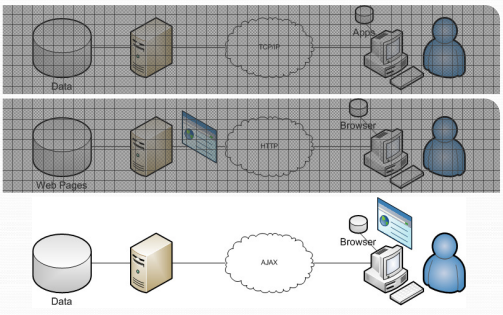
jQuery

Agenda

- Introduction To jQuery
- Selection and DOM Traversal
- DOM And Attributes Manipulation
- CSS Styling and jQuery
- Events

Evolution



Introduction To jQuery

- History :
  - Aug 22, 2005 : John Resig, creator of jQuery, floated the idea.
  - Aug 26, 2006 : First stable version of jQuery, **v1.0** released.

    . . .
  - May 3, 2011 : **v1.6** released - major rewrite leading to performance improvement
  - Popular version 1.7.1 (21-Nov 2011).

Introduction

- jQuery places a heavy emphasis on *chaining*.
- jQuery's features are organized into a handful of simple categories:
  - core functionality
  - selecting, manipulating, traversing
  - CSS, attributes
  - events
  - effects

The jQuery philosophy is "Write less, do more."

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Useful Resources

- The jQuery docm : http://api.jquery.com
- The jQuery forum: http://forum.jquery.com/
- The jQuery mailing list archives : http://docs.jquery.com/Discussion#Archives

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What is jQuery?

jQuery is:

- Free!
- Open-source and available under both MIT and GPL licences
- Only ~32Kb (minified and gzipped, ready for production) ⇒ lightweight footprint
- Cross-browser compatible
- Extensible! You can write your own plugins.

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What is jQuery?

- jQuery is a JavaScript library that simplifies:
  - HTML element selection and document object model (DOM) traversal
  - Element creation, deletion, and modification
  - Event handling
  - Ajax interactions

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Why use jQuery ?

- jQuery is written entirely in JavaScript.
  - Why reinvent the wheel?
  - jQuery is tested and used by thousands of web sites.
  - jQuery is optimized for performance by JavaScript experts.
- jQuery is also designed to circumvent cross-browser compatibility problems.
- Consistent interface for maximal functionality across different browsers.
- jQuery is used by big companies such as: Google, Microsoft, Nokia, Dell, Bank of America, Drupal .
- Large community and developer pool ⇒ support is huge!

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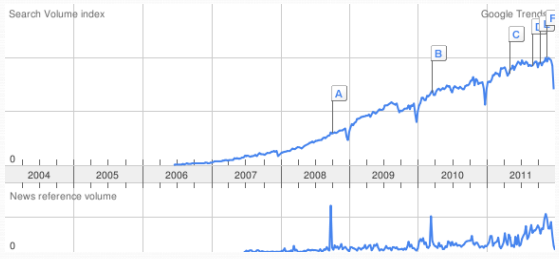
Usage Graph



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A typical jQuery statement

selector	action	parameters
`jQuery('p')`	`.css`	`('color', 'blue');`
`$('p')`	`.css`	`('color', 'blue');`

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The jQuery() Function

Four different ways to invoke it:

1. Invoke $() is to pass a CSS selector (a string)
   - It returns the set of elements from the current document that match the selector.
2. Invoke $() is to pass it an Element or Document or Window object.
   - It returns that jQuery object.
3. invoke $() to pass it a string of HTML text.
   - Returns a jQuery object representing those elements.

