

# HTML5, CSS3, Javascript for Mobile Web

Aryo Pinandito

# Well, you could build native, but...

- Which platforms do you choose?
- How many codebases do you want to (or even can you) support?
- How long will it take to build native on N number of platforms?
- How much effort will be duplicated?
- What if you bet on the wrong platform?
- Who writes the code? Hire out? Retrain/retool yourself or your devs?

# The Web Is An Option...

- ...and should be preferred when feasible
- Mobile browsers are progressing fast and converging around WebKit
- But there are limitations
- Native apps are inherently more capable than web apps
- Native apps run faster and smoother on resource constrained devices



# Common Components

- Web documents
- Server-side programming
- Client-side programming
- Web services
- JQuery



HTML5

+



CSS3

+



JavaScript

# HyperText Markup Language

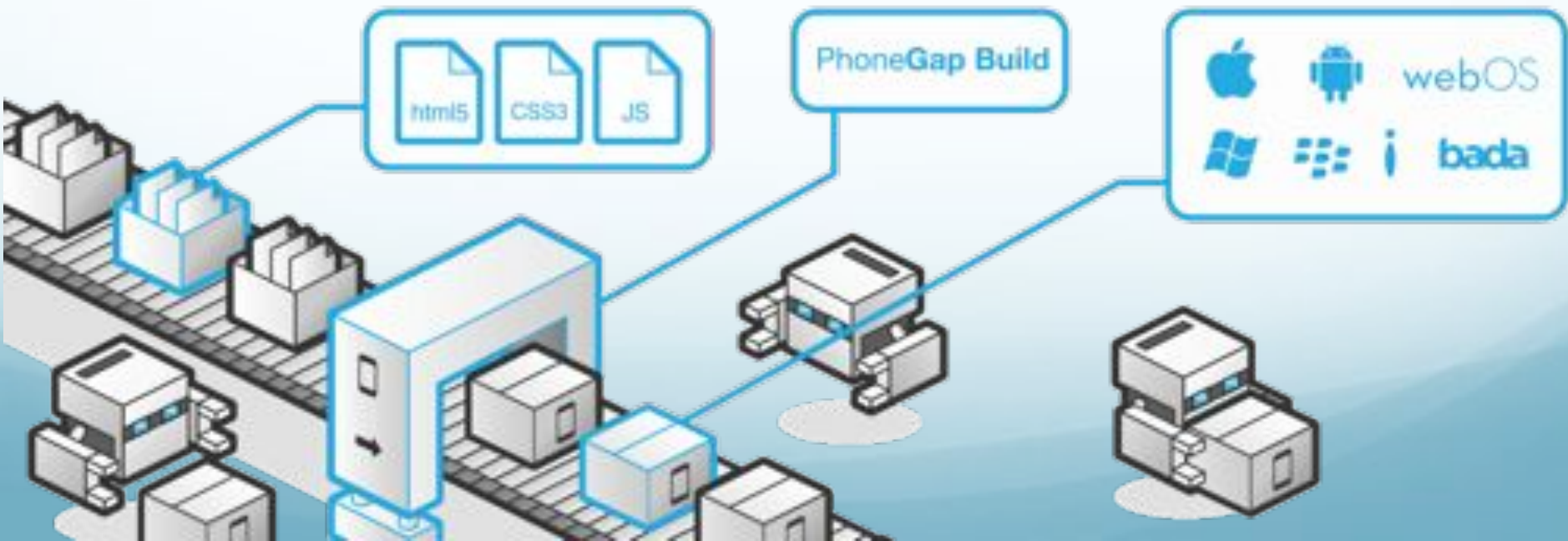
- Disagreement about HTML's role
  - Only give the content and structure of the document, leave visualization to the browser
    - Browsers vary (graphical, text based, mobile devices)
    - User preferences vary (some people like larger fonts)
    - Environment varies (screen sizes, fonts available, etc.)
  - But authors want to control what the document looks like
- Trend towards separating content from presentation
  - Cascading Style Sheets – presentation information only
  - HTML documents contain little formatting

# Many Choices...

- Build a Native app (for specific platform) that runs like a website (WebView).
- Build a Native “bare bone” app that connects to a website. The app is actually located on the website (Sencha, jQTouch, jQuery Mobile, etc.)
- Build your app in the Cloud and don't mess with Xcode or Eclipse (PhoneGap).
- Build your app using a third party dev tool.

