Progressive Rendering & Full Page Caching

George Ogata
Motivation
• Rails without streaming:
  http://www.youtube.com/watch?v=ihzcZGOeWkM

• Rails with streaming:
  http://www.youtube.com/watch?v=95DjSUk0JLU
How can we do this in Rails?
Template Streaming

http://github.com/oggy/template_streaming
What do you need to know?
Application
Middleware
Middleware
Middleware
Web Server
class App
  def call(env)
    ...
    [status, headers, body]
  end
end
```ruby
class Middleware
  def initialize(app)
    @app = app
  end
  def call(env)
    ...
    status, headers, body = @app.call(env)
    ...
    [status, headers, body]
  end
end
```
status, headers, body = app.call(env)
socket.print status_line(status)
socket.print header_lines(headers)
body.each do |chunk|
  socket.print chunk
end
class Controller
  def render(*args)
    end
  end
end
class Controller
  def render(*args)
    if streaming?
      # code
    else
      @body = render_now(*args)
    end
  end
end
class Controller
  def render(*args)
    if streaming?
      @body = StreamingBody.new do
        render_now(*args)
      end
    else
      @body = render_now(*args)
    end
  end
end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each
    @render.call
  end
end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each
    @render.call
    body.each do |chunk|
      socket.print chunk
    end
  end
end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each(&block)
    @render.call
  end
end

body.each do |chunk|
  socket.print chunk
end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each(&block)
    @push = block
    @render.call
  end
end

body.each do |chunk|
  socket.print chunk
end

end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each(&block)
    @push = block
    @render.call
  end

  def push(chunk)
    @push.call(chunk)
  end
end

body.each do |chunk|
  socket.print chunk
end
class StreamingBody
  def initialize(&block)
    @render = block
  end

  def each
    @render.call
  end
end

body.each do |chunk|
  socket.print chunk
end

def push(chunk)
  @push.call(chunk)
end

def flush
  chunk = @template.buffer.slice!(0..-1)
  @body.push(chunk)
end

body.each do |chunk|
  socket.print chunk
end
<% flush %>
Web Servers
body.each do |chunk|
  socket.print chunk
end
Thin
Thin

gem 'event_machine_flush'
EventMachineFlush.flush(connection)
HTTP/1.1 200 OK
Date: Tue, 17 May 2011 17:44:17 GMT
Content-Type: text/html
Content-Length: 265210

...
HTTP/1.1 200 OK
Date: Tue, 17 May 2011 17:44:17 GMT
Content-Type: text/html
Transfer-Encoding: chunked

123
...
...
4ab
...
...
Rack::Chunked
HTTP/1.1 200 OK
Date: Tue, 17 May 2011 17:44:17 GMT
Content-Type: text/html
Transfer-Encoding: chunked

123
...
...
4ab
...
...
<% cookies[:foo] = 'boo' %>
<% cookies[:foo] = 'boo' %>

<% session[:foo] = 'boo' %>
<% flash[:foo] = 'boo' %>
Client \rightarrow /\text{news} \rightarrow Server
Client

/news

Server

200 OK
ETag: abc123
...content...
Client /news Server
If-None-Match: abc123
Thursday, May 19, 2011
response.etag = MD5(body)
response.etag = MD5(body)
class ArticlesController < ApplicationController
  def show
    fresh_when etag: [@article, REVISION]
  end
end
class ArticlesController < ApplicationController
  def show
    fresh_when last_modified: @article.updated_at
  end
end
Client

Server
If-Modified-Since: Tue, 17 May 2011 17:44:17 GMT
HTTP request:

```
GET /news HTTP/1.1
Host: example.com
If-Modified-Since: Tue, 17 May 2011 17:44:17 GMT
```

HTTP response:

```
HTTP/1.1 304 Not Modified
```

Response diagram:
- Client
- Server
- /news
- If-Modified-Since: Tue, 17 May 2011 17:44:17 GMT
- 304 Not Modified
Reverse Proxy Caching
Cache

Server
Request → Cache → Server

/news
Request → Cache

/news

Server

200 OK

Last-Modified: Tue, 17 May 2011 17:44:17 GMT
Cache-Control: public
...content...
Request → Cache → Server

Response ← Cache ← Server

/news

200 OK

Last-Modified: Tue, 17 May 2011 17:44:17 GMT
Cache-Control: public
...content...
Request → Cache → Server
If-Modified-Since: Tue, 17 May 2011 17:44:17 GMT