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The jQuery() Function

4. Pass a function to it.
   - This function is called when the document has been loaded & the DOM is ready.

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jQuery Terminology

- *"the jQuery function"*
- *"a jQuery object"*
- *"the selected elements"*
- *"a jQuery function"*
  - jQuery.noConflict()

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Distinction between jQuery functions and methods

```
// Call the jQuery function each() to
// invoke the function f once for each element of array a
$.each(a,f);
```

```
// Call the jQuery() function to obtain a jQuery object that represents all
// <a> elements in the document. Then call the each() method of that
//  jQuery object to invoke the function f once for each selected element.
$("a").each(f);
```

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Queries and Query Results

- $("body").length // => 1: doc have only one body element
- $("body")[0] // This the same as document.body
- // Find all headings, map to their ids, convert to a true array, and sort it.
- $(":header").map(function() { return this.id; }).toArray().sort();

- All jQuery objects have a property named jquery, and testing for the existence of this property is a simple way to distinguish jQuery objects from other array-like objects.

```
// Find all <script> elements in the document body
var bodyscripts = $("script", document.body);
bodyscripts.selector   // => "script"
bodyscripts.context    // =>  document  body info
bodyscripts.jquery
```

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jQuery Getters and Setters

- Uses a single method for both.
  - Setter : set values on every element in the jQuery object, and then return the jQuery object to allow method chaining.
  - Getter : can only appear at the end of a method chain.

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Getting and Setting CSS Attributes

```
$("h1").css("font-weight");  // Get font weight of first <h1>
$("h1").css("fontWeight");  // Camel case works, too

$("h1").css("font");  // Error: can't query compound styles

$("h1").css({ backgroundColor: "black",  // Set multiple styles at once
              textColor: "white", // camelCase names work better
              fontVariant: "small-caps", // as object properties
              padding: "10px 2px 4px 20px",
              border: "dotted black 4px" });

// Increase all <h1> font sizes by 25%
$("h1").css("font-size",  function(i,curval) {
        return Math.round(1.25*parseInt(curval));
});
```

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How to Start

Three easy steps:

- Access the jQuery library and include it in your page.
- Make sure the page is ready.
- Execute the jQuery code!

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Download the Library

From the http://jquery.com/ - two versions of the code:

- Production - Minified JavaScript (illegible) for use in production
  - Lightweight footprint
  - Saves bandwidth for you and speeds up page requests for your users.
- Development- Uncompressed JavaScript
  - Very useful if you need to look at how jQuery is implemented.

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To include the jQuery library

```
<head>
  <title>My jQuery page</title>
  <script type="text/javascript" src="jquery-1.9.1-min.js">
  </script>

  <script type="text/javascript" src="myscript.js">
   </script>
</head>
```

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jQuery library from CDN

```
<head>
  <title>My jQuery page</title>
  <script type="text/javascript"
  src="http://code.jquery.com/jquery-1.9.1.min.js">
  </script>

  <script type="text/javascript" src="myscript.js">
   </script>
</head>
```

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The jQuery Function Object

- Loading the jQuery library creates a single *function object* named jQuery :
  - jQuery('li').css('background-color', 'yellow');
  - Alias :

```
$('li').css('background-color', 'yellow');
```

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Is The Document Ready?

- jQuery code in the <script> element inside the <head> of your document.
- *onLoad* handler on the <body> element .
- The *ready* event occurs when the page DOM is complete.

```
$(document).ready(function() {
    //Perform here all the jQuery magic
});
```

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Is The Document Ready?

- Register a *callback* function / *handler* :
  $(function() { /* jQuery code */ });

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Where to Run Your Code?

- Place the <script> elements that load external JavaScript files in the <head>of a document.
- Place your <script> element(s) just before the</body> close tag.
  - Progressive enhancement

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Selections And Dom Traversing

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Selection

- Select elements before you can manipulate them.
  - Support for most CSS selectors, plus its own custom extensions.
- jQuery selection returns a *jQuery object*.
  - The jQuery object represents **0** or more elements in the document.
  - $('div').length returns the number of elements in the page.

