "Dave",
  :last_name => "Thomas"
)
user.save
```

```
user = User.create(
  :first_name => "Dave",
  :last_name => "Thomas"
)
user.new_record? # false
```



# SAVE!

```
user = User.new(  
  :first_name => "Dave",  
  :last_name => "Thomas"  
)
```

```
if user.save  
  # All is ok  
else  
  # Could not save user :-(  
end
```

```
begin  
  user.save!  
rescue RecordInvalid => e  
  # Could not save!  
end
```

# CREATE! = NEW + SAVE!

```
begin
  user = User.create!(
    :first_name => "Dave",
    :last_name => "Thomas")
rescue RecordInvalid => e
  # Could not create user...
end
```



# COLUMN/ATTRIBUTE DATA TYPES

MySQL	Ruby Class
integer	Fixnum
clob, blob, text	String
float, double	Float
char, varchar	String
datetime, time	Time

# CUSTOM ATTRIBUTE ACCESSORS

```
class Song < ActiveRecord::Base
  def length=(minutes)
    # self[:length] = minutes*60
    write_attribute(:length, minutes * 60)
  end

  def length
    # self[:length] / 60
    read_attribute(:length) / 60
  end
end
```



# DEFAULT ATTRIBUTE VALUES

```
class User < ActiveRecord::Base
  def language
    self[:language] || = "sv"
  end
end
```

# BOOLEAN ATTRIBUTES

- Everything except nil and false is true in Ruby
- However, in MySQL boolean columns are char(1) with values 0 or 1, both of which are true in Ruby.
- Instead of saying user.admin, say user.admin?
- When you add the question mark, false is the number 0, one of the strings '0', 'f', 'false', or "", or the constant false



# FIND

- `User.find(:first) # => User object`
- `User.find(:all) # => Array with all User objects`
- `User.find(3) # => User object with id 3`

# FIND WITH :CONDITIONS

```
User.find(:all,  
  :conditions =>  
    ["first_name = ? and created_at > ?", "David", 1.year.ago])
```

```
User.find(:all,  
  :conditions =>  
    ["first_name = :first_name, last_name = :last_name",  
     { :first_name => "David", :last_name => "Letterman" }])
```

```
User.find(:all,  
  :conditions => { :first_name => "Jamis", :last_name => "Buck" })
```

```
User.find(:all, :conditions => [ "category IN (?)", categories])
```



# POWER FIND WITH ADDITIONAL ATTRIBUTES

```
users = User.find(:all,  
  :conditions => ["users.id = taggings.taggable_id and users.age > ?", 25],  
  :limit => 10,  
  :offset => 5,  
  :order => "users.last_name",  
  :joins => " , taggings",  
  :select => "count(*) as count, users.last_name",  
  :group => "users.last_name")  
  
puts users.first.count # => 3  
puts users.first.attributes # => {"last_name" => "Svensson", "count" => 3}
```

# EVERYTHING IS A FIND :ALL

```
# select * from users limit 1
```

```
User.find(:first) <=> User.find(:all, :limit => 1).first
```

```
# select * from users where id = 1
```

```
User.find(1) <=> User.find(:all, :conditions => "users.id = 1")
```



# LIKE CLAUSES

# Like this

```
User.find(:all, :conditions => ["name like ?", "%" + params[:name] + "%"])
```

# Not like this

```
User.find(:all, :conditions => ["name like '%?%'", params[:name]])
```

# DYNAMIC FINDERS

User.find\_by\_first\_name "Peter"

User.find\_all\_by\_last\_name "Hanson"

User.find\_by\_age "20"

User.find\_by\_last\_name("Buck",  
:conditions => {:country = "Sweden", :age => 20..30})

User.find\_by\_first\_name\_and\_last\_name "Andreas", "Kviby"



# RECORDNOTFOUND EXCEPTION

`User.exists?(999) # => false`

`User.find(999) # => raises ActiveRecord::RecordNotFound`

`User.find_by_id(999) # => nil`

`User.find(:first, :conditions => {:id => 999}) # => nil`

# FIND OR CREATE

# No 'Summer' tag exists

```
Tag.find_or_create_by_name("Summer") # equal to Tag.create(:name => "Summer")
```

# Now the 'Summer' tag does exist

```
Tag.find_or_create_by_name("Summer") # equal to Tag.find_by_name("Summer")
```

# No 'Winter' tag exists

```
winter = Tag.find_or_initialize_by_name("Winter")
```

```
winter.new_record? # true
```



# UPDATE

```
order = Order.find(12)
order.name = "Bill Gates"
order.charge = 10000
order.save!
```

```
order = Order.find(13)
order.update_attributes!(
  :name => "Steve Jobs",
  :charge => 1
)
```

```
Order.find(12).update_attribute(:charge, -1) # => Does not trigger validation
```

# UPDATE\_ATTRIBUTES IS SYNTACTIC SUGAR

```
def update_attributes(attributes)
  self.attributes = attributes
  save
end
```

```
def update_attributes!(attributes)
  self.attributes = attributes
  save!
end
```

```
def update_attribute_with_validation_skipping(name, value)
  send(name.to_s + '=', value)
  save(false) # Passing false to save bypasses validation
end
```



# LOCKING

```
# SELECT * FROM accounts WHERE (account.`id` = 1) FOR UPDATE
account = Account.find(id, :lock => true)
account.status = 'disabled'
account.save!
```

```
# Optimistic locking with integer column lock_version in the accounts table:
account1 = Account.find(4)
account2 = Account.find(4)
account1.update_attributes(:status => 'disabled')
account2.update_attributes(:status => 'enabled') # => Raises StaleObjectError
```

# DESTROY

```
# Instance method User#destroy
```

```
User.count # => 5
```

```
u = User.find(:first)
```

```
u.destroy
```

```
User.count # => 4
```

```
# Class method User.destroy
```

```
User.destroy(2, 3)
```

```
User.count # => 2
```

```
User.exists?(2) # => false
```

```
User.find(:all).map(&:id) # => [4, 5]
```

```
# Class method User.destroy_all
```

```
User.destroy_all("id >= 5")
```

```
User.count # => 1
```

```
User.destroy_all
```

```
User.count # => 0
```



# DESTROY CLASS METHODS

```
def destroy(id)
  id.is_a?(Array) ? id.each { |id| destroy(id) } : find(id).destroy
end
```

```
def destroy_all(conditions = nil)
  find(:all, :conditions => conditions).each { |object| object.destroy }
end
```

# DELETE: DOES NOT INSTANTIATE OBJECTS

```
# Class method User.delete  
User.count # => 5  
# delete from users where id = 3  
User.delete 3  
User.count # => 4  
User.exists?(3) # => false
```

```
# Class method User.delete_all  
User.delete_all(:conditions => "id >= 4")  
User.count # => 2  
# delete from users  
User.delete_all  
User.count # => 0
```



# CALCULATIONS

Person.minimum('age')

Person.maximum('age')

Person.sum('age')

Person.count(:conditions => ["age > ?", 25])

Person.average('age')

Person.calculate(:std, :age)

# EXECUTING SQL

```
# Works like find(:all) but takes a SQL string or conditions Array
# Post.find_by_sql "SELECT p.*, c.author FROM posts p, comments c WHERE p.id = c.post_id"
def find_by_sql(sql)
  connection.select_all(sanitize_sql(sql), "#{name} Load").
    collect! { |record| instantiate(record) }
end
```

```
ActiveRecord::Base.connection.execute("select * from users")
```

```
ActiveRecord::Base.select_one | select_all | select_value | select_values
```



# VIRTUAL ATTRIBUTES

```
# Virtual attributes are attributes that do not correspond  
# directly to database columns like normal ActiveRecord  
# attributes.
```

```
class Person < ActiveRecord::Base
```

```
  def full_name  
    first_name + " " + last_name  
  end
```

```
  def full_name=(full_name)  
    first_name = full_name.split.first  
    last_name = full_name.split.last  
  end
```

```
end
```

# SERIALIZING ATTRIBUTE VALUES

```
class Person < ActiveRecord::Base
  serialize params
end
```

```
person = Person.new
person.params = {
  :height => 190,
  :weight => 80,
  :eye_color => 'blue'
}
person.save
```



# COMPOSITE ATTRIBUTES

```
class Name
  attr_reader :first, :initials, :last
  def initialize(first, initials, last)
    @first = first
    @initials = initials
    @last = last
  end
  def to_s
    [ @first, @initials, @last ].compact.join(" ")
  end
end
```

```
class Customer < ActiveRecord::Base
  composed_of :name,
    :class_name => Name,
    :mapping =>
      [ #database   ruby
        [ :first_name, :first ],
        [ :initials,   :initials ],
        [ :last_name,  :last ]
      ]
end
```

# TRANSACTIONS

```
Account.transaction do  
  account1.deposit(100)  
  account2.withdraw(100)  
end
```

```
Account.transaction(account1, account2) do  
  account1.deposit(100)  
  account2.withdraw(100)  
end
```



# CHAD FOWLER SAYS

ActiveRecord is an example of a leaky abstraction and you need to understand the SQL that it generates to avoid gotchas such as the N+1 problem.



# ACTIONCONTROLLER BASICS



# CONTROLLERS

- Controllers are Ruby classes that live under app/controllers
- Controller classes extend ActionController::Base
- An action is a public method and/or a corresponding view template

# CONTROLLER ENVIRONMENT

- `cookies[:login] = { :value => "peter", :expires => 1.hour.from_now`
- `headers['Content-Type'] = 'application/pdf; charset=utf-8'`
- `params`
- `request: env, request_uri, get?, post?, xhr?, remote_ip`
- `response`
- `session`
- `logger.warn("Something pretty bad happened")`



# REQUEST.ENV

```
SERVER_NAME = localhost
PATH_INFO = /
HTTP_ACCEPT_ENCODING = gzip,deflate
HTTP_USER_AGENT = Mozilla/5.0 (Macintosh; U; Intel Mac OS X; en-US; rv:1.8.1.3) Gecko/20070309 Firefox/2.0.0.3
SCRIPT_NAME = /
SERVER_PROTOCOL = HTTP/1.1
HTTP_CACHE_CONTROL = no-cache
HTTP_ACCEPT_LANGUAGE = en-us,en;q=0.5
HTTP_HOST = localhost:3000
REMOTE_ADDR = 127.0.0.1
SERVER_SOFTWARE = Mongrel 0.3.13.4
HTTP_KEEP_ALIVE = 300
REQUEST_PATH = /
HTTP_COOKIE = volunteer_id=ff4cc4f37c77a4efbee41e9e77a5d3d4bb619d22;
fcP=C=0&T=1176293486407&DTO=1176293486401&U=103359521886406&V=1176293592419;
_session_id=819e71f41ab4e64a111358374c3b662f
HTTP_ACCEPT_CHARSET = ISO-8859-1,utf-8;q=0.7,*;q=0.7
HTTP_VERSION = HTTP/1.1
REQUEST_URI = /
SERVER_PORT = 3000
GATEWAY_INTERFACE = CGI/1.2
HTTP_PRAGMA = no-cache
HTTP_ACCEPT = text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5
HTTP_CONNECTION = keep-alive
```

# RENDERING A RESPONSE

- A response is rendered with the render command
- An action can only render a response once
- Rails invokes render automatically if you don't
- Redirects are made with the redirect\_to command
- You need to make sure you return from an action after an invocation of render or redirect\_to



# RENDER EXAMPLES

- `render :text => "Hello World"`
- `render :action => "some_other_action"`
- `render :partial => "top_menu"`
- `render :xml => xml_string`
- Options: `:status`, `:layout`, `:content_type`
- `send_file("/files/some_file.pdf")`

# REDIRECT EXAMPLES

- `redirect_to :back`
- `redirect_to("/help/order_entry.html")`
- `redirect_to :controller => 'blog', :action => 'list'`



# COOKIES

- A hash stored by the browser
- `cookies[:preference] = { :value => 'ice cream', :expires => 10.days.from_now, :path => '/store' }`
- Valid options: `:domain`, `:expires`, `:path`, `:secure`, `:value`

# SESSIONS

- A hash stored on the server, typically in a database table or in the file system.
- Keyed by the cookie `_session_id`
- Avoid storing complex Ruby objects, instead put id:s in the session and keep data in the database, i.e. use `session[:user_id]` rather than `session[:user]`



# CONFIGURING SESSIONS

- `session :off, :only => %w{ fetch_rss fetch_atom }`
- `session :session_key => '_my_app_session_id', :session_domain => 'my.domain.com'`
- `config.action_controller.session_store = :active_record_store`
- `rake db:sessions:create`

# THE FLASH

- The flash is a way to set a text message to the user in one request and then display it in the next (typically after a redirect)
- The flash is stored in the session
- `flash[:notice]`, `flash[:error]`
- `flash.now[:notice]` = “Welcome” unless `flash[:notice]`
- `flash.keep(:notice)`



# BEST PRACTICE

- Don't put SQL and too much code in your controllers/views - it's a code smell, and maybe the most common design mistake Rails developers make. Actions should be 3-4 lines that script business objects. The goal is fat models and skinny controllers.
- Always access data via the logged in user object (i.e. `current_user.visits.recent`).



# ACTIONVIEW BASICS



# WHAT IS ACTIONVIEW?

- ActionView is the module in the ActionPack library that deals with rendering a response to the client.
- The controller decides which template and/or partial and layout to use in the response
- Templates use helper methods to generate links, forms, and JavaScript, and to format text.

# WHERE TEMPLATES LIVE

- Templates that belong to a certain controller typically live under `app/view/controller_name`, i.e. templates for `Admin::UsersController` would live under `app/views/admin/users`
- Templates shared across controllers are put under `app/views/shared`. You can render them with `render :template => 'shared/my_template'`
- You can have templates shared across Rails applications and render them with `render :file => 'path/to/template'`



# TEMPLATE ENVIRONMENT

- Templates have access to the controller objects flash, headers, logger, params, request, response, and session.
- Instance variables (i.e. `@variable`) in the controller are available in templates
- The current controller is available as the attribute `controller`.

# THREE TYPES OF TEMPLATES

- **rxml** - Files with Ruby code using the Builder library to generate XML. Typically used for RSS/Atom.
- **rhtml** - The most common type of template used for HTML. They are HTML files with embedded Ruby and they use the ERb library.
- **rjs** - Ruby code with a Rails specific API that generate JavaScript. Used for AJAX functionality.



# BUILDER TEMPLATE

## EXAMPLE: RSS

