Selector-based View Composition

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What is SVC?

- Modification to Model-View-Controller (MVC) architecture
- Provides automatic progressive enhancement (Ajaxification) of web pages.

State of Ajax on the Web

- Allows interactivity
- Expected by users
- Only works if browser supports JavaScript

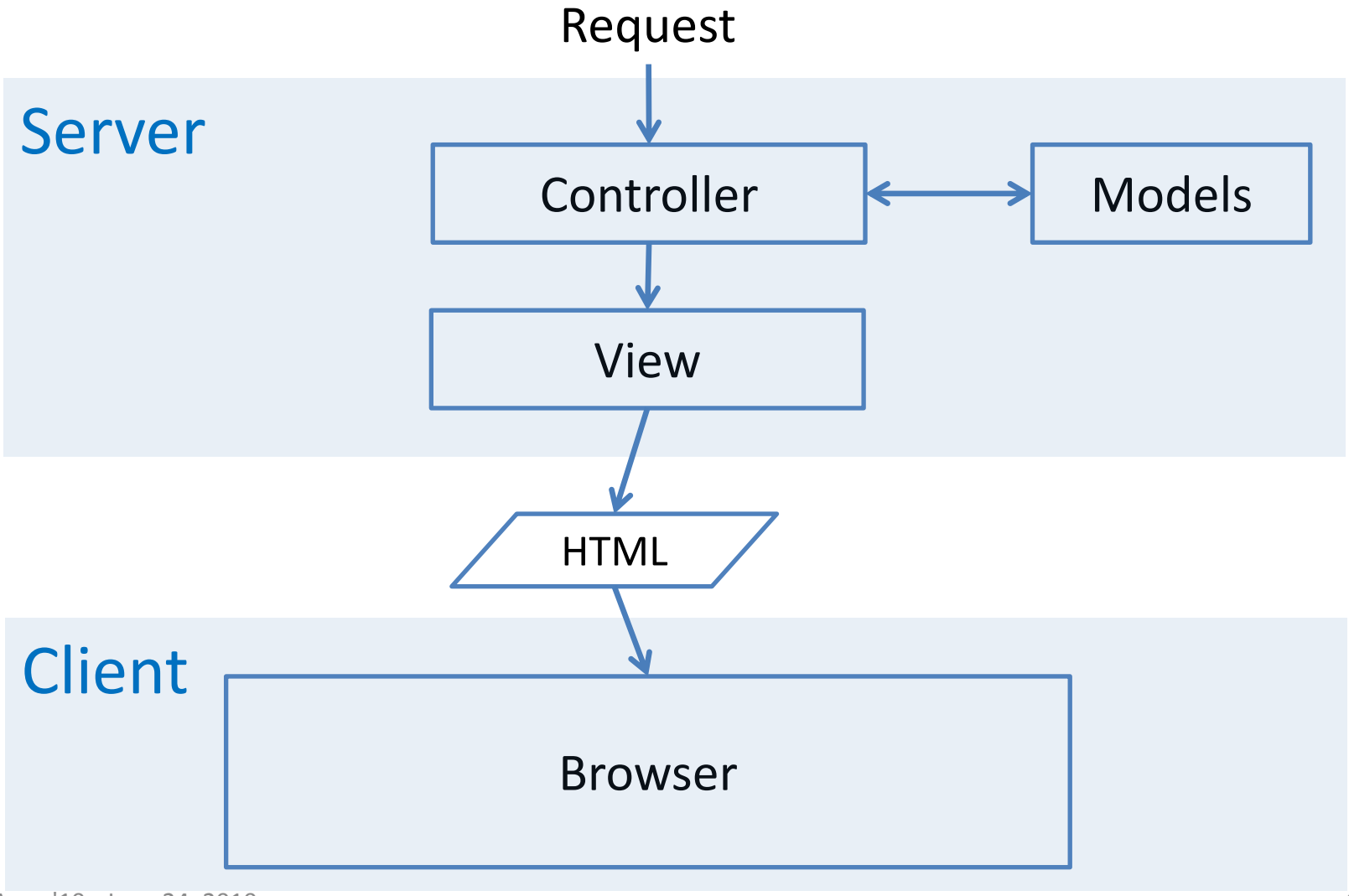
Ajax and Non-JavaScript Browsers

- Why support non-JavaScript browsers?
  - JS may be disabled
  - Users with disabilities
  - **Search engines**
  - Other annoyances if only JS supported
    - E.g., “Open in new tab” may not work