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Basic Selectors

- $('p');
- $('*');
- $('.status');
- $('#header');
- $('p, li, .status, #nav');

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jQuery Usage Example

```
$("li:odd").prepend('<span>Changed</span>').css({background:"red"});
```

```
<ul>
  <li>
    First item
  </li>
  <li>
    Second item
  </li>
  <li>
    Third item
  </li>
</ul>
```

```
<ul>
  <li>
    <span>Changed</span>
    First item
  </li>
  <li>
    Second item
  </li>
  <li>
    <span>Changed</span>
    Third item
  </li>
</ul>
```

```
<ul>
  <li style="background:red;">
    <span>Changed</span>
    First item
  </li>
  <li>
    Second item
  </li>
  <li style="background:red;">
    <span>Changed</span>
    Third item
  </li>
</ul>
```

Hierarchy Selectors

- $('#footer span');
- $('ul > li');
- $('h2 + p');
- $('h2 ~ p');

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Selection By Attribute

- $('a[href]');
- $('a[href="http://google.com/af/zaz"]');
- $('a[href*="goo.gl"]');
- $('a[href^="http://goog.co"]');
- $('a[href$=".pdf"]');
- $('p[lang|="en"]');

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Form Selectors

- $(':button'); , $(':checkbox'); , $(':file'); , $(':image'); , $(':password'); ,$(':radio'); , $(':reset'); , $(':submit'); , $(':text');
- $(':input');
- $(':checked');
- $(':selected');

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Position Filters

- $('.article:eq(2)');
- $('.article:gt(1)');
- $('.article:lt(3)');
- $('.article:first');
- $('.article:last');
- $('.article:odd');
- $('.article:even');

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Other Filters

- $(p:contains('Google'));
- $('div:has(h2)');
- $('option:not(:selected)');
- $('p:hidden');

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jQuery Method Chaining

- The value returned from a jQuery selection is an instance of a jQuery object.

```
$('.status')
      .css('backgroundColor','yellow')
      .attr('title', 'My Web page');
```

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jQuery Usage Example

```
$("div:hidden").find(".foo").empty().text("Changed").end().show();
```

DOM Traversal

- Methods for selecting the children, the parents, and the siblings of each element in the wrapped set.

Traversal methods:

- $('.article').children('p');
- $('.article').find('p');
- $('h2').prev();
- $('h2').next('p');
- $('#form-button').siblings('fieldset');
- $('.menu-li2').parent();

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Filter Methods

- $('#content h2').first();
- $('#menu > li').eq(1);
- $('li').filter(':even');
- $('div').not('.article');
- $('li').has('ul');

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Advanced Method Chaining

- Combining method chaining with traversal methods :

```
$('#selected')
    .css('backgroundColor', 'yellow')
    .parent()
    .addClass('current');
```

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Advanced Method Chaining

```
$('.article')
    .find('p')
    .css('color','green')
    .end()
    .find('h2').css('color','red');
```

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Dom Manipulation

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DOM Manipulation

- Most common operation.
- Handling of elements in the DOM :
  - create, insert, move, clone, remove, and replace.
- To create :
  - Provide a string with HTML markup of the element as the sole argument:

```
var $menuli1 = $('<li class="menu-li1“>Food</li>');
```

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Creating Elements

- To create :
  - Provide a string with the basic HTML markup as the first arg, and a JavaScript object as the second arg.

```
var $menuli1 = $('<li/>', {
    'class': 'menu-li1',
    'text': ‘Food‘
  });
```

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Inserting Elements

Many ways to insert elements into a page:

- Before an existing element.
- After an existing element.
- Inside a container element, at its beginning.
- Inside a container element, at its end.

- Also, there are two approaches to each method of inserting elements into a page:
  - Place the selected element(s) relative to another element
  - Place an element relative to the selected element(s)

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Before an Existing Element

- .insertBefore()

```
var $menuli1 = $('<li class="menu-li1">Italian Food</li>');
$menuli1.insertBefore('.menu-li1:first');
```

- .before()

```
$('.menu-li1:first').before('<li class="menu-li1">Italian Food</li>');
```

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CSS Styling

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Reading And Modifying CSS

- Accessing CSS properties in plain old JavaScript : painful.
- jQuery handles these browser inconsistencies.
  - .css() method
  - CSS names (e.g., background-color) or
  - DOM name (e.g., backgroundColor)

  - E.g. `$('div').css('backgroundColor');`
    `$('.header').css('backgroundColor', 'red');`