Request → Cache → Server
/news
Request → Cache → Server

Response ← Cache ← Response

/news

200 OK

Last-Modified: Tue, 17 May 2011 17:45:55 GMT
Cache-Control: public
Max-Age: 600
...content...
Request → Cache → Server
If-Modified-Since: Tue, 17 May 2011 17:44:17 GMT

Request -→ Cache -→ Server

Stale

Response

/news

200 OK

Last-Modified: Tue, 17 May 2011 17:45:55 GMT

Cache-Control: public

Max-Age: 600

...content...
So I guess that means streaming is a complete waste of time...
Obstacles

- Personalization
- Dynamic content
Obstacles

• Personalization

• Dynamic content
Comic Books, Without The Nerd-Factor
Bergen Street Comics appeals to comic book-junkies and first timers alike
By Colin Jones  Dec 05
Read full article »
Comic Books, Without The Nerd-Factor
Bergen Street Comics appeals to comic book-junkies and first timers alike
By Colin Jones | Dec 05
Read full article »

Admin
Request → Cache

<esi:include src="/admin_menu"/>

Server
Request \rightarrow \text{Cache} \rightarrow \text{/admin_menu} \rightarrow \text{Server}

<esi:include src="/admin_menu" />
Obstacles

- Personalization
- Dynamic content
Obstacles

- Personalization
- Dynamic content
SEARCH RESULTS

SEARCH IN:
Announcements
Articles
Blog Posts
Classifieds
Events
Listings
Local Facts
Questions
Users

SEARCH
pets

Showing 1-10 of 49 results

SHOPPING, GIFTS & STATIONERY, SERVICES, PETS
Yuppy Puppy Pet Boutique
8104 Main St, Ellicott City, MD 21043
410-750-9663
Photos (13)

SERVICES, PETS, GROOMING
Happy Tails Pet Grooming
10176 Baltimore National Pike, Ellicott City, MD 21042
410-750-1170

CHARITABLE, FAMILY
Santa Photos with Your Pet
December 19, 2010, 11:00am–4:00pm
6501 Baltimore National Pike, Catonsville, MD

GROOMING
Silver Hydrant Pet Care Studio
9090 Frederick Rd, Ellicott City, MD 21042
410-461-2233

GOVERNMENT
Get Your Adopted Pet Microchipped for Free
By Wendy Goldband | Sep 7, 2010
All animals adopted from Howard County Animal Control will be microchipped for free at the time of their adoption. Come to the shelter
SEARCH RESULTS

SEARCH IN:
Announcements
Articles
Blog Posts
Classifieds
Events
Listings
Local Facts
Questions
Users

SEARCH FOR:
PETS

Showing 1-10 of 49 results
Sort by: Relevance | Date

SHOPPING, GIFTS & STATIONERY, SERVICES, PETS
Yuppy Puppy Pet Boutique
8104 Main St, Ellicott City, MD 21043
10-7, 8-9:30
photos

SERVICES, PETS, GROOMING
Happy Tails Pet Grooming
10176 Baltimore National Pike, Ellicott City, MD 21042
410-750-1170

CHARITABLE, FAMILY
Santa Photos with Your Pet
December 19, 2010, 11:00am–4:00pm
6501 Baltimore National Pike, Catonsville, MD

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9090 Frederick Rd, Ellicott City, MD 21042
410-461-2233

GOVERNMENT
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By Wendy Goldband | Sep 7, 2010
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STREAMING!
Modifying the Body
class ArticlesController
  stream

  def index
    @article = Article.paginate(params)
  end

  after_filter do
    mangle!(@response.body)
  end
end
class MangleResponse
  def initialize(app)
    @app = app
  end

  def call(env)
    status, headers, @body = @app.call(env)
    [status, headers, self]
  end

  def each
    @body.each do |chunk|
      yield mangle!(chunk)
    end
  end
end
Marin Girl Scouts Thank UC Berkeley Alpha Phi Sorority
Much thanks to Laura Campbell and UC Berkeley Alpha Phi...By Yal Lincroft | May 12
Read full announcement »

What Do You Have To Say?