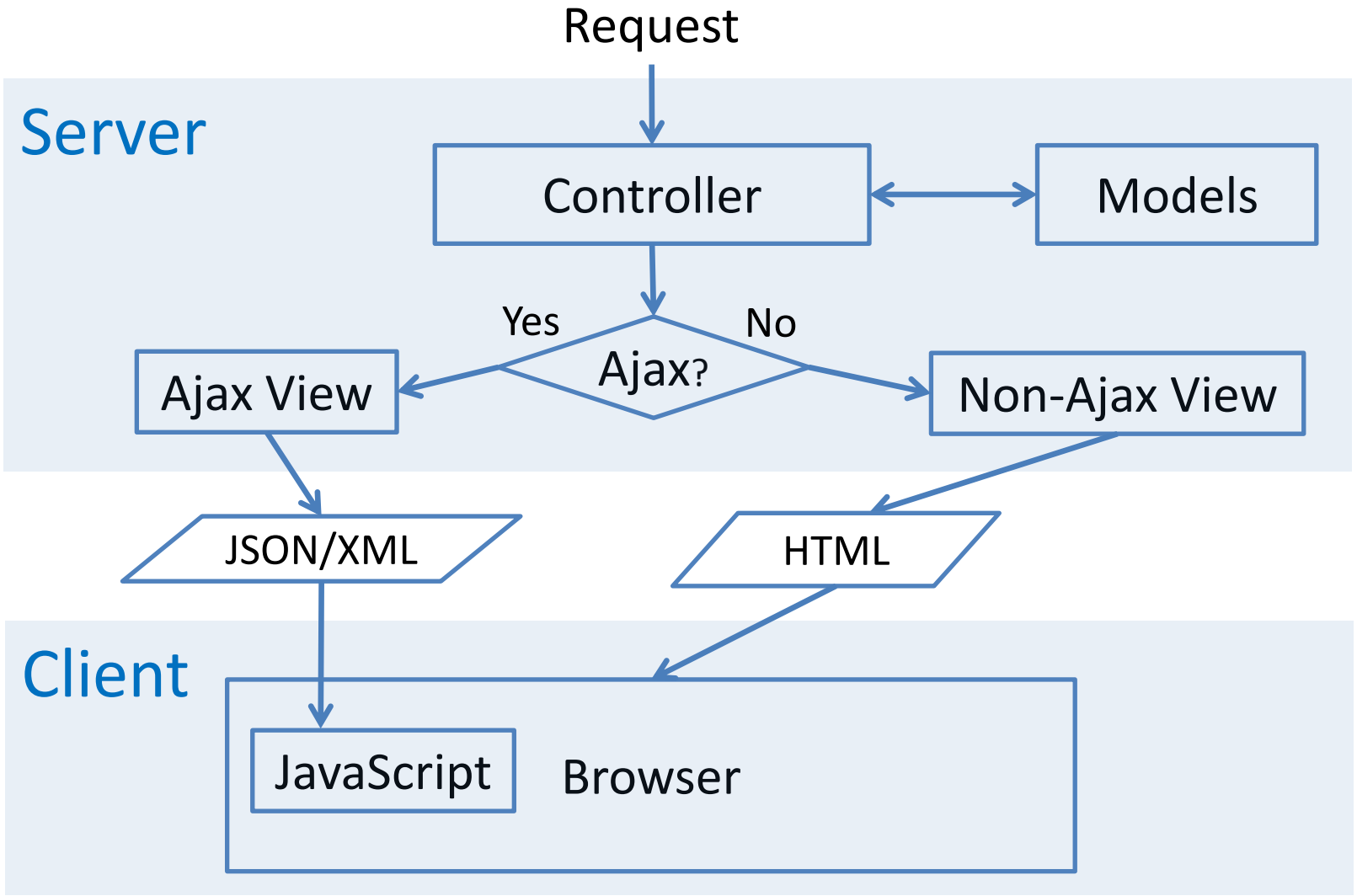
Progressive Enhancement

- Standard "best practice" for supporting both JS and non-JS browsers
- Idea:
  1. Create working, non-JS version of site
  2. Add JavaScript to "enhance site" by adding interactivity
- Difficult
  - All Ajax functionality needs to be duplicated

MVC before Progressive Enhancement



MVC after Progressive Enhancement



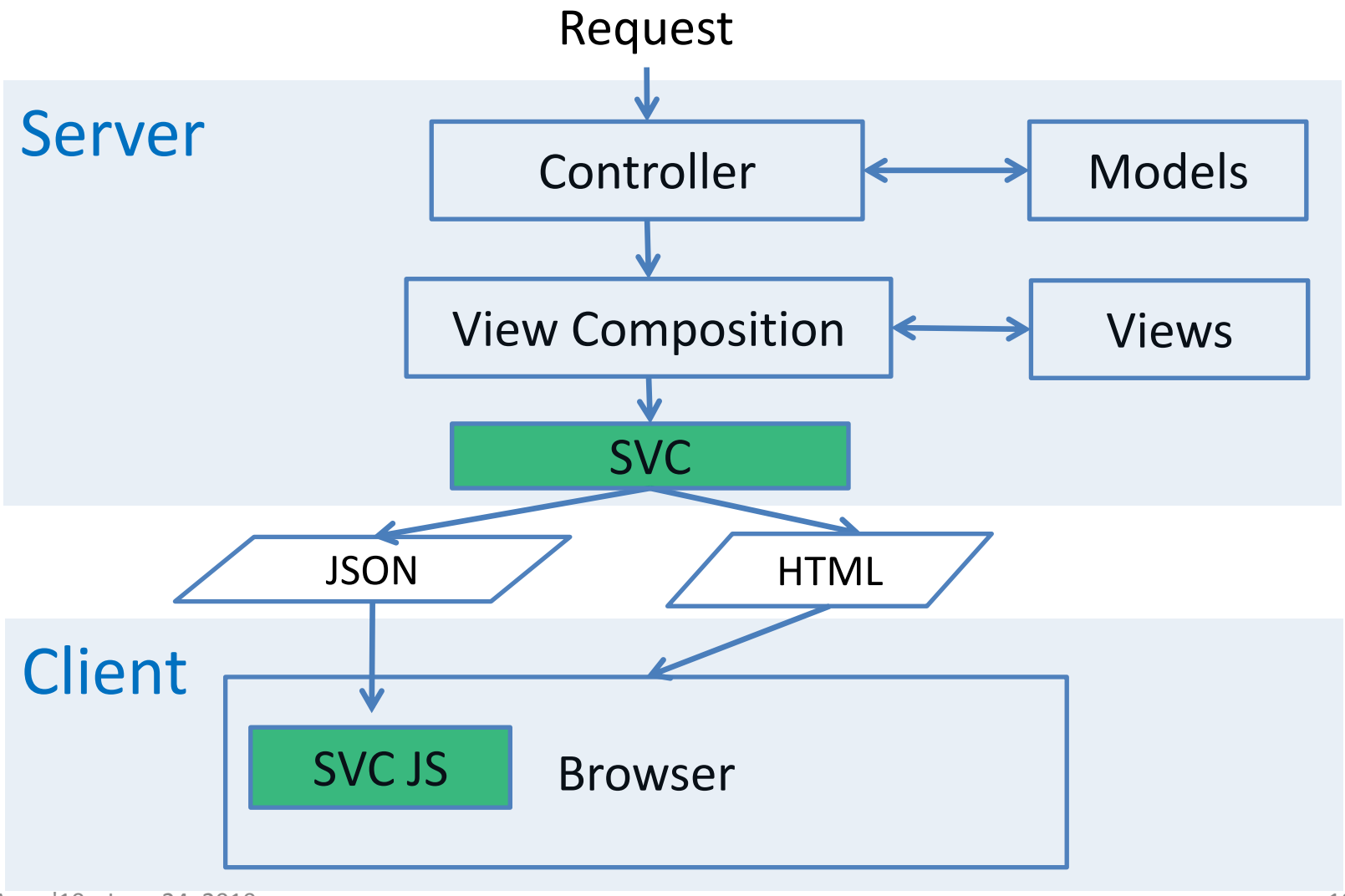
SVC

- Provided as server-side API
- API is used to *compose views* together
- (CSS) *selectors* are used to identify the point of composition
- Advantages:
  - Write view update code once
  - No need to write JavaScript (for actions supported by SVC)
  - Language agnostic
  - Existing template code and JavaScript unaffected

Why Selectors?