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Setting Properties

```
$('.article')
    .css({ 'backgroundColor': '#A2C5CC',
           'borderColor': 'green',
           'marginBottom': '12px'
});
```

```
$('#mydiv').css('color', 'green');   =>
document.getElementById('mydiv').style.color = 'green';
```

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Removing CSS Properties

- Setting the value of a style property to an empty string removes it:
  - In the HTML style attribute
  - Through jQuery's .css() method
  - Through direct DOM manipulation of the style property

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Events

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Events Overview

When an user is interacting with a web page, lots of events are fired:

- Clicking on an element
- Typing in a text box
- Scrolling on the page
- Hovering on an element
- etc…

- JS can detect & handle these :
  - *event handler* or a *callback*

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Common Event Types

blur	change	click	dblclick	error	focus
focusin	focusout	keydown	keypress	keyup	load
mousedown	mouseenter	mouseleave	mousemove	mouseout	mouseover
mouseup	resize	scroll	select	submit	unload

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Performing Tasks on Page Load

JavaScript's built-in onload event.

- window.onload : Either of:
  - Within our HTML markup:

```
function doStuff() {
    // Perform a task...
}
<body onload="doStuff();">
```

  - Within JavaScript code:

```
window.onload = doStuff;
```

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Performing Tasks on Page Load

Using jQuery:

```
$(document).ready(function() {
    // Our code here...
});
```

Or, we can write:

```
$().ready(function() {
    // Our code here...
});
```

Or, make an implicit call :

```
$()(function() {
    // Our code here...
});
```

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Simple Events

User initiated:

- Mouse clicks (onclick)
- Form fields being modified (onchange)
- Windows changing size (onresize).

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Binding an Event

```
$(document).ready(function() {
    $('#switcher-large').bind('click', function() {
        $('body').addClass('large');
    });
});
```

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Event Handler Context

- Using **$(this)** within the event handler: creates a jQuery object corresponding to the element.
  - Can act on it just as if located it with a CSS selector.

```
$(this).addClass('selected');
```

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Sample html

```
<div id="switcher">
    <h3>Style Switcher</h3>
    <div class="button selected" id="switcher-
      normal">Normal</div>
    <div class="button" id="switcher-narrow">Narrow
      Column</div>
    <div class="button" id="switcher-large">Large Print</div>
</div>
```

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Optimization

```
$('#switcher-large').bind('click', function() {
    $('body').removeClass('narrow').addClass('large');
});

$('#switcher .button').bind('click', function() {
    $('#switcher .button').removeClass('selected');
    $(this).addClass('selected');
    });
});
```

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Shorthand Events

```
$(document).ready(function() {
  $('#switcher .button').click(function() {
    $('body').removeClass();
    if (this.id == 'switcher-narrow') {
      $('body').addClass('narrow');
    }
    else if (this.id == 'switcher-large') {
      $('body').addClass('large');
    }
    $('#switcher .button').removeClass('selected');
    $(this).addClass('selected');
  });
});
```

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Compound Events

- These intercept combinations of user actions, and respond to them using more than one function.
  - .toggle()
  - .hover()
- The .toggle() method takes two arguments, both of which are functions.
  - The first click on the element causes the first function to execute.
  - The second click triggers the second function.
  - The two functions continue to alternate every other click thereafter.

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.toggle()

```
$(document).ready(function() {
  $('#switcher h3').toggle(function() {
    $('#switcher .button').addClass('hidden');
  }, function() {
    $('#switcher .button').removeClass('hidden');
  });
});
```

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Alt. approach

```
$(document).ready(function() {
    $('#switcher h3').click(function() {
        $('#switcher .button').toggleClass('hidden');
    });
});
```

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.hover()

```
$(document).ready(function() {
    $('#switcher .button').hover(function() {
        $(this).addClass('hover');
    }, function() {
        $(this).removeClass('hover');
    });
});
```