```
xml.instruct!  
xml.rss "version" => "2.0", "xmlns:dc" => "http://purl.org/dc/elements/1.1/" do  
  xml.channel do  
    xml.title "Recent comments for #{@user.login}"  
    xml.link @rss_url  
    xml.pubDate CGI.rfc1123_date(@comments.first ? @comments.first.updated_at :  
Time.now)  
    xml.description ""  
    @comments.each do |comment|  
      xml.item do  
        xml.title "Comment by #{comment.creation_user.login} #{time_ago_in_words  
comment.created_at} ago"  
        xml.link @server_url + comment_url(comment)  
        xml.description h(comment.body)  
        xml.pubDate CGI.rfc1123_date(comment.updated_at)  
        xml.guid @server_url + comment_url(comment)  
        xml.author h(comment.creation_user.login)  
      end  
    end  
  end  
end  
end
```

# RHTML TEMPLATES

- `<%= ruby code here %>` - Evaluates the Ruby code and prints the last evaluated value to the page.
- `<% ruby code here %>` - Evaluates Ruby code without outputting anything to the page.
- Use a minus sign (i.e. `<%= ... %->` and `<% ... %->`) to avoid the newline after the tag to be printed to the page.
- Remember to quote especially user inputted data with the helper `h`: `<%= h comment.body %>`.



# PARTIALS

- Partials are templates that render a part of a page, such as a header or footer, or a menu, or a listing of articles
- Partials help promote reuse of page elements
- Partials work just like page templates (views) and run in the same environment. They also live in the same directory as page templates.
- The filenames of partials always start with an underscore.

# RENDERING PARTIALS

- Render a partial from an action with `render :partial => 'name_of_partial'`
- Render a partial in a page template with the same command: `<%= render :partial => 'name_of_partial' %>`



# PASSING VARIABLES TO PARTIALS

- Controller instance variables are available in partials
- If you pass `:object => @an_article` to the `render` command then that variable will be available in a local variable in the partial with the same name as the partial.
- If there is an instance variable with the same name as the partial then it will be available as a local variable in the partial with the same name, i.e. `@article = Article.find(1); render :partial => 'article'`.
- You can pass any objects into local variables in the partial with the `:locals` argument: `render :partial => 'article', :locals => { :author => @author, :options => @options }`

# PARTIALS AND COLLECTIONS

```
<% for article in @articles %>  
  <%= render :partial => 'article', :object => article %>  
<% end %>
```

Can be written more concisely with the :collections argument:

```
<%= render :partial => 'article', :collection => @articles %>
```



# LAYOUTS

- Layouts are templates under `app/views/layouts` that contain common page elements around pages such as headers, footers, menus etc.
- The layout template contains the invocation `<%= yield %>` which will render the action output.

# DETERMINING WHICH LAYOUT TO USE

- If no layout is specified in the controller or render method then Rails looks for a controller layout at `app/views/layouts/controller_name.rhtml` and uses that.
- If there is no controller layout then Rails will use any application layout at `app/views/layouts/application.rhtml`
- You can pass the `:layout` argument to the layout command: `render 'some_template', :layout => 'my_special_layout'`. You can also turn off layouts by saying `:layout => false`.
- You can declare in your controller which layout should be used by saying something like: `layout "standard", :except => [:rss, :atom]`. Turn off layouts by saying `layout nil`.



# DYNAMIC LAYOUT SELECTION

```
class BlogController < ActionController::Base
  layout :determine_layout

  private
  def determine_layout
    user.admin? ? "admin" : "standard"
  end
end
```

# PASSING DATA TO LAYOUTS

- You can pass data to layouts via instance variables
- You can also wrap parts of your template in `<%= content_for(:left_menu) %> ... <%= end %>` invocations and then in your layout render that with `<%= yield :left_menu %>`



# HELPERS

- Helpers are Ruby modules with methods that are available in your templates.
- Helpers can avoid duplication and minimize the amount of code in your templates.
- By default each controller has a corresponding helper file at `app/helpers/controller_name_helper.rb`

# TEXT\_HELPER.RB

```
truncate("Once upon a time in a world far far away", 14)
highlight('You searched for: rails', 'rails')
excerpt('This is an example', 'an', 5)
pluralize(2, 'person')
word_wrap('Once upon a time', 4)
textilize(text)
markdown(text)
simple_format(text)
auto_link(text)
strip_links(text)
sanitize(html)
strip_tags(html)
<tr class="<%= cycle("even", "odd") -%>">
```



# URL\_HELPER.RB

```
url_for({:controller => 'blog'}, :only_path => false)
```

```
link_to "Other Site", "http://www.rubyonrails.org/", :confirm => "Sure?"
```

```
link_to "Image", { :action => "view" },  
  :popup => ['new_window','height=300,width=600']
```

```
link_to "Delete Image", { :action => "delete", :id => @image.id }, :method  
=> :delete
```

```
button_to "New", :action => "new"
```

```
link_to_unless_current("Home", { :action => "index" })
```

```
mail_to "me@domain.com", "My email", :encode => "javascript"  
# => <script type="text/javascript">eval(unescape('%64%6f%63...%6d  
%65%6e'))</script>
```

```
mail_to "me@domain.com", "My email", :encode => "hex"  
# => <a href="mailto:%6d%65@%64%6f%6d%61%69%6e.%63%6f%6d">My email</a>
```

# TRY A DIFFERENT TEMPLATING SYSTEM: HAML

```
#content
  .left.column
    %h2 Welcome to our site!
    %p= print_information
  .right.column= render :partial => "sidebar"
```

```
<div id='content'>
  <div class='left column'>
    <h2>Welcome to our site!</h2>
    <p>
      <%= print_information %>
    </p>
  </div>
  <div class="right column">
    <%= render :partial => "sidebar" %>
  </div>
</div>
```



# TESTING

# RAILS TESTING LANDSCAPE

Rails	Ruby Tool	Interface
	Selenium, Watir	HTTP from Browser (IE, Firefox)
	WWW::Mechanize	HTTP
Integration tests		Dispatcher
Functional	RSpec, test/spec	Controller
Unit	RSpec, test/spec	Model



# TEST::UNIT:TESTCASE

- Test::Unit is a Ruby testing library, very similar to JUnit.
- Rails ships with three types of tests: unit, functional, and integration. Those tests are all structured into test case classes that extend the Test::Unit::TestCase class.
- Every method in the test case with a name that starts with “test\_” represents a single test that gets executed by the framework.
- Before every test method the **setup** method is invoked, and afterwards the **teardown** method.
- Every test method makes one or more assertions about the behaviour of the class under test

# UNIT TESTS

- Every model `MyModel` in Rails has a corresponding unit test case in the class `TestMyModel` in `test/units/test_my_model.rb`
- Unit tests are created for you by `script/generate model`



# UNIT TEST EXAMPLE

```
require File.dirname(__FILE__) + '/../test_helper'

class UserTest < Test::Unit::TestCase
  fixtures :customers, :services, :users, :calls

  def test_should_create_user
    assert_difference 'User.count' do # Requires Edge Rails
      user = create_user
      assert !user.new_record?, "#{user.errors.full_messages.to_sentence}"
    end
  end

  protected
  def create_user(options = {})
    User.create({
      :name => "Quire",
      :email => 'quire@example.com',
      :password => 'quire',
      :password_confirmation => 'quire',
      :role => 'super'
    }.merge(options))
  end
end
```

# TEST\_HELPER.RB

```
ENV["RAILS_ENV"] = "test"
require File.expand_path(File.dirname(__FILE__) + "../config/environment")
require 'test_help'

class Test::Unit::TestCase
  # Transactional fixtures accelerate your tests by wrapping each test method
  # in a transaction that's rolled back on completion
  self.use_transactional_fixtures = true

  # Instantiated fixtures are slow, but give you @david where otherwise you
  # would need people(:david)
  self.use_instantiated_fixtures = false

  # Add more helper methods to be used by all tests here...
end
```



# TEST DATA WITH FIXTURES

- Fixtures are files that load test data into the test database that tests can run against. Every model and database table has a corresponding fixture file at `test/fixtures/table_name.yml`
- Fixture files are in YAML format, a readable alternative to XML. You can also keep fixture files in CSV format if you like.
- The fixture command will delete from the specified tables and then load their fixture files. The fixtures will then be available in your tests as `table_name(:fixture_name)`, i.e. `users(:joe)`.

# FIXTURE EXAMPLE:

## USERS.YML

```
quentin:  
  id: 1  
  login: quentin  
  email: quentin@example.com  
  salt: 7e3041ebc2fc05a40c60028e2c4901a81035d3cd  
  crypted_password: 00742970dc9e6319f8019fd54864d3ea740f04b1 # test  
  created_at: <%= 5.days.ago.to_s :db %>
```

```
aaron:  
  id: 2  
  login: aaron  
  email: aaron@example.com  
  salt: 7e3041ebc2fc05a40c60028e2c4901a81035d3cd  
  crypted_password: 00742970dc9e6319f8019fd54864d3ea740f04b1 # test  
  bio: Aaron is a weird guy  
  created_at: <%= 1.days.ago.to_s :db %>
```



# ASSERTIONS

- `assert(actual, comment)` # Asserts truth
- `assert_equal(expected, actual, comment)`
- `assert_in_delta(expected_float, actual_float, delta, message)`
- `assert_match(pattern, string, message)`
- `assert_nil(object, message)`/`assert_not_nil`
- `assert_raise(Exception, ..., message) { block ... }`
- `assert_difference(expressions, difference = 1, &block)`

# FUNCTIONAL TESTING OF CONTROLLERS

- Functional tests run against a single controller instance, simulate requests against it, and make assertions about the responses
- Requests are made via the methods get/post/put/delete and they end up invoking the process method on the controller and executing an action.



# FUNCTIONAL TEST EXAMPLE

```
require File.dirname(__FILE__) + '/../test_helper'
require 'comments_controller'

class CommentsController; def rescue_action(e) raise e end; end

class CommentsControllerTest < Test::Unit::TestCase
  fixtures :users, :comments

  def setup
    @controller = CommentsController.new
    @request     = ActionController::TestRequest.new
    @response    = ActionController::TestResponse.new
    @request.env['HTTP_HOST'] = "localhost"
    @request.session[:user] = users(:aaron)
  end

  def test_rss
    get :rss, :id => users(:quentin)
    assert_response :success
    assert_select "rss > channel" do
      assert_select "title", /Recent comments/
      assert_select "item", 1
      assert_select "item > title", Regexp.new(users(:aaron).login)
      assert_select "item > description", users(:quentin).comments.first.body
    end
  end
end
```

# ASSERTIONS IN FUNCTIONAL TESTS

- `assert_response :success | :redirect | :missing | :error`
- `assert_redirected_to(:controller => 'blog', :action => 'list')`
- `assert_template 'store/index'`
- `assert_not_nil assigns(:items)`
- `assert session[:user]`
- `assert_not_nil flash[:notice]`



# ASSERT\_SELECT