- Selectors, e.g.,
  - `#foo` (element with id "foo")
  - `.foo` (elements with class "foo")
  - `div > a` (select all 'a' elements that are children of 'div' elements)
- Familiar to developers (CSS)
- Becoming more common in JS frameworks
  - Closure, Dojo, jQuery, MooTools, Prototype, YUI

SVC


Request
Server
Controller
Models
View Composition
Views
SVC
JSON
HTML
Client
SVC JS
Browser

What does SVC look like?

```
$svc->initial('example'); // assume example is
                          //<p id="msg"></p>
$svc->text('#msg', 'My message');
$svc->addClass('p', 'highlight');
```

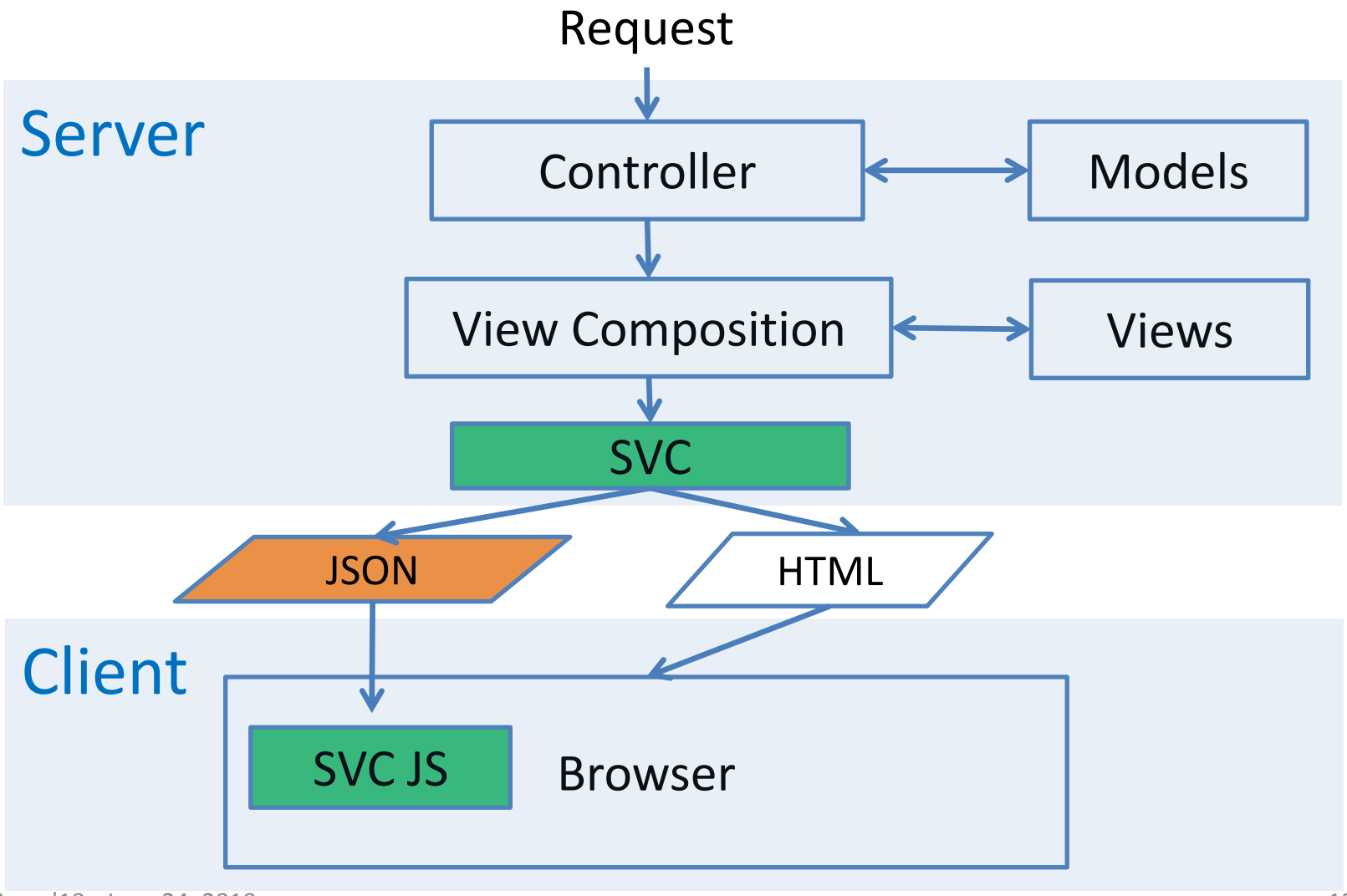
- Non-Ajax request response (HTML):

```
<p id="msg" class="highlight">My message</p>
```

- Ajax Request response (JSON)

```
[['text', ['#msg', 'My message']],
 ['addClass', ['p', 'highlight']]]
```

SVC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Browser

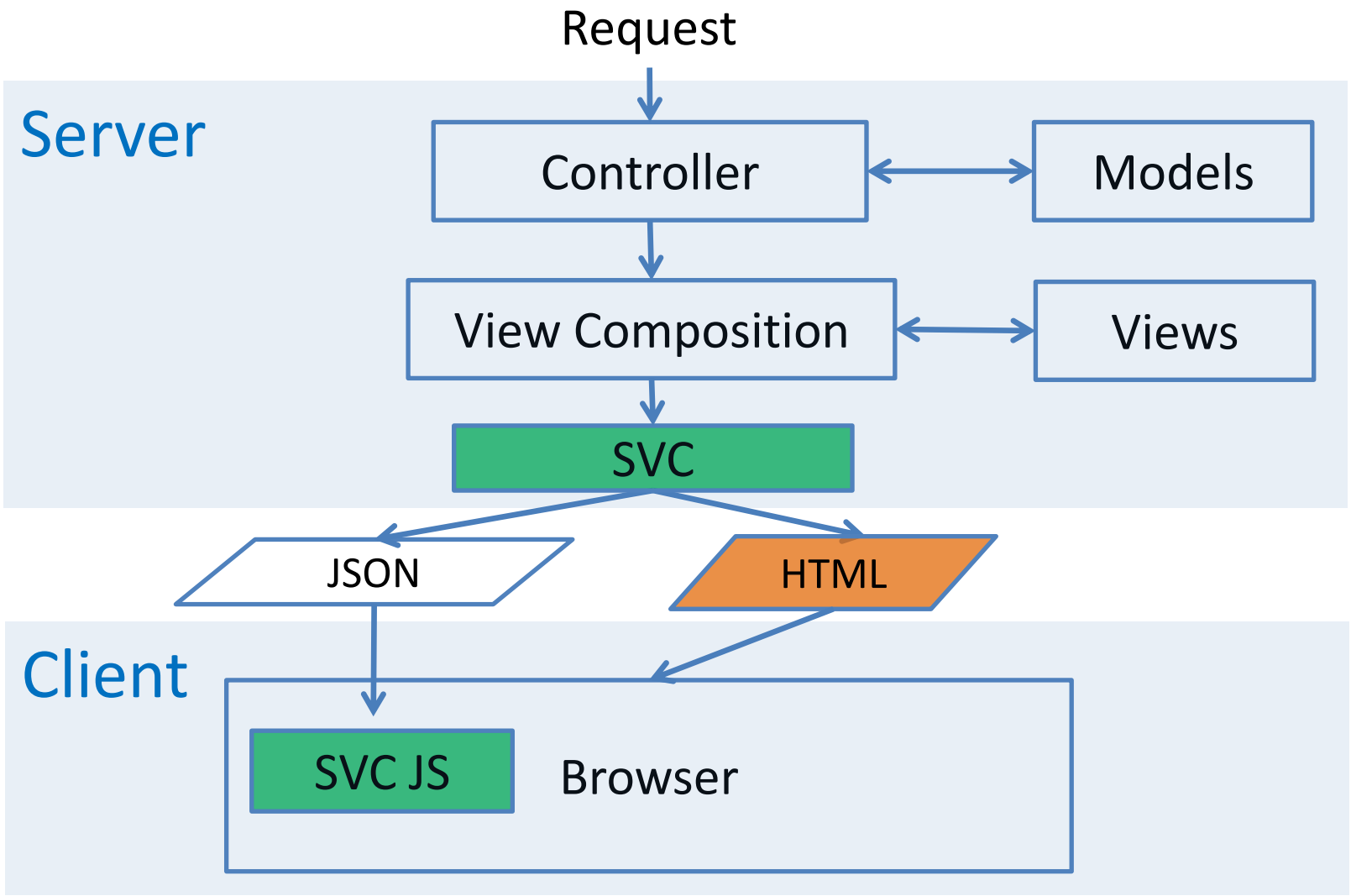
SVC Client-side JavaScript

- SVC client-side JS applies JSON to current document
- In previous example:

```
[['text', ['#msg', 'My message']],
['addClass', ['p', 'highlight']]]
```