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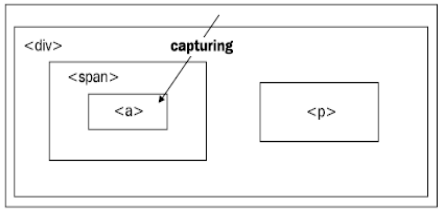
Event Capturing



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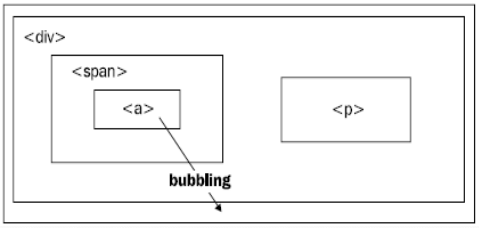
Event Bubbling



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Side Effects of Event Bubbling

- Event bubbling can cause unexpected behaviour - the wrong element responds to a *mouseover* or *mouseout*.
- When the cursor exits the <a> element, a mouseout event is sent to that.
  - This event will then bubble up to the and then to the , firing the same event handler.
    - This bubbling sequence is not likely to be desired.

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Event Object

```
$(document).ready(function() {
    $('#switcher').click(function(event) {
        if (event.target == this) {   // the first receiver
            $('#switcher .button').toggleClass('hidden');
        }
    });
});
```

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Stopping Event Propagation

- .stopPropagation() : eliminates bubbling completely for the event.

```
$('#switcher .button').removeClass('selected');
$(this).addClass('selected');
event.stopPropagation();
```

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Default Actions

- .preventDefault() : stops the event in its tracks before the default action is triggered.
- Event propagation and default actions are **independent** mechanisms.
- If we wish to halt both, we can return **false** from our event handler, which is a shortcut for calling both.

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Removing an Event Handler

```
$(document).ready(function() {
  var toggleStyleSwitcher = function() {
    $('#switcher .button').toggleClass('hidden');
  };

  $('#switcher').click(toggleStyleSwitcher);

  $('#switcher-normal').click(function() {
    $('#switcher').click(toggleStyleSwitcher);
  });
  $('#switcher-narrow, #switcher-large').click(function() {
    $('#switcher').unbind('click', toggleStyleSwitcher);
  });
});
```

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One shot trigger

- Unbind an event handler immediately after the first time it is triggered.

```
$(document).ready(function() {
    $('#switcher').one('click', toggleStyleSwitcher);
});
```

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Simulating User Interaction

- .trigger() method

```
$(document).ready(function() {
    $('#switcher').trigger('click');
});
```

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jQuery Event Object

- Commonly used properties and methods :
  - pageX , pageY
  - target
  - timestamp
  - type
  - preventDefault()
  - stopPropagation()

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Event Delegation

- Handles dynamic addition of new similar elements.
- It lets an event "bubble up" the DOM tree to a parent element.
- Convenient methods:
  - .live()
  - .on()

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live()

- Lets you bind a handler.
- It works for all current and future matched elements.

```
$('#description').live('mouseover', function() {
        $(this).css('background-color', 'yellow');});
```

- To stop (unbind):

```
$('p#description').die('mouseover');
```

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.on()

```
$("#dataTable tbody tr").on("click", function(event){
        alert($(this).text());
});
```

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AJAX

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Ajax

- Coined in 2005
- Acronym for Asynchronous JavaScript and XML.
- Mimics the feel of a desktop application, and gives the user a more responsive and natural experience.
- Earlier, each web browser supplied slightly different methods for achieving this.

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Loading Remote HTML

- load()
  - Magically grabs an HTML file off the server and insert its contents within the current web page.
  - You can load either static HTML files, or dynamic pages that generate HTML output.
    - same origin
  - So, its different from the window load event.