```
assert_select "p.warning" # <p class="warning">...</p>
assert_select "p#warning" # <p id="warning">...</p>
assert_select "html p.warning" # Ancestor chaining
assert_select "html > body > p.warning" # Direct parent chaining
assert_select "div#cart table tr", 3 # Integer, n times
assert_select "div#cart table tr", 3..5 # Range, n times
assert_select "div#cart table tr", false # Not present on page
assert_select "div#cart table tr td#price", "$23" # Tag contents
assert_select "div#cart table tr td#price", /23/ # Regexp

assert_select "form input" do
  assert_select "[name=?]", /.+/ # Not empty
end
```

# INTEGRATION TESTS

- Test against the Rails dispatcher and can span all controllers
- Simulate user scenarios/stories.
- Can involve multiple simultaneous sessions
- You make requests with the methods get/post etc.
- You have access to pretty much the same environment and assertions as in functional tests



# INTEGRATION TEST EXAMPLE

```
class TracerBulletTest < ActionController::IntegrationTest
  def test_tracer_bullet
    get("/mcm/user/login")
    assert_response :success

    post("/mcm/user/login", :email => self.mail, :password => self.password)
    assert_redirected_to :controller => 'mcm/general'
    follow_redirect!
    assert_response :success

    expect_count = contacts(:adam_sandler).jobs.size
    post("/mcm/contacts/search", :q => 'sandler new york')
    assert_response :success
    assert_n_search_results(expect_count)

    get "/mcm/lists/show/#{list.id}"
    assert_response :success
    assert_template 'mcm/lists/show'
  end
end
```

# INTEGRATION TEST

## EXAMPLE: WITH DSL

```
class TracerBulletTest < ActionController::IntegrationTest
  def test_tracer_bullet
    setup_test_users
    carl = new_session_as(:carl)

    carl.logs_in
    carl.searches_for_contacts
    ...
  end

  module TestingDSL
    attr_accessor :mail, :password

    def logs_in
      get("/mcm/user/login")
      assert_response :success

      post("/mcm/user/login", :email => self.mail, :password => self.password)
      assert_redirected_to :controller => 'mcm/general'
      follow_redirect!
      assert_response :success
    end
    ...
  end

  def new_session_as(person)
    open_session do |sess|
      sess.extend(TestingDSL)
    end
  end
end
```



# RUNNING TESTS

- rake - runs all tests
- rake test:units
- rake test:functionals
- rake test:integration
- ruby test/unit/user\_test.rb

# STUBBING AND MOCKING

- Sometimes you may need to stub out interactions with external systems (payment gateways etc.) and isolate the code under test.
- Mock and stub objects are similar, but mock objects tend to be more intelligent and verify that the right messages are received.
- Mock classes that should be in place for all tests (static mocks) can be put under test/mocks/test.
- You may use the libraries “Mocha and Stubba” or FlexMock for dynamic stubbing/mocking. The stubs/mocks that you set up are isolated to the test.



# MOCHA AND STUBBA

## EXAMPLES

```
client = Goyada::HttpClient.new({})
client.expects(:http_timeout).returns(0.01)
client.expects(:get_connection).returns(lambda { sleep 10 })
response = client.send(:https_response, "http://www.test.com", nil, nil)
assert_equal(client.send(:error_response).code, response.code)
assert_equal(Timeout::Error, response.exception.class)

::HttpClient.expects(:get_iso8859).with(http_url).returns("a piece of text")
get :read, :dtmf => 3
assert_response :success
assert_vxml "prompt", /a piece of text/
```

# SUBMITTING FORMS AND CLICKING LINKS

- A limitation in most controller and integration tests is that they bypass forms and links in the views.
- To be able to submit forms you may use the Form Test Helper plugin, or alternatively Hpricot Forms.

# Form Test Helper usage example:

```
submit_form "/account/signup", :user => {  
  :login => "Dave Thomas",  
  :email => "dave@pragmaticprogrammers.com",  
  :password => "dave",  
  :password_confirmation => "dave"  
}  
  
select_link("/user/aaron").follow
```



# RCOV

- rcov is a Ruby library that measures code coverage of tests. It can be used to find gaps in your test coverage.
- rcov will generate a report of how many percent of each Ruby class is covered and indicate which lines of code are not executed by the tests.

```
# Installation of rcov:  
gem install rcov  
ruby script/plugin install http://svn.codahale.com/rails\_rcov  
rake test:test:rcov
```

# HECKLE

- Heckle will mutate your code by inverting boolean expressions and run your tests and make sure they fail
- Heckle helps find missing assertions and can also find redundancies in your code.

# Installation of Heckle:

```
gem install -y heckle
```

```
heckle -t test/functional/comments_controller_test.rb CommentsController create
```



# AJAX AND RJS TESTING

- When you develop AJAX functionality you write actions generate and return JavaScript with the RJS API.
- The best way to test AJAX functionality is with a browser testing tool like Selenium.
- With the ARTS plugin you can make assertions against the RJS code in your controller and integration tests.

# ARTS PLUGIN USAGE EXAMPLE

```
# In a controller test...
def test_edit
  xhr :get, :edit, :id => users(:aaron), :attribute => 'bio'
  assert_response :success
  assert_rjs :page, dom_id('bio', :edit_link), :hide
  assert_rjs :replace, dom_id('bio', :div), /<form/
end
```



# HTML VALIDATION AND LINK CHECKING

- I've written a plugin called `http_test` that you can use to HTML validate all your HTML responses in your controller and integration tests.
- You can also use the plugin to make sure that URLs in links and redirects can be resolved by your application.

# USING THE RAILS TESTS AS DOCUMENTATION

- A great way to learn the Rails API is to read the tests that ship with Rails. The tests tell you how the API is intended to be used, how you should and should not use it. You can also learn about edge cases.
- The Rails tests are also a good place to learn how to write tests for your own application.



# TEST CASE SPECIFIC FIXTURES

- Sharing fixtures across all tests doesn't scale so well and can become hard to maintain. A solution is to use the plugin Fixture Scenarios.

```
[RAILS_ROOT]
```

```
+--test/  
  +-fixtures/  
    +-brand_new_user/  
      +-users.yml
```

```
class UserTest < Test::Unit::TestCase  
  scenario :brand_new_user  
  ...  
end
```

# BDD: FROM VERIFICATION TO SPECIFICATION

- Behaviour Driven Development (BDD) is Test Driven Development (TDD) with a new terminology and structure
- Instead of tests BDD talks about specifications
- Two popular BDD tools for Rails are RSpec and test/spec.
- In BDD specifications are not necessarily structured around a certain class like is typically the case in unit testing, but rather a certain context, such as an empty list.



# RSpec Examples

```
require File.join(File.dirname(__FILE__), '../spec_helper')

context "the Call model" do
  fixtures :customers, :services, :calls

  it "Is not deleted by attempt to delete customer" do
    lambda { customers(:trafiken).destroy }.should raise_error
    calls(:incall).should == calls(:incall).reload
  end
  ...
end

describe Admin::ServicesController do
  include ControllerSpecHelper
  fixtures :customers, :services, :users, :services_users, :audio_files, :prompts, :calls
  integrate_views

  it "Edit form, super user: outcall fields should be visible for outcall service" do
    login(:super)
    get :show, :id => services(:outcall).id
    response.code.should == "200"
  end
end
```



# ACTIVE RECORD ASSOCIATIONS



# THREE KINDS OF RELATIONSHIPS

class A	class B	Foreign keys	Mapping
<pre>class User   <b>has_one</b> :weblog end</pre>	<pre>class Weblog   <b>belongs_to</b> :user end</pre>	weblogs.user_id	One user maps to zero or one weblog
<pre>class Weblog   <b>has_many</b> :posts end</pre>	<pre>class Post   <b>belongs_to</b> :weblog end</pre>	posts.weblog_id	One weblog maps to zero or more posts
<pre>class Post   <b>has_and_belongs_to_many</b> :categories end</pre>	<pre>class Category   <b>has_and_belongs_to_many</b> :posts end</pre>	categories_posts.post_id categories_posts.category_id	Any number of posts maps to any number of categories

# HAS\_ONE

```
has_one :credit_card, :dependent => :destroy
has_one :credit_card, :dependent => :nullify
has_one :last_comment, :class_name => "Comment", :order => "posted_on"
has_one :project_manager, :class_name => "Person",
  :conditions => "role = 'project_manager'"
has_one :attachment, :as => :attachable # Polymorphic association
```



# BELONGS\_TO

```
class LineItem < ActiveRecord::Base
  belongs_to :paid_order,
             :class_name => 'Order',
             :foreign_key => 'order_id',
             :conditions => 'paid_on is not null'
end

li = LineItem.find(1)
puts li.product.name

li.product = Product.new(:name => 'I Go Ruby')
li.save

li.build_product(:name => 'MacBook Pro') # Equivalent to product = Product.new
li.create_product(:name => 'SoundsSticks II') # build_product + save
```

# HAS\_MANY

```
has_many :comments, :order => "posted_on"
has_many :comments, :include => :author
has_many :people, :class_name => "Person",
  :conditions => "deleted = 0", :order => "name"
has_many :tracks, :order => "position", :dependent => :destroy
has_many :comments, :dependent => :nullify
has_many :tags, :as => :taggable
has_many :subscribers, :through => :subscriptions, :source => :user
has_many :subscribers, :class_name => "Person", :finder_sql =>
  'SELECT DISTINCT people.* ' +
  'FROM people p, post_subscriptions ps ' +
  'WHERE ps.post_id = #{id} AND ps.person_id = p.id ' +
  'ORDER BY p.first_name'
```



# METHODS ADDED BY HAS\_MANY

Firm#clients (similar to Clients.find :all, :conditions => "firm\_id = #{id}")

Firm#**clients**<<

Firm#clients.delete

Firm#clients=

Firm#client\_ids

Firm#client\_ids=

Firm#**clients.clear**

Firm#clients.empty? (similar to firm.clients.size == 0)

Firm#**clients.count**

Firm#**clients.find** (similar to Client.find(id, :conditions => "firm\_id = #{id}"))

Firm#clients.build (similar to Client.new("firm\_id" => id))

Firm#clients.create (similar to c = Client.new("firm\_id" => id); c.save; c)

# HAS\_MANY EXAMPLE

```
blog = User.find(1).weblog
blog.posts.count # => 0
blog.posts << Post.new(:title => "Hi, this is my first post!")
blog.posts.count # => 1
blog.posts.find(:conditions => ["created_at > ?", 1.minute.ago]) = blog.posts.first
```



# HAS\_AND\_BELONGS\_TO\_MANY

# Requires a join table

```
create_table :categories_posts, :id => false do
  t.column :category_id, :integer, :null => false
  t.column :post_id, :integer, :null => false
end
```

# Indices for performance

```
add_index :categories_posts, [:category_id, :post_id]
add_index :categories_posts, :post_id
```

```
product = Product.find_by_name "MacBook Pro"
category = Category.find_by_name("Laptops")
product.categories.count # => 0
category.products.count # => 0
product.categories << category
product.categories.count # => 1
category.products.count # => 1
```

# JOIN MODELS

```
class Article < ActiveRecord::Base
  has_many :readings
  has_many :users, :through => :readings
end
class User < ActiveRecord::Base
  has_many :readings
  has_many :articles, :through => :readings
end
class Reading < ActiveRecord::Base
  belongs_to :article
  belongs_to :user
end
```

```
user = User.find(1)
article = Article.find(1)
Reading.create(
  :rating => 3,
  :read_at => Time.now,
  :article => article,
  :user => user
)
article.users.first == user
```



# JOIN MODEL WITH CONDITIONS

```
class Article < ActiveRecord::Base
  has_many :happy_users, :through => :readings,
    :source => :user,
    :conditions => "readings.rating >= 4"
end
```

```
article = Article.find(1)
article.happy_users
```

# EXTENDING ASSOCIATIONS

```
class User < ActiveRecord::Base
  has_many :articles, :through => :readings do
    def rated_at_or_above(rating)
      find :all, :conditions => ['rating >= ?', rating]
    end
  end
end

user = User.find(1)
good_articles = user.articles.rated_at_or_above(4)
```



# POLYMORPHIC ASSOCIATIONS

```
create_table :images, :force => true do |t|  
  t.column :comment, :string  
  t.column :file_path, :string  
  t.column :has_image_id, :integer  
  t.column :has_image_type, :string  
end
```

```
class Image < ActiveRecord::Base  
  belongs_to :has_image, :polymorphic => true  
end
```

```
class User < ActiveRecord::Base  
  has_one :image, :as => :has_image  
end
```

```
class Post < ActiveRecord::Base  
  has_one :image, :as => :has_image  
end
```

# SINGLE TABLE INHERITANCE: TABLE DEFINITION