  - Sets the text of any element with ID 'msg'
  - Adds class "highlight" to any paragraph tag.
- Size: 1.7KB, requires jQuery (could be written on top of other libraries as well)

SVC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How does SVC perform actions on server-side?

- JavaScript is used to update view on client-side, but what about server?
- Need to compose view on server-side for non-JS requests
  - Requires selector support and DOM manipulation
- Our version of SVC uses WebKit (WebCore)
  - Actions implemented in C++ extension to PHP

How does SVC Progressively Enhance?

- SVC can now respond to both Ajax and non-Ajax requests
- But how are Ajax requests generated?
- Developer has used SVC on server
- Writes HTML without JavaScript in mind (e.g., ...a href="/foo">Link)

How does SVC Progressively Enhance?

- On server-side, SVC adds the class "svc_rewrite" to any element which should use JavaScript to load request
- On client-side, SVC adds `onclick` or `onsubmit` event handlers to any element with the class "svc_rewrite"

When does SVC Progressively Enhance Pages?

- SVC does not know when loading a link using Ajax is appropriate
  - We do not want to transmit page to server to see if manipulating the DOM makes sense
- SVC provides API to define which links should be rewritten to use Ajax

```
$svc->rewrite('a', 'b')
```

(On page "b", rewrite all links to "a")

What can be done with SVC?

- We implemented the following actions:
  - addClass
  - append
  - attr
  - css
  - html
  - prepend
  - remove
  - removeClass
  - text

What can be done with SVC?

- SVC can be easily extended.
- Could be written once and distributed as SVC plugins
- Only requirement is that action can be performed on client and server.

How are Actions Added to SVC?

- Implement action on client and server.
- E.g., add `before` action
  - On server, use PHP or scripting language to perform update to view
  - On client, use JavaScript to perform equivalent action
  - SVC users can then call `before` in any of their code.

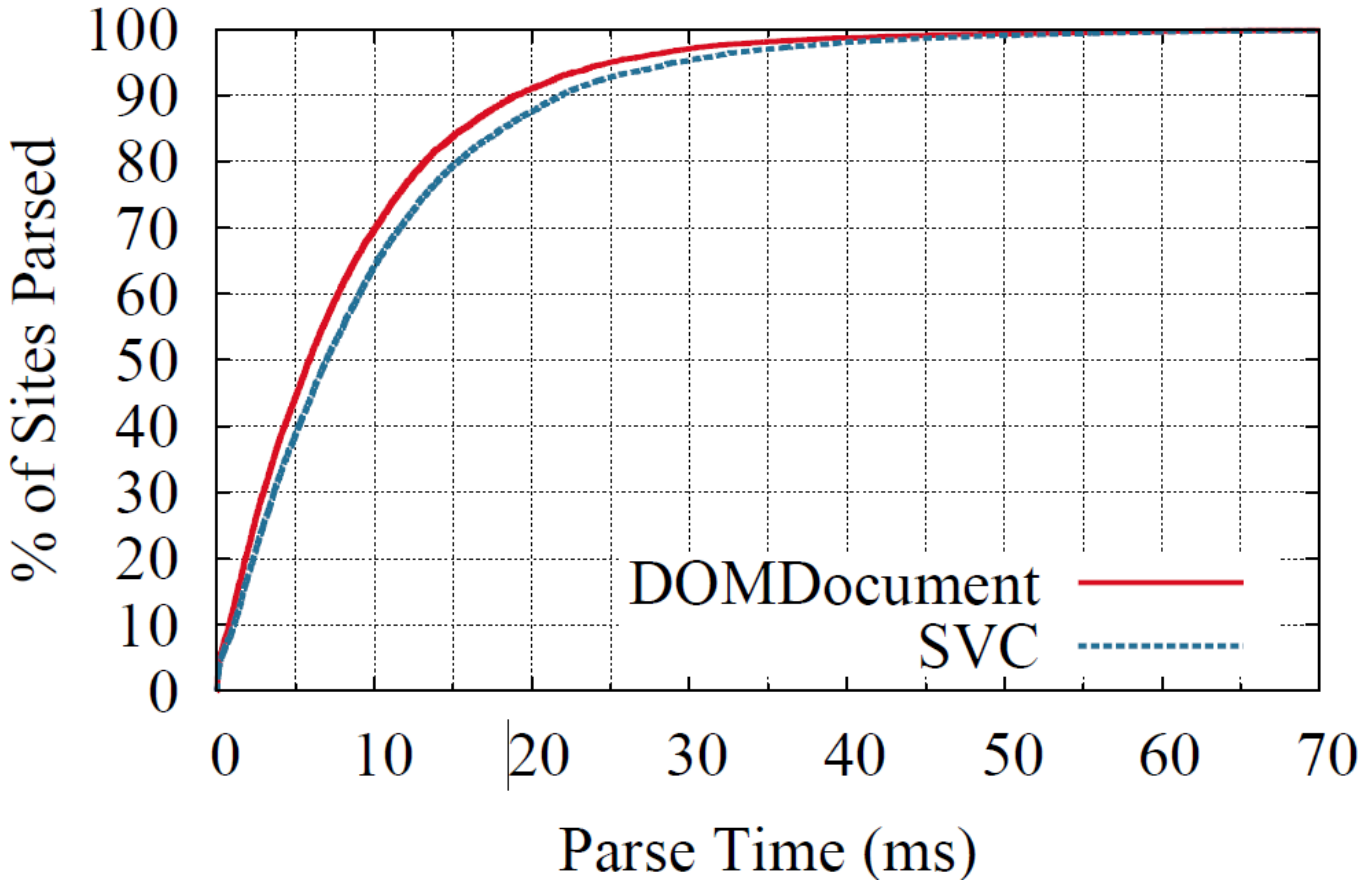
Adding non-DOM Actions to SVC

- Actions we've seen manipulate the DOM
- SVC actions not limited to DOM manipulation
  - Only requirement is to server/client equivalence
- E.g., redirect
  - On server, output HTTP header
  - On client, call window.location