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Picking up only parts

- Be specific using selectors

```
$('#biography').load('computadors.html div:first');
```

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Advanced loading

- A common requirement is to specify some data to pass along to the server, e.g. search for info.

```
$('div#results').load('search.php',
  'q=jQuery&maxResults=10');
```

- Alt.: adding a callback fn.

```
$('div#result').load('feed.php', function(data, status,
  response) { // Post-processing time!
});
```

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Fetching Data with $.getJSON

- Creating mashups
  - Grab data from multiple third-party web sites and squish it together in a new and interesting way.
  - XML
  - JSON

```
$.getJSON(
  'http://feeds.delicious.com/v2/json/tag/celebs?call
  back=?', function(data) {
      alert('Fetched ' + data.length + ' items!'); });
```

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The jQuery Ajax Workhorse

- $.ajax method
  - All of jQuery's Ajax functions are simply wrappers around the $.ajax method.
  - Each designed to provide with a simple interface for a specific type of task.

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$.ajax

```
$.ajax({
   type: 'GET',
   url: 'getDetails.php',
   data: { id: 142 },
   success: function(data) {
         // grabbed some data!
   };
});
```

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Common Ajax Settings

```
$.ajaxSetup({
   type: 'POST'
   url: 'send.php',
   timeout: 3000
});

$.ajax({
   data: { id: 142 }
});
```

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Loading External Scripts with $.getScript

- To make the application to be as snappy as possible.
- This function will load and execute a JavaScript file via Ajax.
- We can load a minimal amount of our code when the page loads
- Then pull in further files as we need them.
  - This is particularly useful if we require any plugins that have a sizeable footprint,

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Loading External Scripts with $.getScript

```
$.getScript('http://view.jquery.com/trunk/plugins/color/
jquery.color.js', function() {
    $('body').animate({'background-color': '#fff'}, 'slow');
});
```

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GET and POST Requests

- Simple wrapper functions around the $.ajax method
  - But are more convenient to use.
  - Just select a URL and any data you want to push.

```
$.get(url, data, callback, dataType);
$.post(url, data, callback, dataType);
```

- dataType : xml, html, json, etc. (optional)

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GET and POST Requests

```
$.get("getInfo.php", function(data) {
      alert("got your data:" + data);
});

$.post("setInfo.php", {id: 2, name: "Equator  and land"});
```

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jQuery Ajax Events

- When making Ajax requests with jQuery, a number of events are fired.
  - Show "loading ..." message
  - Error can occur.
- There are two types of Ajax events in jQuery:
  - local events: apply only to individual Ajax requests.
    - You handle local events as callbacks.
  - Global

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Local Error

```
$.ajax({
   url: "test.html",
   error: function() {
         alert('an error occurred!');
   }
});
```

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Global Error

- Are attached to the DOM node where you'd like to show a response to the user.

```
$("#msg").ajaxError(function(event, request, settings) {
   $(this).html("Error requesting page " + settings.url +
   "!");
});
```

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Ajax Events

- The success (local) and ajaxSuccess (global) events let us know when an event has completed successfully.
- The complete(local) and ajaxComplete(global) events tell us when an Ajax request has concluded, regardless of its success or failure.
- You will only receive either a success or error event for each request.
- But you'll always receive a complete event.

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Ajax Events

- The beforeSend(local) and ajaxSend(global) events let us react just before an Ajax request is sent into the world.
- The ajaxStart and ajaxStop global events occur when an Ajax request fires and no others are already running, and when all requests are finished, respectively.

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jQuery : Best Practices

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Best Practices

- Always Descend From an #id
  - The fastest selector in jQuery is the ID selector
    E.g. ($('#my_button')).
  - Selecting a single element : direct.
  - Selecting Multiple Elements:
    - Descend from the closest parent ID
- Use Tags Before Classes
  - The second fastest selector in jQuery is the Tag selector.
    E.g. ($('head'))

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Best Practices

- Cache jQuery Objects
  - Save your jQuery objects to a variable & continue.
- Harness the Power of Chaining
  - Less code & so, lightweight.
- jQuery allows us to run additional selector operations on a wrapped set.
  - This reduces performance overhead on subsequent selections, since already stored.
- Limit direct DOM manipulation

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Best Practices

- Compressing Your JS
  - Gzipping + minifying
- Use of CDN vs local hosted copy
  - Specify the library version explicitly.
  - Sharing of bandwidth
  - More users likely to have it already
  - Else, it downloads in parallel
  - Google could collect details about your site (traffic profile, etc.)

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