```
create_table :people, :force => true do |t|
  t.column :type, :string

  # common attributes
  t.column :name, :string
  t.column :email, :string

  # attributes for type=Customer
  t.column :balance, :decimal, :precision => 10, :scale => 2

  # attributes for type=Employee
  t.column :reports_to, :integer
  t.column :dept, :integer

  # attributes for type=Manager
  # - none -
end
```



# SINGLE TABLE INHERITANCE: CLASS HIERARCHY

```
class Person < ActiveRecord::Base  
end
```

```
class Customer < Person  
end
```

```
class Employee < Person  
  belongs_to :boss, :class_name =>  
    "Employee", :foreign_key => :reports_to  
end
```

```
class Manager < Employee  
end
```

# SINGLE TABLE INHERITANCE: USAGE

```
wilma = Manager.create(:name => 'Wilma Flint', :email => "wilma@here.com",  
:dept => 23)
```

```
Customer.create(:name => 'Bert Public', :email => "b@public.net",  
:balance => 12.45)
```

```
barney = Employee.new(:name => 'Barney Rub', :email => "barney@here.com",  
:dept => 23)
```

```
barney.boss = wilma  
barney.save!
```

```
manager = Person.find_by_name("Wilma Flint")  
puts manager.class #=> Manager  
puts manager.email #=> wilma@here.com  
puts manager.dept #=> 23
```

```
customer = Person.find_by_name("Bert Public")  
puts customer.class #=> Customer  
puts customer.email #=> b@public.net  
puts customer.balance #=> 12.45
```



# ACTS AS LIST

```
class Parent < ActiveRecord::Base
  has_many :children, :order => :position
end
```

```
class Child < ActiveRecord::Base
  belongs_to :parent
  acts_as_list :scope => parent
end
```

# ACTS AS LIST: USAGE

```
parent = Parent.new
%w{ One Two Three Four}.each do |name|
  parent.children.create(:name => name)
end
parent.save
```

```
def display_children(parent)
  puts parent.children(true).map {|child| child.name }.join(", ")
end
```

```
display_children(parent) #=> One, Two, Three, Four
puts parent.children[0].first? #=> true
two = parent.children[1]
puts two.lower_item.name #=> Three
puts two.higher_item.name #=> One
```

```
parent.children[0].move_lower
display_children(parent) #=> Two, One, Three, Four
parent.children[2].move_to_top
display_children(parent) #=> Three, Two, One, Four
parent.children[2].destroy
display_children(parent) #=> Three, Two, Four
```



# ACTS AS TREE

```
create_table :categories, :force => true do |t|  
  t.column :name, :string  
  t.column :parent_id, :integer  
end
```

```
class Category < ActiveRecord::Base  
  acts_as_tree :order => "name"  
end
```

# ACTS AS TREE: USAGE

```
root = Category.create(:name =>"Books")
fiction = root.children.create(:name =>"Fiction")

non_fiction = root.children.create(:name =>"NonFiction")
non_fiction.children.create(:name =>"Computers")
non_fiction.children.create(:name =>"Science")
non_fiction.children.create(:name =>"ArHistory")

fiction.children.create(:name =>"Mystery")
fiction.children.create(:name =>"Romance")
fiction.children.create(:name =>"ScienceFiction")

display_children(root) # Fiction, Non Fiction

sub_category = root.children.first

puts sub_category.children.size #=> 3
display_children(sub_category) #=> Mystery, Romance, Science Fiction
non_fiction = root.children.find(:first, :conditions => "name = 'Non Fiction'")
display_children(non_fiction) #=> Art History, Computers, Science
puts non_fiction.parent.name #=> Books
```



# EAGER LOADING: FROM N+1 TO 1 QUERY

```
# Joins posts, authors, comments  
# in a single select  
@posts = Post.find(:all,  
  :conditions => "posts.title like '%ruby%'",  
  :include => [:author, :comments])
```

```
<% for post in @posts %>  
  <%= post.author.name %>: <%= post.title %>  
  Comments:  
  <% for comment in post.comments %>  
    <%= comment.body %>  
  <% end %>  
<% end %>
```

# COUNTER CACHE

```
create_table :posts do
  ...
  t.column :comments_count, :integer
end

class Post < ActiveRecord::Base
  has_many :comments
end

class Comment < ActiveRecord::Base
  belongs_to :post, :counter_cache => true
end
```



# ASSOCIATION CALLBACKS

```
class Project
  # Possible callbacks: :after_add, :before_add, :after_remove, :before_remove
  has_and_belongs_to_many :developers,
    :after_add => [:evaluate_velocity,
      Proc.new { |p, dl| p.shipping_date = Time.now}]

  def evaluate_velocity(developer)
    ...
  end
end
```



# ACTIVE RECORD VALIDATIONS



# VALIDATION

- Validations are rules in your model objects to help protect the integrity of your data
- Validation is invoked by the save method. Save returns true if validations pass and false otherwise.
- If you invoke save! then a RecordInvalid exception is raised if the object is not valid
- Use save(false) if you need to turn off validation

# VALIDATION CALLBACK METHODS

```
class Person < ActiveRecord::Base
  def validate
    puts "validate invoked"
  end

  def validate_on_create
    puts "validate_on_create invoked"
  end

  def validate_on_update
    puts "validate_on_update invoked"
  end
end

peter = Person.create(:name => "Peter") # => validate, validate_on_create invoked
peter.last_name = "Forsberg"
peter.save # => validate_on_update invoked
```



# VALIDATION ERRORS

```
class Person < ActiveRecord::Base
  def validate
    if Person.find_by_name(name)
      errors.add(:name, "is already being used")
    end

    if name.blank? and email.blank?
      errors.add_to_base("You must specify name or email")
    end
  end
end

peter = Person.create(:name => "Peter") # => validate, validate_on_create invoked
peter.valid? # => true
peter.errors # => []

peter2 = Person.create(:name => "Peter")
peter2.valid? # => false
peter2.errors.on(:name) # => "is already being used"
peter2.errors.full_messages # => ["Name is already being used"]
```

# VALIDATION MACROS

validates\_acceptance\_of  
validate\_associated  
validates\_confirmation\_of  
validates\_each  
validates\_exclusion\_of  
validates\_format\_of  
validates\_inclusion\_of  
validates\_length\_of  
validates\_numericality\_of  
validates\_presence\_of  
validates\_size\_of  
validates\_uniqueness\_of



# VALIDATION MACROS:

## USAGE


```
class User < ActiveRecord::Base
  validates_presence_of :name, :email, :password
  validates_format_of :name,
    :with => /^\\w+$/,
    :message => "may only contain word characters"
  validates_uniqueness_of :name,
    :message => "is already in use"
  validates_length_of :password,
    :within => 4..40
  validates_confirmation_of :password
  validates_inclusion_of :role,
    :in => %w(super admin user),
    :message => "must be super, admin, or user",
    :allow_nil => true
  validates_presence_of :customer_id,
    :if => Proc.new { !%w(admin user).include?(u.role) }
  validates_numericality_of :weight,
    :only_integer => true,
    :allow_nil => true
end
```



# ACTIVE RECORD CALLBACKS



# CALLBACK SEQUENCE



create	update	destroy
before_validation before_validation_on_create after_validation after_validation_on_create before_save before_create	before_validation before_validation_on_update after_validation after_validation_on_update before_save before_update	before_destroy
<i>create operation</i>	<i>update operation</i>	<i>destroy operation</i>
after_create after_save	after_update after_save	after_destroy

# THREE COMMON WAYS TO DEFINE CALLBACKS

```
# 1. Defining a method  
def before_save  
  # encrypt password here  
end
```

```
# 2. Referring to a method via a symbol  
before_save :encrypt_password
```

```
# 3. With a Proc object  
before_save Proc.new { |object| ... }
```



# BEFORE\_SAVE EXAMPLE

```
class User < ActiveRecord::Base
  before_save :encrypt_password

  private
  def encrypt_password
    return if password.blank?
    if new_record?
      self.salt = Digest::SHA1.hexdigest("--#{Time.now.to_s}--#{login}--")
    end

    self.crypted_password = encrypt(password)
  end
end
```

# AFTER\_SAVE EXAMPLE

```
class Comment < ActiveRecord::Base
  belongs_to :user

  def after_save
    user.ferret_update
  end

  def after_destroy
    user.ferret_update
  end
end
```



# OBSERVERS

```
class AuditObserver < ActiveRecord::Observer
  observe Order, Payment, Refund

  def after_save(model)
    model.logger.info("Audit: #{model.class.name}
      #{model.id} created")
  end
end

# List your observers in config/environment.rb
config.active_record.observers =
  :order_observer, :audit_observer
```

# AFTER\_FIND AND AFTER\_INITIALIZE: MUST BE METHODS

```
def after_find  
end
```

```
def after_initialize  
end
```



# ACTIONVIEW FORMS



# HOW FORMS WORK

Form helpers => HTML => params =>  
ActiveRecord validate + save

```
<% form_tag(:action => 'update', :id => @user} do %>
  <%= text_field 'user', 'email' %>
<% end %>
```

```
<form action="/admin/users/update/1" method="post">
  <input id="user_email" name="user[email]" />
</form>
```

```
params = {:user => {:email => "joe@user.com"}}
```

```
@user = User.find(params[:id])
@user.update_attributes(params[:user])
```



# FORM\_FOR - WRAPPING MODEL OBJECTS

```
<%= error_messages_for :user %>
```

```
<% form_for :user, @admin_user,  
  :url => {:action => 'save'},  
  :html => {:class => 'admin_form', :multipart => true} do |f| -%>
```

```
  <%= f.text_field :email %>
```

```
  <%= text_area :user, 'bio' %>
```

```
  <%= submit_tag 'Sign up' %>
```

```
<% end -%>
```

# FORMS WITH MULTIPLE OBJECTS: FIELDS\_FOR

```
<% form_for :company do |f| -%>
  <%= f.text_field :name %>
  <%= f.text_area :description %>

  <fieldset>
    <legend>Product</legend>
    <%= error_messages_for :product %>
    <% fields_for :product do |p| %>
      <%= p.text_field.name %>
    <% end %>
  </fieldset>

  <%= submit_tag 'Sign up' %>
<% end -%>
```



# PROCESSING MULTIPLE OBJECT FORM SUBMISSION

```
def create
  @company = Company.new(params[:company])
  @product = Product.new(params[:product])

  Company.transaction do
    @company.save!
    @product.save!
    redirect_to :action => :show, :id => @company
  end
rescue ActiveRecord::RecordInvalid => e
  @product.valid? # Force validation as it may not have been validated
  render :action => :new
end
```

# FORM\_HELPER.RB

```
fields_for :permission, @person.permission do |fields| ...
```

```
text_field("post", "title", "size" => 20)
```

```
password_field
```

```
hidden_field
```

```
file_field
```

```
text_area("post", "body", "cols" => 20, "rows" => 40)
```

```
check_box("post", "validated") # => 0/1 booleans
```

```
radio_button("post", "category", "rails")
```



# SELECT BOXES

```
<% form_for :user do |form| %>
  <%= form.select(:name,
    %w{ Andy Bert Chas Dave Eric Fred }) %>

  <%=
    @users = User.find(:all, :order => "name")
    form.collection_select(:name, @users, :id, :name)
  %>
<% end %>
```

# FORM\_OPTIONS\_HELPER.RB

```
select("post", "category",  
  Post::CATEGORIES, {:include_blank => true})
```

```
select("post", "person_id",  
  Person.find(:all).collect { |p| [ p.name, p.id ] })
```

```
select_tag "service[users][]",  
  options_for_select(User.find(:all, :order => 'name').  
    map { |u| [u.name, u.id] }, @service.users.map(&:id)),  
  {:multiple => "multiple", :size => 10, :id => 'users'}
```

```
collection_select('user', 'role_ids', @roles, :id, :name,  
  {}, :multiple => true)
```

```
time_zone_select
```

```
country_select
```

```
option_groups_from_collection_for_select
```

```
<select name="addressgroup[address_ids][]" multiple="multiple">
```



# DATE\_HELPER.RB

```
distance_of_time_in_words(from_time, to_time)
time_ago_in_words(from_time)
date_select("post", "written_on",
  :start_year => 1995, :use_month_numbers => true,
  :discard_day => true, :include_blank => true)
datetime_select("post", "written_on")
```

# CUSTOM FORM BUILDERS