James Leigh commented on: California Teachers Association Rally in San Francisco Civic Center Plaza
with the people who believe that we need a way to figure out merit pay for teachers, and how to remove problem teachers...
11:58 PM

Ira Sharenov commented on: California Teachers Association Rally in San Francisco Civic Center Plaza
Albert, I agree and I read the same thing. It is teacher performance that is critical and money is a lesser issue. Right now ...
09:06 PM

Chris Nicholson commented on: California Teachers Association Rally in San Francisco Civic Center Plaza
The unions are the problem. But for CTA propaganda, I actually think teachers would be more receptive to logical, objective ...
yesterday

Marissa Matthews answered: My friend knows the neighbor of the house. It is indeed a house and no he is not making into a hydroponics store. Dude lives there, always has always will. See the question

Business
House Hunt: Find Weekly Open Houses Here
Read full post »

Schools
School District Tackles Questions on Volunteer Policy
Read full post »

Sports
How to Get to Bay to Breakers
Read full post »

News
Bike To Work Day Brings Out Record Number of Cyclists
Read full post »

Arts
Last-Minute Poetry Duo Saves May Library Reading
Read full post »

Obituary
Granddaughter of Albert Einstein Remembered Sadly

Want to blog on Patch?
HTTP/1.1 200 OK
Date: Mon, 17 May 2011 17:44:17 GMT
Content-Type: text/html
Transfer-Encoding: chunked

... SHIT.
HTTP/1.1 200 OK
Date: Mon, 17 May 2011 17:44:17 GMT
Content-Type: text/html
Transfer-Encoding: chunked

...  
...  
...  
...  
...  

<div id="errors"> ... </div>
Baltimore City Council Live Blog
Follow what’s going on in tonight’s meeting live.
By Adam Bednar | yesterday
Read full article »

Three Local Teams to Host Quarterfinal IAAM Lacrosse...
Sale of Local Superfresh Stores on the Fast Track
North Baltimore Stories of the Week

What Do You Have To Say?

Submit
160 characters left
Oops, something has gone wrong!

Sorry, we didn't mean for this to happen. Please refresh this page or check back in a few minutes. If the problem persists, kindly let us know by sending your feedback.
Baltimore City Council Live Blog
Follow what’s going on in tonight's meeting live.
By Adam Bednar | yesterday
Read full article »

Three Local Teams to Host Quarterfinal IAAM Lacrosse... 
Sale of Local Superfresh Stores on the Fast Track 
North Baltimore Stories of the Week 

News

Local Voices
Patch Blogs
City Bar Catches Shellenberger’s Eye
class View
  def render(*)
    begin
      super
      rescue Exception => e
      
    rescue Exception => e
    end
  end
end
class View
  def render(*args)
    begin
      super
      rescue Exception => e
        log_error(e)
        notify(e)
    end
  end
end
class View
  def render(*args)
    begin
      super
      rescue Exception => e
        log_error(e)
        notify(e)
        request.env['errors'] << e
        ''
    end
  end
end
class Middleware
...

class BodyProxy
...

def each(&block)
    @body.each(&block)
    if env['errors'].present?
        yield render_errors(env['errors'])
    end
end
end
end
<html>
  <head>
    ...
  </head>
  <body>
    ...
  </body>
</html>

<div id="errors"> ... </div>
<html>
  <head>
    ... 
  </head>
  <body>
    ...
    <div id="errors"> ... </div>
  </body>
</html>
<html>
    <head>
        ...
    </head>
    <body>
        ...
        
        
        "">
        
        <script type="text/javascript">
            window.location = "/500.html"
        </script>
    </body>
</html>
<head>
<title><%= yield :title %></title>
</head>
<body>
  <%= yield %>
</body>

 <% content_for :title do %>
   My Great App
 <% end %>

Thursday, May 19, 2011
<head>
    <title>
        <%= t "titles.#{controller_name}.#{action_name}" %
    </title>
</head>
<body>
    <%= yield %>
</body>
en:
  titles:
    things:
      index: Things
      new: New Thing
      edit: Edit Thing
<head>
  <title><%= yield :title %></title>
</head>
<body>
  <%= yield %>
</body>

<% content_for :title do %>
  My Great App
<% end %>
<head>
  <title><%= yield :title %></title>
</head>
<body>
  <%= yield %>
</body>

<% provide :title do %>
  My Great App
<% end %>
<% yield :title %>
Content

<% provide :title do %>
  ...
<% end %>

Layout

<%= yield :title %>
Client Thresholds

- Internet Explorer: 255 bytes
- Safari: 1 kB
- Chrome: 2 kB
<head>
  ...
  <script type="text/javascript">
    function load_js(url) {
      ...
    }
    load_js('app.js');
  </script>
</head>
<body>
  ...
  ...
  ...
  ...
  ...
  ...
  appFunction();
</body>
<head>
  ...
  <script type="text/javascript">
    function load_js(url, callback) {
      ... }
    load_js('application', function() { inline(); });
  </script>
</head>
<body>
  ...
  ...
  ...
  ...
  ...
  window.inline = function() {
    appFunction();
  }
</body>
<head>
...
<script type="text/javascript">
function load_js(url, callback) {

load_js('application', function() {
  window.libLoaded = 1;
  if (window.inline) inline();
});
</script>
</head>
<body>