SVC Overhead

- Non-Ajax requests (initial and non-JS requests)
  - Page needs to be constructed on server
  - Requires parsing, running selectors and actions
  - DOM output can be cached.
- Ajax requests
  - List of SVC actions sent directly to client
  - Modifications performed by client JS
  - Essentially no server overhead

SVC Server-side Parsing Overhead

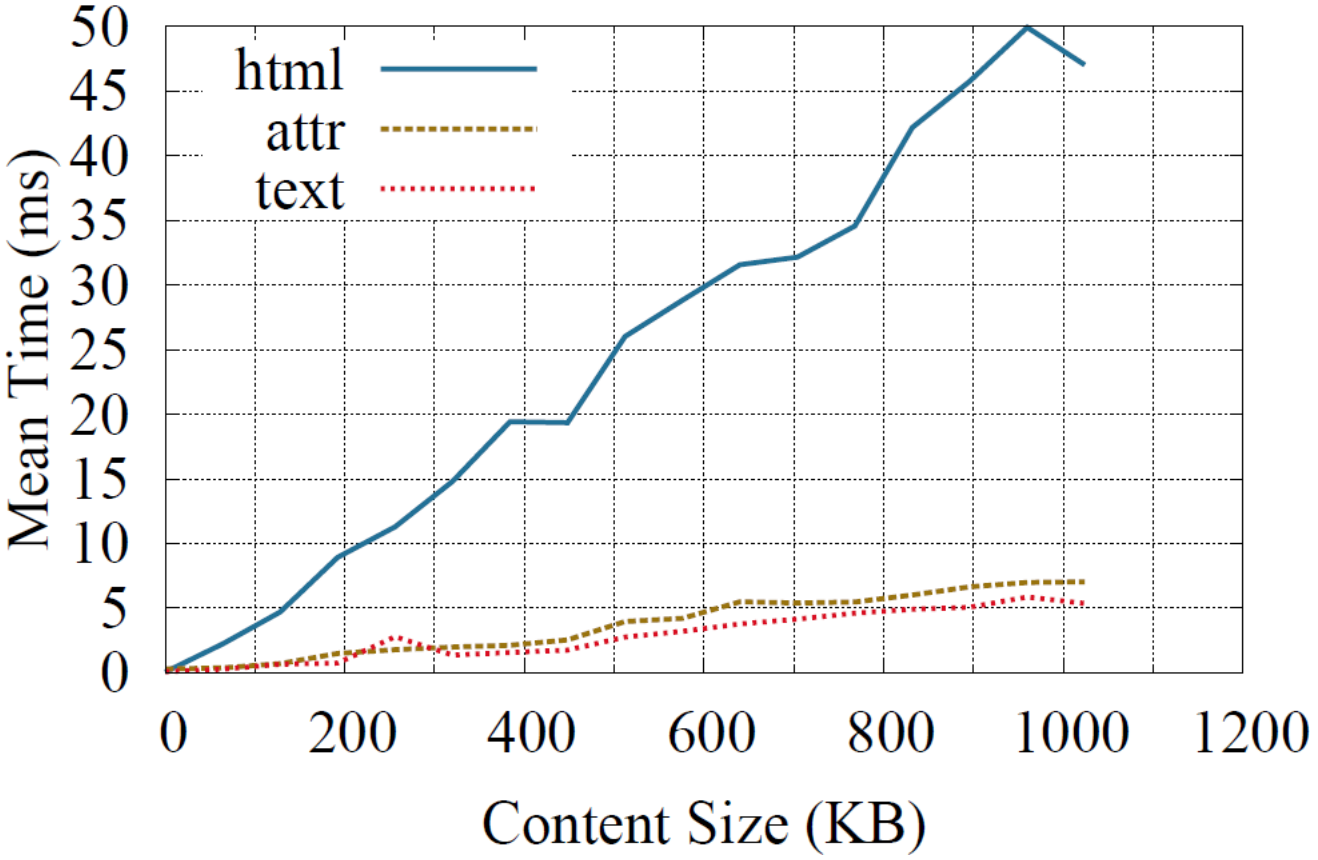


- E.g., SVC parsed 80% of the sites in 15ms
- DomDocument is an alternative PHP HTML parser
- 10,000 most popular websites parsed

SVC Server-side Selector Overhead

- Our SVC implementation uses WebCore's querySelectorAll
- Translated SlickSpeed test to PHP
  - Ran 40 selectors against standard 108KB webpage
  - Ran test 1000 times, mean time of 1.49ms per selector
  - More details in paper

SVC Server-side Action Overhead



- Mean time to insert 0-1MB (64KB increments)
- 100 runs per size

SVC Client-side Overhead

- Our SVC JavaScript wraps jQuery functionality
  - E.g., the literal implementation of addClass

```
addClass: function(selector, className){
    $(selector).addClass(className);
},
```

- Depends on browser, underlying JS library, action complexity

Alternatives to SVC

- GWT, Cappuccino, SproutCore and RJS (Rails JS)
  - Allow server-side creation of JS
  - Do not provide non-JS browser support
- Not aware of any other solution that provides automatic progressive enhancement of pages
- More comparisons in paper

Extending SVC

- Additional Language Support
  - Python prototype has been written
    - Simpler than PHP – only requires lxml library
- Additional client-side libraries
  - Currently based on jQuery
  - Versions could be written for Prototype, Closure, Dojo, etc.

Conclusion

- SVC provides automatic progressive enhancement and compatibility with older browsers
- SVC allows composition of views using selectors
- More info: http://svc.from.bz

Thanks! Questions?

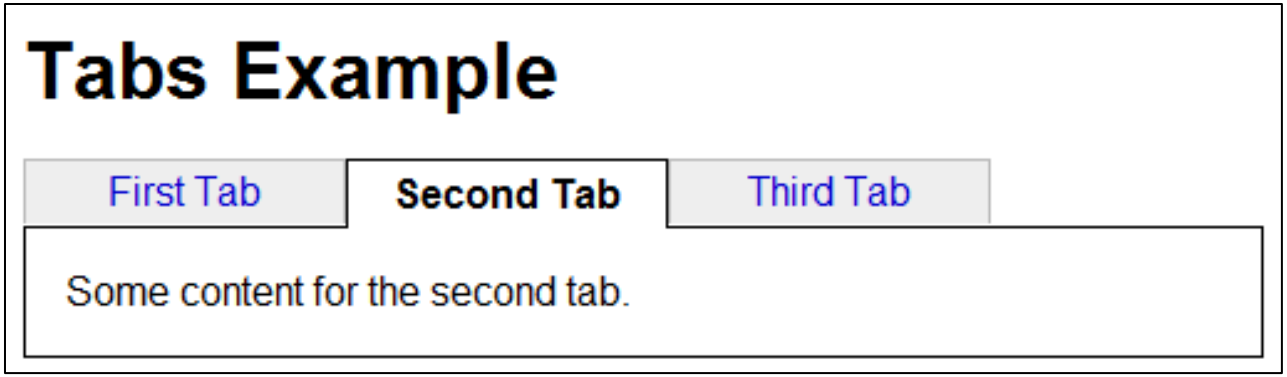
Addendum Example: Tabs

- Page consisting of multiple tabs
- Tabs should load using Ajax when available
  - But work without JavaScript
- Changing tab requires changing:
  - Tab content
  - CSS class in tab header
  - Page title