```
class TaggedBuilder < ActionView::Helpers::FormBuilder
  # <p>
  # <label for="product_description">Description</label><br/>
  # <%= form.text_area 'description' %>
  #</p>
  def self.create_tagged_field(method_name)
    define_method(method_name) do |label, *args|
      @template.content_tag("p",
        @template.content_tag("label" ,
          label.to_s.humanize,
          :for => "#{@object_name}_#{label}") +
          "<br/>" + super)
    end
  end

  field_helpers.each do |name|
    create_tagged_field(name)
  end
end

ActionView::Helpers::Base.default_form_builder = TaggedBuilder
```



# FORM\_TAG\_HELPER.RB - WORKING WITH NON- MODEL FIELDS

```
<% form_tag('/upload', :multipart => true) do %>  
  ...  
<% end %>  
  
<%= form_tag %>  
  ...  
</form>
```

# FILE UPLOAD

```
class Fax < ActiveRecord::Base
  def fax_file=(fax_file_field)
    @fax_file_field = fax_file_field
    return if fax_file_field.blank? or fax_file_field.original_filename.blank?
    self.fax_file_name =File.basename(fax_file_field.original_filename) if !fax_file_field.original_filename.blank?
    self.fax_file_type =fax_file_field.content_type.chomp if !fax_file_field.content_type.blank?
  end

  def after_save
    write_fax_file
  end

  def after_destroy
    File.delete(self.fax_file_path) if File.exists?(self.fax_file_path)
  end

  def write_fax_file
    return if @fax_file_field.blank? or @fax_file_field.original_filename.blank?
    FileUtils.mkdir_p(File.dirname(self.fax_file_path)) if !File.exists?(File.dirname(self.fax_file_path))
    if @fax_file_field.instance_of?(Tempfile)
      FileUtils.copy(@fax_file_field.local_path, self.fax_file_path)
    else
      File.open(self.fax_file_path, "wb") { |f| f.write(@fax_file_field.read) }
    end
    @fax_file_field = nil
  end
end
```



# THERE IS A BETTER WAY: ATTACHMENT\_FU

```
class User < ActiveRecord::Base

  has_attachment :content_type => :image,
                 :storage => :file_system,
                 :max_size => 500.kilobytes,
                 :resize_to => '320x200>',
                 :thumbnails => { :thumb => '100x100>' }

  validates_as_attachment

end

<%= link_to image_tag(@user.public_filename(:thumb)),
  @user.public_filename %>
```

# ACTIVERECORD\_HELPER.RB

```
error_message_on "post", "title"  
error_messages_for "post"  
form("post")  
# => generate whole form, uses Post.content_columns
```



# STYLING ERROR MESSAGES

Customize the CSS styles #errorExplanation and .fieldWithErrors

```
ActionView::Base.field_with_error_proc =  
  Proc.new do |html_tag, instance|  
    "<div class=\"fieldWithErrors\">#{html_tag}</div>"  
  end
```

# FILTERS



# FILTERS

- Typically used to implement authentication and authorization. Can also be used for logging, compression, or just code reuse between actions
- There are before, after, and around filters
- `before_filter :authenticate, :except => [:rss]`
- `after_filter :log_access, :only => [:rss]`
- If a before filter returns false then the request is aborted

# AROUND FILTERS

```
class BlogController < ApplicationController
  around_filter :time_an_action
end
```

```
def time_an_action
  started = Time.now
  yield
  elapsed = Time.now - started
  logger.info("#{action_name} took #{elapsed} seconds")
end
```



# FILTER BLOCKS AND CLASSES

```
around_filter do |controller, action|  
  started = Time.now  
  action.call  
  elapsed = Time.now - started  
end
```

```
class TimingFilter  
  def filter(controller)  
    started = Time.now  
    yield  
    elapsed = Time.now - started  
  end  
end
```

```
around_filter TimingFilter.new
```

# FILTER INHERITANCE

- `skip_before_filter :authorize, :only => [:an_action]`
- `skip_filter :logging`



# VERIFICATION

```
verify :only => :post_comment,  
      :session => :user_id,  
      :add_flash => { :note => "You must log in to comment"},  
      :redirect_to => :index
```

```
verify :method => :post,  
      :only => [:destroy, :create, :update],  
      :redirect_to => { :action => :list }
```



# CACHING



# CACHING

- Rails provides three types of caching: page, action, and fragment caching
- Page caching creates whole html pages under public that get served by the web server without Rails
- Action caching caches only the output of an action. Filters (i.e. authentication) still get run
- You can use Memcached with plugins such as Cached Model and Cache Fu to cache some or all of your database queries

# CACHE DECLARATIONS AND CONFIGURATION

- `caches_page :public_content`
- `expire_page :action => 'public_content'`
- `caches_action :premium_content`
- `expire_action :action => 'premium_content', :id => 2`
- `config.action_controller.perform_caching = true`



# CACHE STORAGE

- Can store fragments in file system, DRb, memcached
- If you have multiple servers and store in the file system you need to setup a shared network drive
- Page caches are always kept as HTML files under the public directory and needs sharing across servers as well

# CACHE SWEEPERS

```
class ArticleSweeper < ActionController::Caching::Sweeper
  observe Article

  def after_create(article)
    expire_public_page
  end

  def after_update(article)
    expire_article_page(article.id)
  end

  def after_destroy(article)
    expire_public_page
    expire_article_page(article.id)
  end

  private
  def expire_public_page
    expire_page(:controller => "content", :action => 'public_content')
  end
  def expire_article_page(article_id)
    expire_action(:controller => "content",
                  :action => "premium_content",
                  :id => article_id)
  end
end
```



# CACHE SWEEPER DECLARATION

```
class ContentController < ApplicationController
  cache_sweeper :article_sweeper, :only =>
    [ :create_article, :update_article, :delete_article ]
end
```

# FRAGMENT CACHING

- Fragment caching is used for pages where only certain parts (fragments) should be cached whereas other parts should be dynamic
- Parts of the page that should be cached are included in a `<% cache do %> ... <% end %>` block.
- The cache method can take a hash of options to identify the fragment, i.e. `<% cache(:action => 'list', :part => 'articles') %>`
- You expire cached fragments with an invocation such as `expire_fragment(:action => 'list', :part => 'articles')`



# FRAGMENT CACHE STORAGE

- Fragment caches can be stored in files, in memory (for single server), on a DRb server, or in memcached
- You configure storage with the parameter `ActionController::Base.fragment_cache_store` in `config/environement.rb`
- See `fragment_store_setting_test.rb` and `caching.rb` in the Rails sources for more details about cache storage and caching in general.



AJAX



# AJAX - INTRODUCTION

- AJAX stands for Asynchronous JavaScript and XML
- AJAX uses an XMLHttpRequest object that does HTTP requests in the background. This avoids full page reloads and instead update parts of the page. This makes the application more responsive and interactive.
- Rails ships with two AJAX JavaScript libraries: Prototype and Scriptaculous. Prototype makes remote requests and interacts with the DOM. Scriptaculous uses Prototype to generate visual effects, auto completion, drag-and-drop etc.

# WHAT CAN WE USE AJAX FOR?

- Post something in the background and add it to a list on the page
- In-Place form editing
- Autocompletion of a text field
- Drag-and-drop sortable lists
- Live searching



# ACTIONVIEW::HELPERS:: PROTOTYPEHELPER

```
link_to_remote(name, options = {}, html_option = {})  
periodically_call_remote(options = {})
```

```
form_remote_tag(options = {}, &block)  
remote_form_for(object_name, *args, &proc)  
submit_to_remote(name, value, options = {})
```

```
remote_function(options)
```

```
observe_field(field_id, options = {})  
observe_form(form_id, options = {})
```

# ACTIONVIEW::HELPERS:: SCRIPTACULOUSHELPER

```
visual_effect(name, element_id = false, js_options = {})  
sortable_element(element_id, options = {})  
draggable_element(element_id, options = {})  
drop_receiving_element(element_id, options = {})
```



# ACTIONVIEW::HELPERS:: JAVASCRIPTMACROSHelper

# Note: this helper module will be moved out of Rails with 2.0 and  
# end up in a plugin

```
in_place_editor(field_id, options = {})
in_place_editor_field(object, method, tag_options = {},
  in_place_editor_options = {})
auto_complete_field(field_id, options = {})
auto_complete_result(entries, field, phrase = nil)
text_field_with_auto_complete(object, method,
  tag_options = {}, completion_options = {})
```

# AJAX LINKS AND FORMS

```
link_to_remote("Destroy", :url => {:action => 'destroy', :id => item},  
  :confirm => "Are you sure?"
```

```
link_to_function "Cancel", "$('create_form').hide();" 
```

```
link_to_function "Cancel" do |page|  
  page[object.dom_id("rate_link")].show  
  page[object.dom_id("rate")].hide  
end
```

```
<% form_remote_tag :url => {:action => 'update'} do %>  
  <%= hidden_field_tag "prompt[id]", @prompt.id %>  
  <%= render :partial => 'form', :locals => {:mode => 'edit'} %>  
  <%= submit_tag "Edit" %>  
<% end %>
```



# RJS

- RJS is a Rails Ruby API for generating JavaScript code that is sent back to the browser and executed there.
- RJS can be used inline in the action by passing the `:update` argument to the `render` command. Alternatively you can use an RJS template file with the ending `.rjs` for your action.
- RJS is especially useful when you need to update several parts of the page.

# EXAMPLE: POSTING A COMMENT: THE VIEW

# In your .rhtml view:

```
<% form_remote_tag
  :url => {:controller => "comments", :action => "create", :id => user},
  :html => { :id => "comment_form"},
  :before => "$('spinner').show()",
  :complete => "$('spinner').hide()" do %>
  <%= text_area "comment", "body", :cols => 80 %><br/>
  <%= submit_tag 'Submit' %>
<% end %>
```

# The form tag generated by form\_remote\_tag:

```
<form action="/comments/create/1" id="comment_form" method="post" onsubmit="$
('spinner').show(); new Ajax.Request('/comments/create/1', {asynchronous:true,
evalScripts:true, onComplete:function(request){$('spinner').hide()}},
parameters:Form.serialize(this)); return false;">
```



# EXAMPLE: POSTING A COMMENT: THE CONTROLLER ACTION

```
def create
  @user = User.find(params[:id])
  @comment = @user.comments.build(params[:comment])
  @comment.creation_user_id = current_user.id
  if @comment.save
    render :update do |page|
      page.insert_html :bottom, 'comment_list', :partial => 'comment'
      page.visual_effect :highlight, @comment.dom_id
      page['comment_form'].reset
    end
  else
    render :update do |page|
      page.alert "Could not add comment for the following reasons:\n" +
        @comment.errors.full_messages.map{|m| "* #{m}"}.join("\n") +
        "\nPlease change your input and submit the form again."
    end
  end
end
```

# EXAMPLE: DELETING A COMMENT

# In your .rhtml view:

```
<div class="comment" id="<%= comment.dom_id %>">
  <p>
    Hey, nice photo!
  </p>
  <%= link_to_remote "Delete", :url => {:controller => "comments",
    :action => 'destroy', :id => comment},
    :confirm => "Are you sure you want to delete your comment?",
    :update => comment.dom_id %>
</div>
```

# The following HTML and JavaScript is generated by link\_to\_remote:

```
<a href="#" onclick="if (confirm('Are you sure you want to delete your comment?')) { new Ajax.Updater('comment-5-',
'/comments/destroy/5', {asynchronous:true, evalScripts:true}); }; return false;">Delete</a>
```

# The action in the controller. The innerHTML of the comment div is replaced with  
# nothing and thus the comment disappears from the page.