# PhoneGap (phonegap.com)

- Easily create apps with the “only free open source framework that supports 7 mobile platforms”
- Build apps in the cloud so the entire app is in a “www” directory.
- No Java, Objective-C programming language skills required.





# Build in the Adobe Cloud

- <https://build.phonegap.com/>
- ZIP your www directory
- Upload it to the server
- After a few minutes, download your .apk or other app files for installation on your devices
  
- Supply your paid (\$99 /year) Apple Developer Account info for iOS use.
- NO compiling or using of ANY app development build tools on your local system.

# Use WebKit Based Browser

- Every browser is backed by a rendering engine to draw the HTML/CSS web page.

IE → Trident

Firefox/Sea Monkey → Gecko

Opera → Presto

Safari/Chrome → WebKit

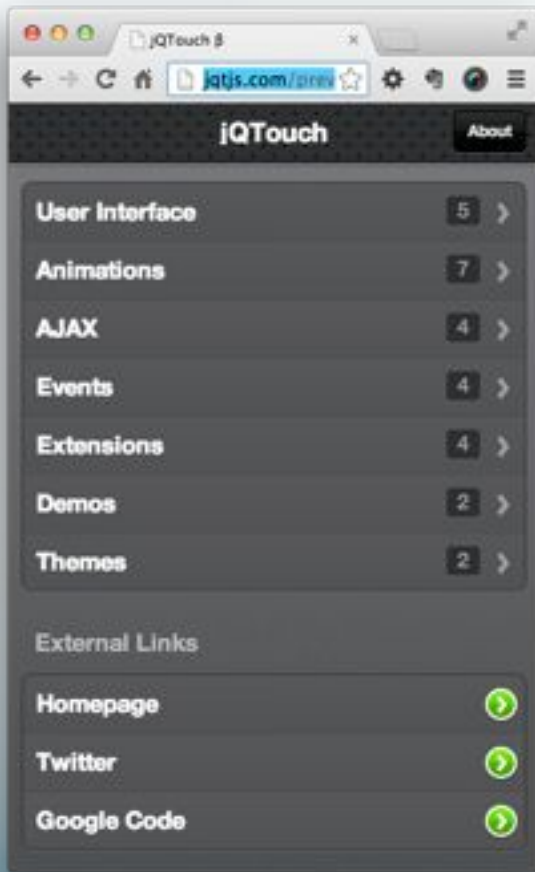
- Most App interfaces will only function on **WebKit** based browsers.