Tabs Screenshots

- Tab 1

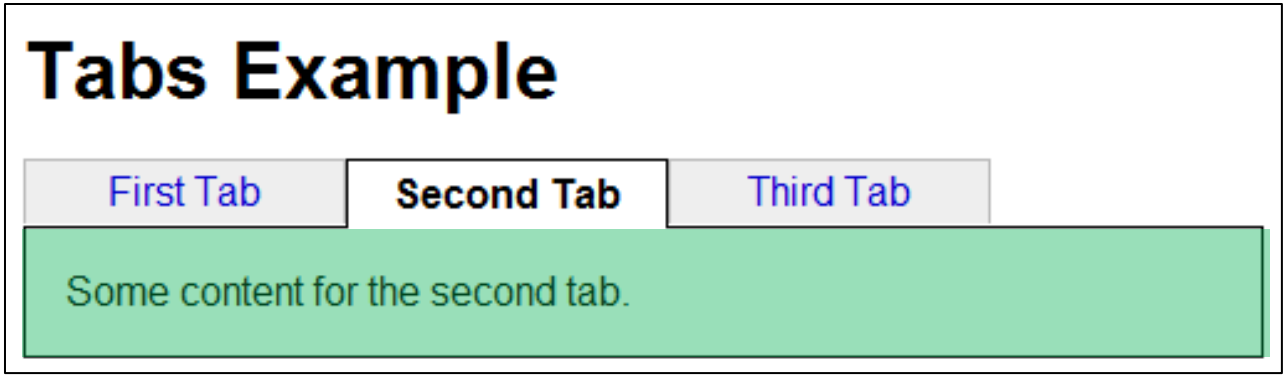
- Tab 2



Tabs Screenshots

- Tab 1

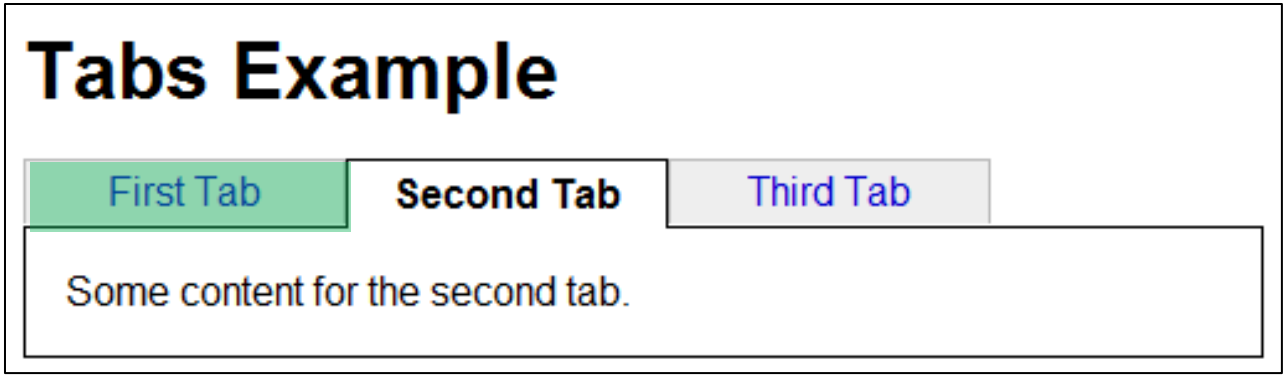
- Tab 2



Tabs Screenshots

- Tab 1

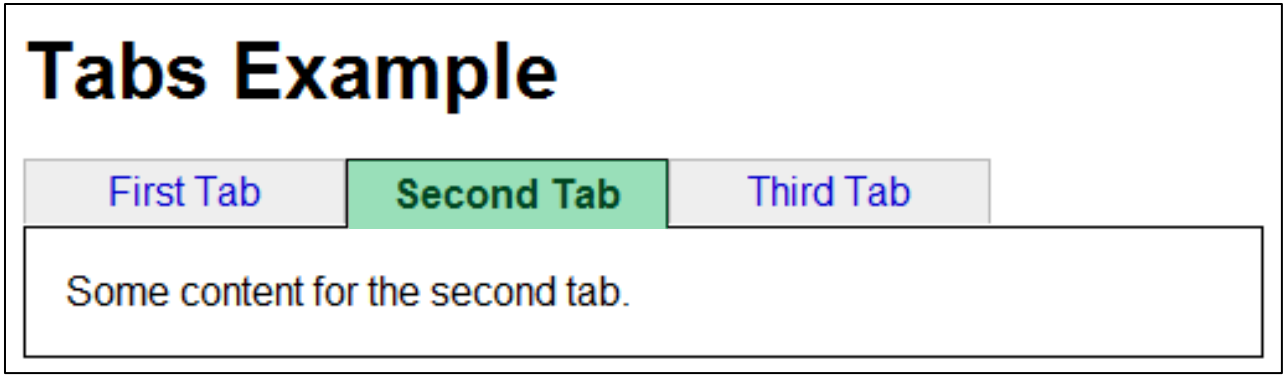
- Tab 2



Tabs Screenshots

- Tab 1

- Tab 2



First Tab Page HTML

```
<html>
  <head>
    <title>First tab page</title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li class="selected"><a href="/tab1">First Tab</a></li>
    <li><a href="/tab2">Second Tab</a></li>
    <li><a href="/tab3">Third Tab</a></li>
  </ul>
</div>
(continued on next page...)
```

First Tab Page HTML


```
<html>
  <head>
    <title>First tab page</title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li class="selected"><a href="/tab1">First Tab</a></li>
    <li><a href="/tab2">Second Tab</a></li>
    <li><a href="/tab3">Third Tab</a></li>
  </ul>
</div>
(continued on next page...)
```

First Tab Page HTML

```
<html>
  <head>
    <title>First tab page</title>
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<div id="tab_header">
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  <ul>
    <li class="selected"><a href="/tab1">First Tab</a></li>
    <li><a href="/tab2">Second Tab</a></li>
    <li><a href="/tab3">Third Tab</a></li>
  </ul>
</div>
(continued on next page...)
```

Tabs header

First Tab Page HTML

```
<html>
  <head>
    <title>First tab page</title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li class="selected"><a href="/tab1">First Tab</a></li>
    <li><a href="/tab2">Second Tab</a></li>
    <li><a href="/tab3">Third Tab</a></li>
  </ul>
</div>
(continued on next page...)
```

CSS class showing selected tab

First Tab Page HTML

```
(continued...)
<div id="content">
  First tab content <br/><br/>

  <b>Bold</b> first tab message.
</div>

</body>
</html>
```