```
def destroy
  @comment = Comment.find(params[:id])
  assert_authorized
  @comment.destroy
  render :text => ''
end
```



# OPTIONS FOR REMOTE LINKS AND FORMS

## # Callbacks:

- :before - before request is initiated and before request object is created
- :after - request object's open method has not been called yet
- :loading - request has not been sent yet
- :loaded - request has been initiated
- :interactive - response is being received
- :success - response is ready and in 200 range
- :failure - response is ready and is not in 200 range
- :complete - response is ready

## # Other options

- :submit - id of a form to submit, can also be just a div with form elements
- :confirm - JavaScript confirm dialog before request
- :condition - JavaScript expression that must be true for request to happen

# SERVER RESPONSES TO AJAX REQUESTS

- nothing, just HTTP headers
- An HTML snippet to be injected into the page
- Structured data (JSON, XML, YAML, CSV etc.) to be processed with JavaScript
- JavaScript code to be executed by the browser.  
Typically generated with RJS.



# OPTIONS FOR UPDATING THE PAGE

- If the action returns HTML you can use the :update options which takes a DOM id where the HTML should be inserted. You can specify different DOM ids for success and failure: :update => { :success => 'list', :failure => 'error' }
- In conjunction with the :update options you can specify the :position option which says where the HTML should be inserted. Possible values are: :before, :top, :bottom, :after

# PROTOTYPE BASICS

- `$A(document.getElementsByTagName('a')).first()`
- `$H({'ren':'happy', 'stimp':'joy'}).keys()`
- `$('some_id').hide() | show() # instead of document.getElementById('some_id')`
- `$F('login') # The value of field input login`
- `$$('div#footer').invoke('hide') # CSS selector`
- `$$('a').each( function(element) { element.hide() })`



# EXAMPLE: AN AJAX SHOPPING CART

# In index.rhtml:

```
<% form_remote_tag :url => { :action => :add_to_cart, :id => product } do %>
  <%= submit_tag "Add to Cart" %>
<% end %>
```

# The action:

```
def add_to_cart
  product = Product.find(params[:id])
  @current_item = @cart.add_product(product)
  redirect_to_index unless request.xhr?
end
```

# The RJS template add\_to\_cart.rjs:

```
page.select("div#notice").each { |div| div.hide }
page.replace_html("cart", :partial => "cart", :object => @cart)
page[:cart].visual_effect :blind_down if @cart.total_items == 1
page[:current_item].visual_effect :highlight,
                                :startcolor => "#88ff88",
                                :endcolor => "#114411"
```

# RJS METHODS

```
# Position argument is one of :before, :top, :bottom, :after
page.insert_html :bottom 'todo_list', "<li>#{todo.name}</li>"
page.replace_html 'flash_notice', "Todo added: #{todo_name}"
page.replace 'flash_notice', :partial => 'flash', :object => todo

page[:flash_notice].remove|show|hide|toggle # page[:flash_notice] <=> $('flash_notice')

page.alert "The form contains the following errors: #{errors.join(" ", ")}"

page.redirect_to :controller => 'blog', :action => 'list'

page.assign 'cur_todo', todo.id # Assign a JavaScript variable
page.call 'show_todo', todo.id # Invoke a JavaScript method
page << "alert('Hello there!')" # Append raw JavaScript to be executed

# Available effects: :fade, :appear, :blind_up/down, :slide_up/down, :highlight,
# :shake, :pulsate, :fold etc.
page.visual_effect :pulsate, 'flash_notice'

page.delay(3) do
  page.visual_effect :fade, 'flash_notice'
end

page.select('p.welcome b').first.hide

page.select('#items li').each do |value|
  value.hide
end
```



# OBSERVING FORMS

```
<%= form_tag({:action => "search"}, {:id => 'search_form'}) %>
...
<%= observe_form('search_form',
  :url => {:action => 'search_count'},
  :frequency => 3,
  :condition => (@model_name == 'Contact' ?
    "!$('search_form').submitting && !contact_search_form_empty()" :
    "!$('search_form').submitting && !outlet_search_form_empty()"),
  :with => "search_form",
  :loading => "$('spinner').show();",
  :complete => "$('spinner').hide();") %>

<%= observe_field("show_hide_select",
  :url => { :action => 'toggle_column', :item_count => item_count },
  :with => "'column_name=' + value") %>
```

# EXAMPLE RESPONSE TO FORM CHANGE

```
# This is a search form where we want to display a preview of the number
# of search hits
def search_count
  query = params[:search_form][/^q=(.*)/, 1]

  if form_has_errors?
    render :update do |page|
      page.alert(@form_errors.join("\n"))
    end and return
  end
  ...
  render :update do |page|
    page["search_count_preview"].show
    page["search_count_preview"].replace_html :partial => '/mcm/search/
search_count_preview'
    page.visual_effect :highlight, "search_count_preview"
    if @search_count > 0
      page.mcm.set_color("search_count_preview", "green")
    else
      page.mcm.set_color("search_count_preview", "red")
    end
  end
end
end
```



# OPTIONS FOR OBSERVERS

- |                         |  |
|-------------------------|--|
| <code>:url</code>       | - url_for style options for URL to submit to                               |
| <code>:function</code>  | - JavaScript function to invoke instead of remote call                     |
| <code>:frequency</code> | - seconds between updates, if not set <code>:on</code> => 'change' is used |
| <code>:update</code>    | - dom id of element to update with response                                |
| <code>:with</code>      | - parameter to submit, defaults to value                                   |
| <code>:on</code>        | - event to observe: changed, click, blur, focus...                         |

# DASHED DOM ID PLUGIN

- When we write AJAX applications we rely heavily on DOM ids for referencing different parts of a page.
- The plugin provides a `dom_id` helper and method for ActiveRecord objects so that their DOM ids can be generated consistently across your application.
- `person.dom_id('name').split(/-/) # => ['person', '3', 'name']`



# THE SPINNER ICON

```
module ApplicationHelper
  def spinner_icon(id)
    %Q{}
  end

  def spinner_dom_id(id)
    dom_id(:spinner, id)
  end
end
```

# DRAG AND DROP

## EXAMPLE: THE REQUEST SIDE

# This example is about dragging books in list to a shopping cart in the menu bar.

# In index.rhtml

```
<li class="book" id="book_<%= book.id %>">
  ...book info here...
</li>
<%= draggable_element("book_#{book.id}", :revert => true) %>
```

# In application.rhtml

```
<div id="shopping_cart">
  <%= render :partial => "cart/cart" %>
</div>
<%= drop_receiving_element("shopping_cart", :url =>
  { :controller => "cart", :action => "add" }) %>
<% end %>
```



# DRAG AND DROP

## EXAMPLE: THE RESPONSE

```
# The action
def add
  params[:id].gsub!(/book_/, "")
  @book = Book.find(params[:id])

  if request.xhr?
    @item = @cart.add(params[:id])
    flash.now[:cart_notice] = "Added <em>#{@item.book.title}</em>"
    render :action => "add_with_ajax"
  elsif request.post?
    @item = @cart.add(params[:id])
    flash[:cart_notice] = "Added <em>#{@item.book.title}</em>"
    redirect_to :controller => "catalog"
  else
    render
  end
end

# add_with_ajax.rjs:
page.replace_html "shopping_cart", :partial => "cart"
page.visual_effect :highlight, "cart_item_#{@item.book.id}", :duration => 3
page.visual_effect :fade, 'cart_notice', :duration => 3
```

# AUTOCOMPLETION

- Auto completion of text fields can be done with the `auto_complete_field` tag.
- You can do fast client side JavaScript auto completion by using the `AutoCompleter.Local Scriptaculous` class. This is described in the Rails Recipes book.



# AUTOCOMPLETION: EXAMPLE

```
# In text field view:
<%= text_field 'user', 'favorite_language' %>
<div class="auto_complete" id="user_favorite_language_auto_complete"></div>
<%= auto_complete_field :user_favorite_language,
  :url=>{:action=>'autocomplete_favorite_language'}, :tokens => ', ',
  :frequency => 0.5,
  :min_chars => 3 %>

# The action
def autocomplete_favorite_language
  re = Regexp.new("^#{params[:user][:favorite_language]}", "i")
  @languages= LANGUAGES.find_all do |l|
    l.match re
  end
  render :layout=>false
end

# The response view in autocomplete_favorite_language.rhtml
<ul class="autocomplete_list">
  <% @languages.each do |l| %>
    <li class="autocomplete_item"><%= l %></li>
  <% end %>
</ul>
```

# IN-PLACE-EDIT

```
# In the view
<div id="<%= dom_id(:email, :div) %>"><%= @user.email %></div>
<%= in_place_editor dom_id(:email, :div),
  :url => {:action => "set_user_email", :id => @user} %>

# In the controller
class UsersController < ApplicationController
  in_place_edit_for :user, :email
  ...
end

# WARNINGS
# 1) in_place_edit_for does *not* use validation
# 2) in_place_editor quotes the value edited. TODO: details on this

# Options:
# :rows, :cols, :cancel_text, :save_text, :loading_text, :external_control,
# :load_text_url
```



# GLOBAL AJAX HOOKS

```
# In public/javascripts/application.js. Will show the spinner whenever
# an AJAX request is in process.
Ajax.Responders.register({
  onCreate: function(){
    $('spinner').show();
  },
  onComplete: function() {
    if(Ajax.activeRequestCount == 0)
      $('spinner').hide();
  }
});
```

# DEGRADABILITY FOR WHEN THERE IS NO JAVASCRIPT

`form_remote_tag` will by default fall and submit to the AJAX URL. To submit to a different URL, you can specify `:html => {:action => {:action => 'some_action'}}`

You can get `link_to_remote` to make a normal GET request if there is no JavaScript with the `:href` HTML option.

In your actions you can give different responses depending on if the request is an AJAX request or not (using `request.xhr?`).



# RJS REUSE

```
module ApplicationHelper
  def replace_article(article)
    update_page do |page|
      page[:article].replace partial => :article, :locals => {:article => article}
    end
  end
end
```

```
def update
  @article = Article.find(:first)
  render :update do |page|
    page << replace_article(@article)
    page.highlight :article
  end
end
```

# BROWSER TOOLS

- Firebug and the Web Developer Extension for Firefox are great tools when working with AJAX. You can use Firebug Lite in other browsers (i.e. IE on windows)



# ROUTING

GOING BEYOND

:CONTROLLER/:ACTION/:ID



# ROUTES

- Routes are rules that map URLs to the params hash
- The params hash contains the controller and action to invoke
- Routes are defined in `config/routes.rb` and are applied in the order that they appear
- If no routes match 404 is returned
- The goal is pretty, human readable, and search engine friendly URLs



# ANATOMY OF A ROUTE

- `map.route_name 'url_pattern', params_hash`
- `map.user_list 'users', :controller => 'users', :action => 'list'`
- `map.home "", :controller => 'home'`
- `link_to "Home", home_url`

# DEFAULTS AND REQUIREMENTS

```
map.connect "blog/:year/:month/:day",  
  :controller => "blog",  
  :action => "show_date",  
  :requirements => { :year => /(19|20)\d\d/,  
    :month => /[01]?\d/,  
    :day => /[0-3]?\d/ },  
  :day => nil,  
  :month => nil
```



# SPLAT PARAMS

```
map.connect '*anything',  
  :controller => 'blog',  
  :action => 'unknown_request'
```

```
map.connect 'download/*path',  
  :controller => 'file'  
  :action => 'download'
```

# URL GENERATION

- ActionController::Base#**url\_for** generates a URL from the params hash
- **link\_to** and **redirect\_to** use url\_for



# ROUTES IN THE CONSOLE

```
rs = ActionController::Routing::Routes  
puts rs.routes  
rs.recognize_path “/store/add_to_cart/1”  
rs.generate :controller => ‘store’, :id => 123
```

# TESTING ROUTES

```
def test_movie_route_properly_splits
  opts = {:controller => "plugin", :action => "checkout", :id => "2"}
  assert_routing "plugin/checkout/2", opts
end
```

```
def test_route_has_options
  opts = {:controller => "plugin", :action => "show", :id => "12"}
  assert_recognizes opts, "/plugins/show/12"
end
```



REST



# REST - THE THEORY

- REST is an alternative to SOAP and is a way to add a web service API to your application.
- Representational State Transfer (REST) is an architecture for hypermedia system.
- The state of a system is divided into resources that are addressable with hyperlinks. All resources share a uniform interface with well defined operations. Connections between client and server are stateless.
- REST is designed to support scalability and decoupling.



# RAILS IMPLEMENTATION OF REST: CRUD

- Resources are typically ActiveRecord models and each model has a controller with seven actions: index, create, new, show, update, edit, destroy
- We are constrained to four types of operations: Create, Read, Update, and Delete (CRUD)
- The four operations correspond to the HTTP verbs GET, POST, PUT, DELETE
- In REST we strive to have associations be join models so that they can be exposed as resources.

# REST AND RAILS

## BUILDING BLOCKS

- Naming conventions for controllers and actions
- A set of URLs for the CRUD operations. URLs are resource IDs and not verbs.
- A set of named routes for the CRUD URLs (from `map.resources`)
- Using the the HTTP Accept header via the `respond_to` method and `ActiveRecord::Base#to_xml` to render a response.
- The `ActiveResource` Ruby client for consuming REST services. Modeled after `ActiveRecord`.



# MAP.RESOURCES :ARTICLES

Method	URL	Action	Helper
GET	/articles	index	articles_url
POST	/articles	create	articles_url
GET	/articles/new	new	new_article_url
GET	/articles/1	show	article_url(:id => 1)
PUT	/articles/1	update	article_url(:id => 1)
GET	/articles/1;edit	edit	edit_article_url(:id => 1)
DELETE	/articles/1	destroy	article_url(:id => 1)

# REST GIVES YOU NAMED ROUTES FOR FREE

```
# Named route helpers:
```

```
article_url
```

```
articles_url
```

```
new_article_url
```

```
edit_articles_url
```

```
# Old
```

```
link_to :controller => 'articles',  
        :action => 'destroy', :post => :true
```