# Sencha

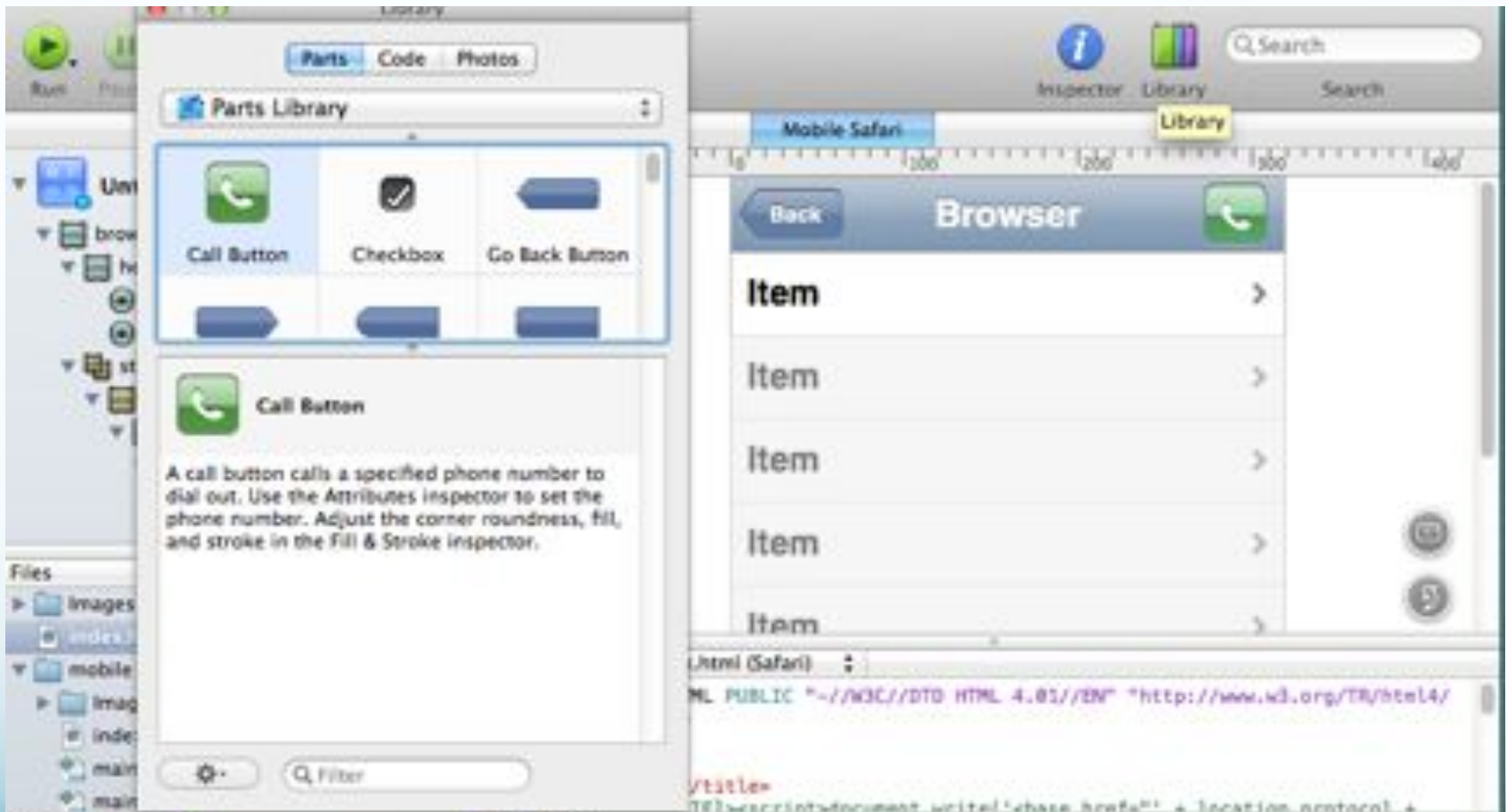
- Build mobile apps for iPhone, Android and Blackberry with **HTML5**
- Commercial and open source Sencha Touch Library versions (Free).
- Sencha Touch is available free charge for commercial and open source application development
- Full service IDE app building tools – Not Free
- Plug-ins for Eclipse, iPhone libraries - Free

# jQT (jqts.com)



- Zepto/jQuery plugin for mobile web development on the iPhone, Android, iPod Touch, and other devices.
- Native WebKit Animations  
Image Preloading
- Callback Events  
Flexible Themes - MIT Licensed
- Swipe Detection - Extensions

# Dashcode



# jQuery Mobile (jquerymobile.com)



- jQuery Mobile isn't a full application framework like SproutCore or Sencha Touch, but the new initiative does aim to bring more native controls to mobile web apps.
- Not supported on all browsers.

<http://jquerymobile.com/gbs>

# The Redirect

- It's not a bad idea to also redirect your main company website to a mobile interpretation of it.
- Use your App version hosted on the internet!