First Tab Page HTML

Tab content

```
(continued...)
<div id="content">
   First tab content <br/><br/>

   <b>Bold</b> first tab message.
</div>

</body>
</html>
```

Tabs Page without SVC

- Create site without JavaScript
- Use JavaScript to add Ajax support
  - This is the Progressive Enhancement step

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
  }
  function tab2() {
  }
  function tab3() {
  }
}
```

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
  }
  function tab2() {
  }
  function tab3() {
  }
}
```

tab1() runs when /tab1 is requested, etc

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
  }
  function tab2() {
  }
  function tab3() {
  }
}
```

We don't show tab3() due to space limitations.

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
  }
  function tab2() {
  }
}
```

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
  }
  function tab2() {
  }
}
```

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
  }
  function tab2() {
  }
}
```

Define array with data which will be sent to the view

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
  }
  function tab2() {
    $data = array('title' => 'Second tab page',
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
  }
}
```

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
     return view('tab_template', $data);
  }
  function tab2() {
    $data = array('title' => 'Second tab page',
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
     return view('tab_template', $data);
  }
}
```

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
     return view('tab_template', $data);
  }
  funct
    $da
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
     return view('tab_template', $data);
  }
}
```

Call view "tab_template" with data array.

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                  'content' => view('tab1_content'));
    return view('tab_template', $data);
  }
  functio     () {
    $                                 ond tab page',

                  'content' => view('tab2_content'));
    return view('tab_template', $data);
  }
}
```

Output interpreted view.

Tabs Controller

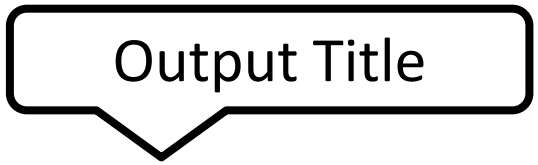
```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
     return view('tab_template', $data);
  }
  function tab2() {
    $data = array('title' => 'Second tab page',
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
     return view('tab_template', $data);
  }
}
```

Template (tab_template)

```
<html>
  <head>
    <title><?=$title?></title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
    <li <? if ($tab_num == 2) { ?> class="selected" <? } ?>
      id="tab_2"><a href="/tab2">Second Tab</a></li>
```

(continued on next page...)

Template (tab_template)




```
<html>
  <head>
    <title><?=$title?></title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
    <li <? if ($tab_num == 2) { ?> class="selected" <? } ?>
      id="tab_2"><a href="/tab2">Second Tab</a></li>
```

(continued on next page...)

Template (tab_template)

```
<html>
  <head>
    <title><?=$title?></title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
    <li <? if ($tab_num == 2) { ?> class="selected" <? } ?>
      id="tab_2"><a href="/tab2">Second Tab</a></li>
```

Set CSS class if appropriate

(continued on next page...)

Template (tab_template)

```
(continued...)
    <li <? if ($tab_num == 3) { ?> class="selected" <? } ?>
      id="tab_3"><a href="/tab3">Third Tab</a></li>
 </ul>
</div>

<div id="content"><?=$content?></div>

</body>
</html>
```

Template (tab_template)

```
(continued...)
    <li <? if ($tab_num == 3) { ?> class="selected" <? } ?>
      id="tab_3"><a href="/tab3">Third Tab</a></li>
 </ul>
</div>

<div id="content"><?=$content?></div>

</body>
</html>
```

Set CSS class if appropriate

Template (tab_template)

```
(continued...)
    <li <? if ($tab_num == 3) { ?> class="selected" <? } ?>
      id="tab_3"><a href="/tab3">Third Tab</a></li>
 </ul>
</div>

<div id="content"><?=$content?></div>

</body>
</html>
```

Output content

Tabs Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
     return view('tab_template', $data);
  }
  function tab2() {
    $data = array('title' => 'Second tab page',
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
     return view('tab_template', $data);
  }
}
```

Content Templates

tab1_content

```
First tab content <br/><br/>

<b>Bold</b> first tab message.
```

tab2_content

```
Some content for the second tab.
```

Non-Ajax Tabs Example Complete

- Site works (but no Ajax)
- Let's enhance!

Adding Ajax (Main Template)

```
<html>
  <head>
    <title><?=$title?></title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
...
```

Adding Ajax (Main Template)

Add scripts to progressively enhance

```
<html>
  <head>
    <title><?=$title?></title>
    <script type="text/javascript" src="jQuery.js"></script>
    <script type="text/javascript" src="tabs.js"></script>
    <link rel="stylesheet" type="text/css" href="style.css"/>
  </head>
<body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
    <li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
...
```

Add Ajax to Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
     return view('tab_template', $data);
  }

   ...
}
```

Add Ajax to Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
    if (is_ajax()) {
      return json_encode($data);
    } else {
      return view('tab_template', $data);
    }
  }

   ...
}
```

Add Ajax to Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
    if (is_ajax()) {
      return json_encode($data);
    } else {
      retur
    }
  }

    ...
}
```

If Ajax request, return JSON

Add Ajax to Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
    if (is_ajax()) {
      return json_encode($data);
    } else {
      return view('tab_template', $data);
    }
  }
    ...
}
```

Otherwise, output HTML

Example: Adding Ajax (tabs.js)

```
$(function() {

});
```

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    // ...
  };

  $('#tab_header a').click(onTabClk);
});
```

Add click handler to tab links

Example: Adding Ajax (tabs.js)

Function to be called when tab link is clicked

```
$(function() {
  var onTabClk = function() {
    // ...
  };

  $('#tab_header a').click(onTabClk);
});
```

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Extract link URL

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      // ... process JSON response
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Make JSON request

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      document.title = data.title;
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

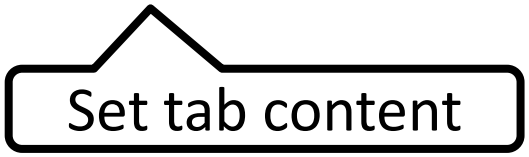
Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      document.title = data.title;
      $('#tab_' + data.tabNum).addClass('selected');
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Set CSS class of new tab

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      document.title = data.title;
      $('#tab_' + data.tabNum).addClass('selected');
      $('#content').html(data.content);
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```



Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      document.title = data.title;
      $('.selected').removeClass('selected');
      $('#tab_' + data.tabNum).addClass('selected');
      $('#content').html(data.content);
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Remove "selected" CSS class from all elements

Example: Adding Ajax (tabs.js)

```
$(function() {
  var onTabClk = function() {
    var href = $(this).attr('href');
    $.getJSON(href, function(data) {
      document.title = data.title;
      $('.selected').removeClass('selected');
      $('#tab_' + data.tabNum).addClass('selected');
      $('#content').html(data.content);
    });
    return false;
  };

  $('#tab_header a').click(onTabClk);
});
```