```
# New
```

```
link_to articles_url(@article), :method => :delete
```



# THE ACCEPT HEADER AND EXTENSIONS

```
# The respond_to method will use the HTTP Accept header or  
# any suffix in the URL. So if the URL is /people/1.xml you  
# will get XML back:
```

```
# GET /posts/1  
# GET /posts/1.xml  
def show  
  @post = Post.find(params[:id])  
  
  respond_to do |format|  
    format.html # show.html.erb  
    format.xml { render :xml => @post }  
  end  
end
```

# CUSTOM REST ACTIONS

```
# Adding a new recent action for a collection
# GET /articles;recent, recent_articles_url
map.resources :articles, :collection => { :recent => :get }

# Adding an action for an individual resource
# PUT /articles/1;release release_article_url(:id => 1)
map.resources :articles, :member => { :release => :put }
```



# NESTED RESOURCES

```
# Nested resources are used for one-to-many relationships. Suppose we have  
# Post class with has_many :comments, and a Comment class with belongs_to :post.  
# The posts controller will be the parent of the comments controller. The  
# comments controller needs the post model of the parent.
```

```
map.resources :posts do |post|  
  post.resources :comments  
end
```

```
# Actions need to be rewritten to use the parent post object  
def index  
  # Old retrieval  
  # @comments = Comment.find(:all)  
  
  @post = Post.find(params[:post_id])  
  @comments = @post.comments.find(:all)  
end
```

```
# Links in the views need to be rewritten to include the  
# parent post:  
<%= link_to comment_url(@comment.post, @comment) %>
```

# SCAFFOLDING

# In Rails 1.2.X

```
script/generate scaffold_resource post title:string body:text published:boolean
```

# In Rails 2.0 (Edge Rails) scaffolding is restful by default:

```
script/generate scaffold post title:string body:text published:boolean
```



# CONSUMING REST

```
# You can any HTTP client to consume a REST service, such as curl or wget on the  
# command line, or Net::HTTP in your Ruby scripts.
```

```
# Using the ActiveRecord client:
```

```
# You need to to get activereource from Edge Rails for this to work, i.e.
```

```
# do rake rails:freeze:gems, svn co http://svn.rubyonrails.org/rails/trunk
```

```
# and cp -r activereource vendor/rails
```

```
class Post < ActiveRecord::Base
```

```
  self.site = "http://localhost:3000"
```

```
end
```

```
post = Post.find(1)
```

```
post.inspect
```

```
post.body = "new body"
```

```
post.save
```

# AUTHENTICATION

- The plugin `restful_authentication` provides basic HTTP authentication. It sets up a `login_required` before filter to all your actions that need authentication.



# ACTIONMAILER



# EMAIL CONFIGURATION

```
# In environment.rb or in config/environments/*. Defaults to :smtp
config.action_mailer.delivery_method = :test|:smtp|:sendmail
```

```
# Authentication is one of :plain, :login, and :cram_md5
```

```
ActionMailer::Base.server_settings = {
  :address => "mail.messagingengine.com",
  :port => 25,
  :domain => "mail.messagingengine.com",
  :authentication => :login,
  :user_name => "peter_marklund@fastmail.fm",
  :password => "...",
}
```

```
config.action_mailer.perform_deliveries = true | false
```

```
config.action_mailer.raise_delivery_errors = true | false
```

```
config.action_mailer.default_charset = "iso-8859-1"
```



# CREATING A MAILER

```
# Creates app/models/statistics_mailer.rb
script/generate mailer StatisticsMailer
```

```
class StatisticsMailer < ActionMailer::Base
  MONTHLY_SUBJECT = "Monthly call statistics"
  FROM_EMAIL = 'admin@somecompany.com'
  BCC_EMAILS = 'peter_marklund@fastmail.fm'

  def monthly(user, stats, sent_on = Time.now)
    @subject      = MONTHLY_SUBJECT
    @body         = {
      :user => user,
      :stats => stats
    }
    @recipients = user.email
    @from       = FROM_EMAIL
    @sent_on    = sent_on
    @headers    = {}
    @bcc        = BCC_EMAILS
    # content_type "text/html" # If we wanted to send HTML email
  end
end
```

# THE MAILER TEMPLATE

# In app/views/statistics\_mailer/monthly.rhtml

Dear <%= @user.name %>,  
here is the statistics for <%= @user.customer.name %> for <%=  
1.month.ago.strftime("%B") %>.

<%- for service in @user.customer.services -%>  
\*\*\* Service <%= service.name %>  
    Number of calls: <%= @stats[service.id]['n\_calls'] %>  
    Number of minutes: <%= @stats[service.id]['n\_minutes'] %>  
    Hour breakdown:  
        HTML: <%= hour\_report\_url %>  
        Excel: <%= hour\_report\_url + "?content\_type=excel" %>  
    List of all calls: <%= "#{Voxway::TAX\_URL}/admin/statistics/calls/  
#{service.id}?time\_period=last\_month" %>  
<%- end -%>

Regards

Peter Marklund



# SENDING EMAIL

```
StatisticsMailer.deliver_monthly(user, stats)
```

```
# Or, you can do:
```

```
email = StatisticsMailer.create_monthly(user, stats)
```

```
# Set any properties on the email here
```

```
email.set_content_type("text/html")
```

```
StatisticsMailer.deliver(email)
```

# MULTIPART EMAILS

```
# If we have several templates with the naming convention  
# mail_name.content.type.rhtml then each such template  
# will be added as a part in the email.
```

```
monthly.text.plain.rhtml  
monthly.text.html.rhtml  
monthly.text.xml.rhtml
```

```
# Alternatively we can use the part method within the  
# mailer delivery method  
def signup_notification(recipient)
```

```
  ...  
  part :content_type => "text/html",  
    :body => "body here..."  
  
  part "text/plain" do |p|  
    p.body = "body here..."  
    p.transfer_encoding = "base64"  
  end  
end
```



# ATTACHMENTS

```
class ApplicationMailer < ActionMailer::Base
  def signup_notification(recipient)
    recipients      recipient.email_address_with_name
    subject         "New account information"
    from            "system@example.com"

    attachment :content_type => "image/jpeg",
      :body => File.read("an-image.jpg")

    attachment "application/pdf" do |a|
      a.body = generate_your_pdf_here()
    end
  end
end
```

# RECEIVING EMAIL

```
class BulkReceiver < ActionMailer::Base
  def receive(email)
    return unless email.content_type == "multipart/report"
    bounce = BouncedDelivery.from_email(email)
    msg     = Delivery.find_by_message_id(bounce.original_message_id)
    msg.status_code = bounce.status_code
    msg.status = 'bounced' if bounce.status =~ /^bounced/
    msg.save!
  end
end
```

```
class ActionMailer::Base
  ...
  def receive(raw_email)
    logger.info "Received mail:\n #{raw_email}" unless logger.nil?
    mail = TMail::Mail.parse(raw_email)
    mail.base64_decode
    new.receive(mail)
  end
end
```

```
# Configure your mail server to pipe incoming email to the program
# /path/to/app/script/runner 'BulkReceiver.receive(STDIN.read)'
```



# UNIT TESTING MAILERS

```
def setup
```

```
  ActionMailer::Base.delivery_method = :test
  ActionMailer::Base.perform_deliveries = true
  ActionMailer::Base.deliveries = []
```

```
  @expected = TMail::Mail.new
  @expected.set_content_type "text", "plain", { "charset" => CHARSET }
  @expected.mime_version = '1.0'
```

```
end
```

```
def test_monthly
```

```
  user = users(:gordon)
  @expected.subject = StatisticsMailer::MONTHLY_SUBJECT
  @expected.from = StatisticsMailer::FROM_EMAIL
  @expected_admin_url = "#{Voxway::TAX_URL}/admin/statistics"
  @expected.body = ERB.new(read_fixture('monthly').join).result(binding)
  @expected.date = Time.now.beginning_of_year
  @expected.to = user.email
  @expected.bcc = StatisticsMailer::BCC_EMAILS
```

```
  stats = [services(:smhi), services(:smhi2)].inject({}) { |stats, service|
stats[service.id] = service.stats; stats }
```

```
  assert_equal @expected.encoded.strip,
    StatisticsMailer.create_monthly(user, stats, @expected.date).encoded.strip
end
```



# PLUGINS



# PLUGINS INTRODUCTION

- Plugins is the mechanism by which Rails applications share code with each other
- Often plugins add application specific functionality or extend Rails in some way
- There is an effort by Marcel Molina, Chad Fowler, and others to make plugins be gems in Rails 2.0

# FINDING PLUGINS

- [agilewebdevelopment.com/plugins](http://agilewebdevelopment.com/plugins) - has a searchable database containing pretty much all plugins
- Rick Olson's plugins at [svn.techno-weenie.net/project/plugins](http://svn.techno-weenie.net/project/plugins) are known to be high quality
- Rails core plugins are at: [dev.rubyonrails.org/svn/rails/plugins](http://dev.rubyonrails.org/svn/rails/plugins)



# CREATING PLUGINS

- Generate your plugin with `script/generate plugin`
- The files `install.rb` and `uninstall.rb` are hooks that run on `install/uninstall`
- The `init.rb` file should load the plugins modules and classes that are kept under `lib`. In `init.rb` you have access to special variables `config`, `directory`, `loaded_plugins`, and `name`.
- Rake tasks are under `tasks` and tests under `test`. You can run the tests with `rake` in the plugin root.

# CONTROLLERS, MODELS, AND VIEWS

```
# Note: deprecated in Edge Rails: use view_paths= and append/prepend_view_paths
class PluginController < ActionController::Base
  self.template_root = File.join(File.dirname(__FILE__), '..', 'views')
end

config.autoload_paths << File.join(File.dirname(__FILE__), 'lib', 'models')
```



# THE RAILS MODULE INCLUSION PATTERN

```
module MyPlugin
  def self.included(base)
    base.extend ClassMethods
    base.send :include, InstanceMethods
  end

  module InstanceMethods
    ...
  end

  module ClassMethods
    ...
  end
end

class ActiveRecord::Base
  include MyPlugin
end
```



# ACTIVESUPPORT



# ACTIVESUPPORT INTRODUCTION

ActiveSupport is a set of libraries that is used by all Rails components. It extends several core Ruby classes in useful ways.

# TO\_XML, TO\_JSON

```
u = User.find(1)
# Those methods are also available in Struct objects
puts u.to_xml
puts u.to_json # Creates a JavaScript hash

Hash.from_xml(xml_string) # => a Hash object
```



# ENUMERATIONS

```
groups = posts.group_by { |post| post.author_id }
```

```
us_states = State.find(:all)
```

```
state_lookup = us_states.index_by { |state| state.short_name }
```

```
total_orders = Order.find(:all).sum { |order| order.value }
```

```
total_orders = Order.find(:all).sum(&:value)
```

# STRING

```
string = "I Go Ruby"  
puts string.at(2)  
puts string.from(5)  
puts string.to(3)  
puts string.first(4)  
puts string.last(4)  
puts string.starts_with?("I")  
puts string.ends_with?("Perl")
```

```
count = Hash.new(0)  
string.each_char { |ch| count[ch] += 1 }
```

```
"person".pluralize  
"people".singularize  
"first_name".humanize # => First Name  
"i go ruby".titleize # => I Go Ruby
```



# NUMBERS

20.bytes  
20.megabytes

20.seconds  
20.hours  
20.months  
20.years

20.minutes.ago  
20.weeks.from\_now  
20.minutes.until("2007-12-01 12:00".to\_time)

# TIME AND DATE

```
time = Time.parse("2007-01-01 13:00")  
time.at_beginning_of_day  
time.at_beginning_of_week  
time.at_beginning_of_month
```



# UTF8

```
"ääö".size  
=> 6
```

```
"ääö".chars.size  
=> 3
```

```
"ääö".upcase  
=> "ääö"
```

```
"ääö".chars.upcase.inspect  
=> #<ActiveSupport::Multibyte::Chars:0x33589c0 @string="ÅÄÖ">
```