  
  
  
  

window.inline = function() {
  $('form').validate_on_submit();
}
if (window.libLoaded) inline();
</body>
<head>
  <title>My Great App</title>
</head>
<body>
  
  
  
  
  
  
  
  
  
  
  <div>Pretty Box</div>
  
  
  
  
</body>
<head>
  <title>My Great App</title>
  <style><%= yield :styles %></style>
</head>
<body>
  .
  .
  .
  <% content_for :styles do %>
    ...
  <% end %>
  <div>Pretty Box</div>
  .
  .
</body>
<head>
  <title>My Great App</title>
</head>
<body>
  .
  .
  .
  <style>
    ...
    ...
  </style>
  <div>Pretty Box</div>
  .
  .
</body>
<head>
  <title>My Great App</title>
</head>
<body>
  .
  .
  .
  <style>
  .
  <div>Pretty Box</div>
  .
  .
</body>
<head>
    <title>My Great App</title>
</head>
<body>

.<div>Pretty Box</div>
.

Browsers say: WHATEVVZ.

</body>
<head>
  <title>My Great App</title>
</head>
<body>
  <style scoped="box">
    ...
  </style>
  <div id="box">Pretty Box</div>
</body>
<head>
  <title>My Great App</title>
</head>
<body>
  .
  .
  .
  .
  .
  .
  <div style="...">Pretty Box</div>
  .
  .
  .
  .
  .
  .
</body>
Pick your evil

- Break HTML-compliance
- Use style attributes
Pick your evil

😊 NO INLINE STYLES 😊
The Future
Autoflushing
TemplateStreaming.autoflush = 50
<% html = render partial: 'tricky' %>
<%= "<div class='tricky'>#{html}</div>" %>
<% form_for @thing do |form| %>

<%= form.label :name %>
<%= form.text_field :name %>

...

<% end %>
<% form_for @thing do |form| %>

<% form.label :name %>
<% form.text_field :name %>

...

<% end %>
<% html = buffer do %>
   <% render partial: 'tricky' %>
<% end %>

<%= "<div class='tricky'>#{html}</div>" %>

Thursday, May 19, 2011
Non-HTML Streaming

{
  "repositories": [ 
    {
      "description": "Progressive rendering for Rails.",
      "name": "template_streaming",
      "url": "https://github.com/oggy/template_streaming",
      "owner": "oggy",
      ...
    },
    {
      "description": "Flush EventMachine::Connection output buffers immediately."
      "name": "event_machine_flush",
      "url": "https://github.com/oggy/event_machine_flush",
      "owner": "oggy",
      ...
    },
    {
      "description": "Rack hook which fires after the socket is closed."
      "name": "rack_after_reply",
      "url": "https://github.com/oggy/rack_after_reply",
      "owner": "oggy",
      ...
    },
    ...
  ]
}
Asynchrony
<% async ->{ Thing.paginate(params) } do |things| %>

...

<% end %>
Fragment Queue
Fragment Queue

Waiting

Waiting
Fragment Queue

Flush!

Waiting
• Streaming is here. Use it!
• Lessons:
  • Set your headers in the controller
  • Use a reverse proxy, stream what you can't cache
  • Use middleware to modify the body
  • Use i18n or provide for metadata
  • External JS goes in the head -- asynchronously!
  • Avoid inline styles, or pick your evil
  • Isolate rendering errors
• Streaming in Rails 3.1 is just the beginning
• Check out Template Streaming
• Think about where this should go
QUESTIONS!

George Ogata

github.com/oggy  george.ogata@gmail.com
THANKS!

• Cartoons by Jessica Walker <jess.ka.walker@gmail.com>
• Stream: http://www.flickr.com/photos/audreyjm529/235458062/
• Rails: http://www.flickr.com/photos/philliecasablanca/2051936659/
• House Bricks: http://www.flickr.com/photos/artbystevejohnson/4654013143/
• Cookies: http://www.flickr.com/photos/jayneandd/4078152188/
• The Great Omi: http://www.flickr.com/photos/pss/3035297341
• Even Faster Web Sites: http://oreilly.com/catalog/9780596522315