Tabs Example Now Progressively Enhanced

- Tabs will load using Ajax in JS browsers

Cost of Progressive Enhancement

- Requires duplication of view updates.
  - Server-side using templates.
  - Client-side using JavaScript

Examples of Duplication: Page Title

- Server-side code

```
<title><?=$title?></title>
```

- Client-side code

```
document.title = data.title;
```

Examples of Duplication: Tab Headers

- Server-side code

```
<li <? if ($tab_num == 1) { ?> class="selected" <? } ?>
      id="tab_1"><a href="/tab1">First Tab</a></li>
<li <? if ($tab_num == 2) { ?> class="selected" <? } ?>
      id="tab_2"><a href="/tab2">Second Tab</a></li>
<li <? if ($tab_num == 3) { ?> class="selected" <? } ?>
      id="tab_3"><a href="/tab3">Third Tab</a></li>
```

- Client-side code

```
$('.selected').removeClass('selected');
$('#tab_' + data.tabNum).addClass('selected');
```

Examples of Duplication: Page Content

- Server-side code

```
<div id="content"><?=$content?></div>
```

- Client-side code

```
$('#content).html(data.content);
```

Tabs Example Using SVC

- Instead of duplicating view update code, use SVC API to describe how to compose views

Example: Non-SVC Controller

```
<?php
class TabsExample extends Controller {
  function tab1() {
    $data = array('title' => 'First tab page',
                  'tab_num' => 1,
                   'content' => view('tab1_content'));
     return view('tab_template', $data);
  }
  function tab2() {
    $data = array('title' => 'Second tab page',
                  'tab_num' => 2,
                  'content' => view('tab2_content'));
     return view('tab_template', $data);
  }
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
     //
  }

  function tab2() {
    // ...
  }
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
     //
  }

  function tab2() {
    // ...
  }
}
```

tabbase() creates an SVC list consisting of only the template "tabbase_template"

Example: Template (tabbase)

```
<html><head>
    <title></title>
    <link rel="stylesheet" type="text/css" href="style.css"/>
</head><body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
      <li id="tab_1"><a href="/tab1">First Tab</a></li>
      <li id="tab_2"><a href="/tab2">Second Tab</a></li>
      <li id="tab_3"><a href="/tab3">Third Tab</a></li>
 </ul>
</div>
<div id="content"></div>
</body></html>
```

Example: Template (tabbase)

```
<html><head>
    <title></title>
    <link rel="stylesheet" t                    ss"/>
</head><body>
<div id="tab_header">
  <h1>Tabs Example</h1>
  <ul>
      <li id="tab_1"><a href="/tab1">First Tab</a></li>
      <li id="tab_2"><a href="/tab2">Second Tab</a></li>
      <li id="tab_3"><a href="/tab3">Third Tab</a></li>
 </ul>
</div>
<div id="content"></div>
</body></html>
```

Like "tab_template", but all content is empty.

Example: SVC Controller

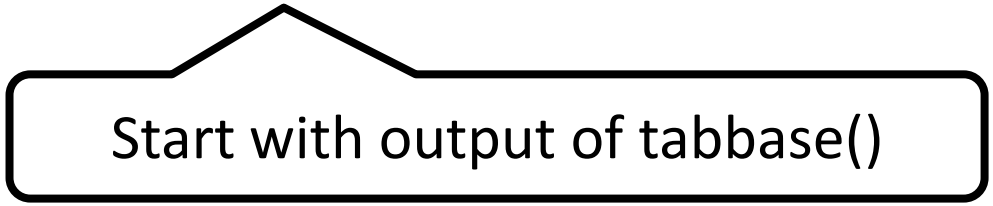
```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
     //
  }

  function tab2() {
    // ...
  }
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
  }

  function tab2() {
    // ...
  }
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
  }

  function tab2() {
    // ...
  }
}
```

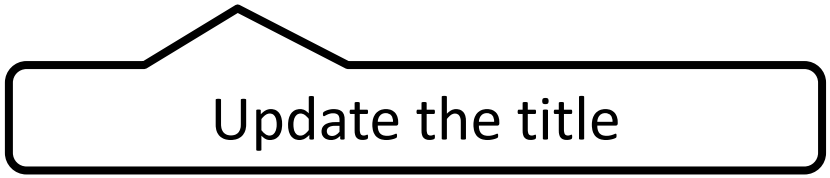


Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
  }

  function tab2() {
    // ...
  }
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
  }

  function tab2() {
    // ...
  }
}
```



Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
  }
  ...
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
  }
  ...
}
```

Remove the "selected"' class from all elements to clear tab highlighting

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
  }
  ...
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
  }
  ...
}
```

Add "selected" class to the first tab.

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
    $this->svc->html('#content', view('tab1_content'));
  }
  ...
}
```

Example: SVC Controller

```
<?php
class TabsExample extends Controller {
  function tabbase() {
    $this->svc->initial(view('tabbase_template'));
  }

  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
    $this->svc->html('#content', view('tab1_content'));
  }
  ...
}
```

Update tab content

Example: SVC Controller

```
  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
    $this->svc->html('#content', view('tab1_content'));
  }
 function tab2() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'Second tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_2', 'selected');
    $this->svc->html('#content', view('tab2_content'));
  }
}
```

Example: SVC Controller

```
  function tab1() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'First tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_1', 'selected');
    $this->svc->html('#content', view('tab1_content'));
  }
function tab2() {
    $this->svc->initial('tabbase');
    $this->svc->text('title', 'Second tab page');
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_2', 'selected');
    $this->svc->html('#content', view('tab2_content'));
  }
}
```

Update second tab in the same way

Example: SVC Controller

Duplicated code! We can factor it out.

```
function tab1() {
  $this->svc->initial('tabbase');
  $this->svc->text('title', 'First tab page');
  $this->svc->removeClass('.selected', 'selected');
  $this->svc->addClass('#tab_1', 'selected');
  $this->svc->html('#content', view('tab1_content'));
}
function tab2() {
  $this->svc->initial('tabbase');
  $this->svc->text('title', 'Second tab page');
  $this->svc->removeClass('.selected', 'selected');
  $this->svc->addClass('#tab_2', 'selected');
  $this->svc->html('#content', view('tab2_content'));
}
}
```

Example: SVC Controller

```
  function tab1() {
    this->_updateTab('First tab page', 1, 'tab1_content');
  }
  function tab2() {
    $this->_updateTab('Second tab page', 1, 'tab2_content');
  }
  function _updateTab($title, $num, $content) {
    $this->svc->initial('tabbase');
    $this->svc->text('title', $title);
    $this->svc->removeClass('.selected', 'selected');
    $this->svc->addClass('#tab_' . $num, 'selected');
    $this->svc->html('#content', view($content));
  }
}
```

SVC Tabs Example: Done!

- SVC framework will automatically Ajaxify tab loads.
- SVC outputs JSON in response to Ajax requests
  - Transformations are applied on client by SVC JS code
- SVC outputs HTML in response to non-Ajax requests
  - Transformations are applied on server-side by SVC code.
- No JavaScript needs to be written