```
"ääö".chars.upcase.to_s  
=> "ÅÄÖ"
```



# RAILS 2.0



# RAILS 2.0

- No radical changes, mostly polishing
- Better REST support
- New breakpoint mechanism that works with Ruby 1.8.5
- HTTP authentication support
- HTTP performance and ActiveRecord caching
- Deprecated code is removed

# WHAT'S NEW IN EDGE

## RAILS: RYANDAIGLE.COM

- \* RESTful URL helper  
`category_article_url(@category, @article) -> url_for([@category, @article])`
- \* New database rake tasks: `db:drop` and `db:reset`
- \* `validates_numericality_of` pimped  
Now takes args: `:greater_than`, `:equal_to`, `:less_than`, `:odd`, `:even`
- \* A more flexible `to_xml`  
`user.to_xml(:except => [:id, :created_at], :include => :posts)`
- \* Object transactions are out but there is a plugin  
No more `Account.transaction(from, to) do ... end` with object state rollback
- \* Code annotations: `FIXME`, `TODO`, `OPTIMIZE`  
List annotations with rake notes
- \* Accessing custom helpers  
By default `ApplicationController` now has helper `:all`
- \* Better organization of `environment.rb`  
You can modularize initialization code and put it under `config/initializers`
- \* ActiveRecord caching  
`ActiveRecord::Base.cache do .. end`
- \* New file extensions: `.erb` and `.builder`

... and much more!



# DEPLOYMENT



# HOSTING

- Most production Rails servers run on Unix - primarily Linux, but also FreeBSD, OpenSolaris, Mac OS X etc. You can deploy on Windows, but it's fairly unsupported and doesn't work with Capistrano.
- There is a multitude of hosting companies in the US specialized in Rails hosting such as Engine Yard, RailsMachine, Slicehost, Rimuhosting. In Europe there is HostingRails.com, brightbox.co.uk etc.
- Virtual Private Servers (VPS), typically on Xen, are becoming an increasingly popular hosting strategy



# FASTCGI

- FastCGI is a long running process that runs a Rails application and handles requests from a front-end web server like Apache or Lighttpd
- When Rails came out FastCGI was the recommended deployment setup. However, it turns out it is hard to debug and unstable in many cases and the community is moving away from it.

# MONGREL

- A light-weight web server written in Ruby
- Well documented, tested, stable and fast.
- Secure by being strict about the HTTP protocol



# TYPICAL MONGREL ARCHITECTURE

- There is a front-end web server that receives HTTP requests, such as Apache, Lighttpd, or Nginx. Any static files under the Rails public directory are served directly from this web server without touching Rails.
- There is a reverse proxy that load balances requests to the Mongrel servers. For Apache this is mod\_proxy\_balancer, for Lighttpd it is typically Pen, or Pound.
- There are one or more servers running multiple Mongrel servers (called Mongrel clusters).

# APACHE + MONGREL: EXAMPLE INSTALLATION

- Install Apache 2.2 with mod\_proxy\_balancer
- Install MySQL 5
- Install Ruby and RubyGems
- Install MySQL/Ruby driver
- Install Ruby gems: rake, rails, termios, capistrano, mongrel, mongrel\_cluster
- There is the deprec gem that can automate all these installation steps on Ubuntu 6.06



# MONGREL ALTERNATIVE: LITESPEED

- LiteSpeed is a commercial web server that is optimized for speed and is configuration compatible with Apache
- LiteSpeed has its own API for acting as a Rails application server so Mongrel is not needed in the picture anymore
- LiteSpeed can handle load balancing and also restart application servers that are hung

# CAPISTRANO

- Capistrano is a Ruby tool used primarily to deploy Rails applications to one or more production servers
- Capistrano logs in to your production servers with SSH, updates the production code and restarts the servers automatically for you
- If something goes wrong you can do a rollback
- Capistrano is also an excellent generic tool for running sysadmin related scripts on your servers



# HOW TO USE CAPISTRANO

```
gem install -y capistrano # version 1.4.1 as of 12/7 2007
cd path_to_rails_app
cap --apply-to .
rm lib/tasks/capistrano.rake # The rake tasks are deprecated

# Edit deploy.rb
set :application, "community"
set :deploy_to, "/var/www/apps/#{application}"
set :domain, "community.marklunds.com"
set :user, "deploy"
set :repository, "svn+ssh://#{user}@#{domain}#/var/www/apps/marklunds/repos/community"

role :web, domain
role :app, domain
role :db, domain, :primary => true
role :scm, domain

# Setup directory structure on server
cap setup

# First deploy. Here we assume database is created and mongrel cluster config is set up.
cap cold_deploy
```

# CAPISTRANO TASKS

`show_tasks` # List all Capistrano tasks

`setup` # Sets up the Capistrano directories on the production server

`update`

`update_code`

`symlink`

`deploy`

`update`

`restart`

`migrate`

`deploy_with_migrations`

`cleanup`

`diff_from_last_deploy`

`disable_web`

`enable_web`

`rollback`

`rollback_code`

`restart`



# CUSTOM CAPISTRANO TASKS

```
def mongrel_cluster(command)
  "mongrel_rails cluster::#{command} -C #{current_path}/config/mongrel_cluster.yml"
end

%w(restart stop start).each do |command|
  task command.to_sym, :roles => :app do
    run mongrel_cluster(command)
  end
end

desc "Run pre-symlink tasks"
task :before_symlink, :roles => :web do
  copy_shared
  backup_db
  run_tests
end

desc "Clear out old code trees. Only keep 5 latest releases around"
task :after_deploy do
  cleanup
  sleep 5
  ping_servers
end

desc "Copy in server specific configuration files"
task :copy_shared do
  run <<-CMD
    cp #{shared_path}/system/voxway.rb #{release_path}/config &&
    cp #{shared_path}/system/database.yml #{release_path}/config
  CMD
end
```

# MORE CAPISTRANO TASKS

```
desc "Run the full tests on the deployed app."
task :run_tests do
  run "cd #{release_path} && RAILS_ENV=production rake && cat /dev/null > log/test.log"
end

desc "Clear out old sessions from the database"
task :clear_sessions, :roles => :db, :only => { :primary => true } do
  delete_sql = "DELETE FROM sessions WHERE updated_at < now() - 48*3600"
  run <<-CMD
    cd #{current_path} && ./script/runner 'ActiveRecord::Base.connection.delete("#{delete_sql}")'
  CMD
end

desc "Backup production database to local file. We want backups on several production servers in case one would crash."
task :backup_db, :roles => :app do
  prod = ::ActiveRecord::Base.configurations['production']

  max_age_files = 100 # Number of days to keep db backup files
  # We could use a date stamp like '$(date +"%d-%m-%y")' but we don't want to collect too many backup files
  backup_type = (ENV['FREQUENCY'] || "pre_deploy")
  run <<-CMD
    ruby -e "Dir['#{backup_dir}/*.dmp'].each { |file| File.delete(file) if (Time.now - File.mtime(file) > 3600*24*#{max_age_files}) }" && mysqldump #{mysql_options(prod)} --set-charset #{prod['database']} >
    #{backup_db_path}
  CMD
end
```



# CAPISTRANO 2.0

- New homepage at [capify.org](http://capify.org). Now command line tool `capify` (replaces `cap --apply-to`)
- Namespaces for tasks. Now deployment tasks are in the `:deploy` namespace
- Deployment strategies: set `:deploy_via :copy`
- New callback framework:  
before `:deploy`, `:record_revision`

# MYSQL AND CHARSETS

```
# Abort if database doesn't have right encoding configured
%w(character_set_database character_set_client character_set_connection).each do |v|
  ActiveRecord::Base.connection.execute("SHOW VARIABLES LIKE '#{v}'").each do |f|
    unless f[1] == "utf8"
      puts "ERROR: MySQL database isn't properly encoded"
      puts "Kindly set your #{f[0]} variable to utf8"
      RAILS_DEFAULT_LOGGER.error("MySQL database isn't properly encoded")
      exit 1
    end
  end
end
end
```



# GEM DEPENDENCIES

- It's a good idea to have as few external library dependencies for your Rails app as possible
- `rake rails:freeze:gems` puts Rails under the vendor dir
- You can freeze the Gem version of Rails by setting `RAILS_GEM_VERSION` in `environment.rb`
- You can make sure gems that your app depend on are present with declarations like “`gem 'RedCloth', '3.0.4'`” in your `environment.rb`

# DEPLOYMENT CHECKLIST

- Be alerted of server errors by installing the `exception_notification` plugin
- You can rotate your log files with `logrotate`
- Remember to clear out old sessions. Configure session storage in `environment.rb`, typically you'll want to use `:active_record_store`.
- Use a monitor/uptime service to make sure your site is up
- You might want to monitor your server with Nagios/Monit/FiveRuns or some other tool.



# SECURITY

- SQL Injection - always use bind variables in your SQL conditions
- Creating records directly from the params hash. Use **attr\_protected** or **attr\_accessible** to protect sensitive attributes
- Don't trust the ID parameter. Check permissions. Use the currently logged in user as a starting point.
- Remember that all public controller methods can be requested.
- HTML quote user input (CSS/XSS protection).
- Don't store sensitive information in the clear. Use `filter_parameter_logging :password`.

# PERFORMANCE I

- Use find with the :include option to avoid the N+1 query problem
- If you loop over objects with many attributes and you only need a few of them you can specify the ones you need with the :select option
- Monitor your log file for slow or unnecessary queries. You can use the query\_analyzer plugin to get queries analyzed in the log file. MySQL has a slow query log.
- Setup master-slave replication for your database and load balance the connections from Rails. There is the Magic Multi Connections plugin for this.



# PERFORMANCE II

- Use Memcached and the Cached Model or Cache Fu plugins to cache your database queries.
- Use the Rails Analyzer gem to get response time statistics for your actions and find the slowest ones.
- Use script/performance/profiler to profile parts of your code and see where most time is spent
- Cache expensive calculations within a request
- You can use Memcached or ActiveSupport::SessionStore for your sessions.
- Use the right number of Mongrels
- Use tools such as RailsBench and httpperf to measure performance

# SOUND ADVICE

Release early in the project and release often. Just like your application, your deployment doesn't need to be perfect from day one. You can start simple and grow into more sophisticated deployment strategies over time.

- paraphrased from James Duncan Davidson



# RESOURCES



# RECOMMENDED BOOKS

- “Agile Web Development with Rails”, 2nd edition, available as PDF
- “Programming Ruby”, 2nd edition, available as PDF. Get “Beginning Ruby” by Peter Cooper if you think “Programming Ruby” is hard to follow. “The Ruby Way” by Hal Fulton is a good complement to “Programming Ruby”. “The Ruby Cookbook” is similar and also pretty good. “Enterprise Integration with Ruby” is good.
- If you develop AJAX UIs: “Ajax on Rails” by Scott Raymond and (less important) “RJS Templates for Rails” by Cody Fauser
- Rails Recipes by Chad Fowler. Get the Advanced Rails Recipes book as soon as it comes out later this year. Expect great titles such as “Rails Deployment” from pragmaticprogrammer.com so get on their announcement mailing list.
- If you have a Java background I recommend “Rails for Java Developers” by Stuart Hallaway and Justin Gehtland.
- “Mongrel. Serving, Deploying, and Extending your Ruby Applications” by Zed Shaw. Solid introduction to Mongrel and describes how to set up Mongrel with Apache.



# VIDEOS AND AUDIO

- [PeepCode.com](http://PeepCode.com) - REST, AJAX, Prototype, Capistrano
- [podcast.rubyonrail.org](http://podcast.rubyonrail.org)
- [podcast.sdruby.com](http://podcast.sdruby.com)
- [rubyonrails.org/screencasts](http://rubyonrails.org/screencasts)
- [railscasts.com](http://railscasts.com)
- [bestechvideos.com/tag/ruby-on-rails](http://bestechvideos.com/tag/ruby-on-rails)
- Code Review with Jamis Buck and Marcel Molina:  
[mtnwestrubyconf2007.confreaks.com/session10.html](http://mtnwestrubyconf2007.confreaks.com/session10.html)
- Chad Fowler at skillsmatter: [skillsmatter.com/menu/479](http://skillsmatter.com/menu/479)

# WEBLOGS

[weblog.rubyonrails.com](http://weblog.rubyonrails.com)

[loudthinking.com](http://loudthinking.com)

[rubyinside.com](http://rubyinside.com)

[therailsway.com](http://therailsway.com)

[weblog.jamisbuck.com](http://weblog.jamisbuck.com)

[errtheblog.com](http://errtheblog.com)

[nubyonrails.com](http://nubyonrails.com)

[planetrubyonrails.org](http://planetrubyonrails.org)

[blog.caboo.se](http://blog.caboo.se)



# APPLICATIONS AND FRAMEWORKS

- Rick Olson has written the discussion forum app Beast, the Blog engine Memphisto, and numerous plugins. Rick's code tends to reflect Rails best practices.
- You can download the Depot application from the Agile Web Development with Rails book.
- The Hobo framework adds an application layer and templating language on top of Rails to allow for faster application development.



# PARTING WORDS OF ADVICE



# ADVICE

- Go with the flow. Stay on the golden path of Rails. Don't break conventions unless you really have to.
- Familiarize yourself with the Rails source code and tests.
- Write tests and give TDD and BDD a serious try
- Learn Ruby and master it.
- Get involved in the community. Somebody has probably come across and solved your problem already.