# Server Side Programming

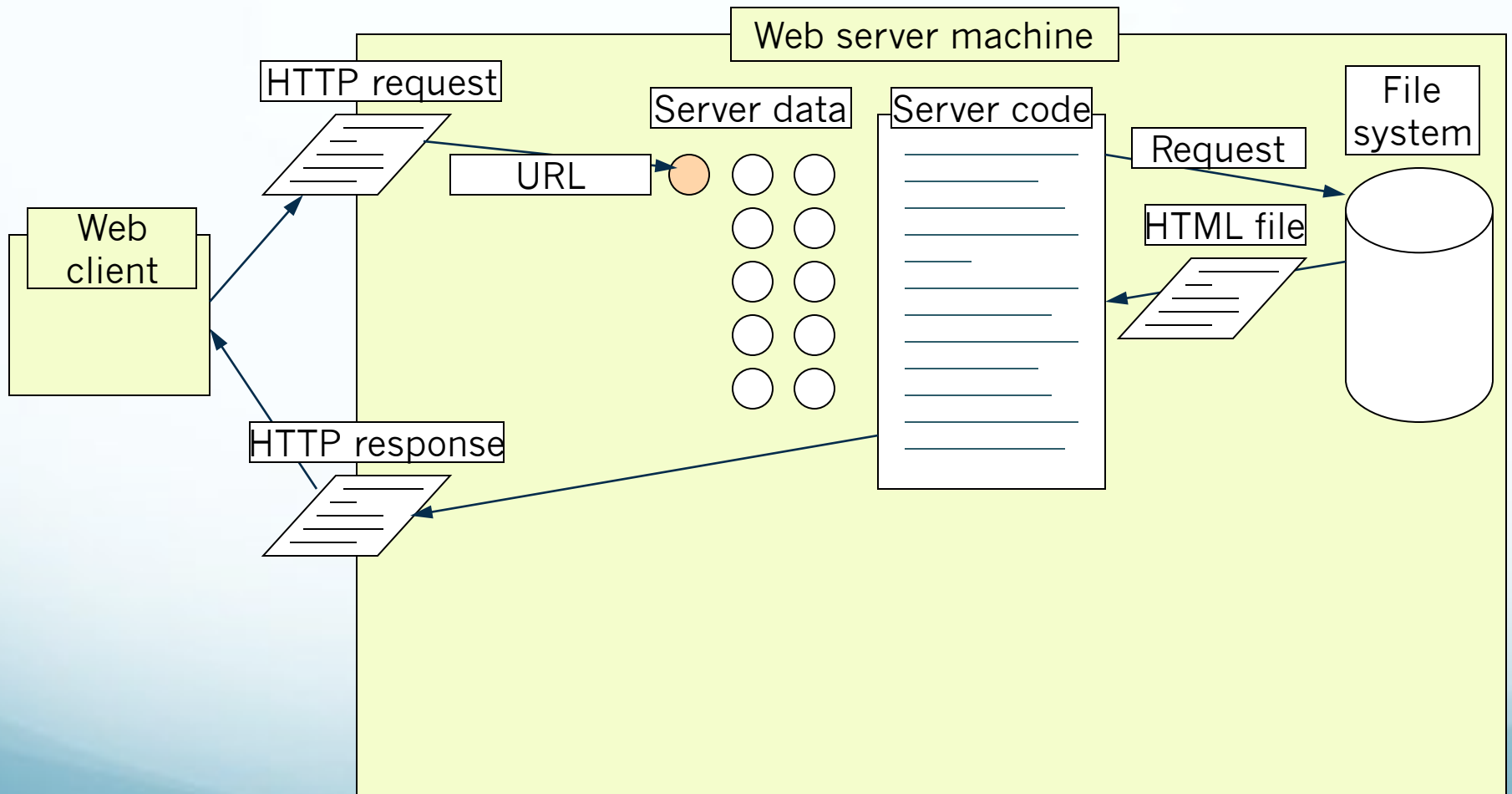
Web Programming



# Server side programming

- Short history
  - CGI – separate programs launched by web server
    - They produce an HTML document as output
    - They receive arguments as input
    - Strong isolation, bad performance
  - Programs embedded inside web page (php, ASP, JSP)
    - Program executed inside web server process
- What are dynamic pages used for?
  - Personalizing based on user identity
  - Interacting with databases (e.g. online banking)
  - Web applications (e.g. web based email)
- Separate database keeps persistent data

# "Lifecycle" of web page



# Client Side Programming

# Why is JavaScript important?

- Web pages can contain JavaScript programs executed inside the browser
  - Supported by all major browsers
    - Microsoft's version called Jscript (the language is the same)
  - User may disable JavaScript due to security fears
    - This is default for some newer versions of Internet Explorer
- Client-side programming important for web because
  - Can promptly validate user input
  - Can update the web page without postback to server
  - Allows page to react to user actions other than pushing a “submit” button – more interactivity
  - Can be used to create interaction and navigation for mobile applications

# What is JavaScript?

- Interpreted, object-oriented programming language with dynamic typing
  - Introduced by Netscape with Netscape 2.0 in 1995
  - Standardized as ECMAScript by ECMA (European Computer Manufacturers Association)
  - Not related to Java other than the name
- Tightly integrated with browser
  - Can handle many types of events generated by the normal interaction between user and browser
  - Can modify the internal objects based on which the browser renders the web page

# Adding JavaScript to a page

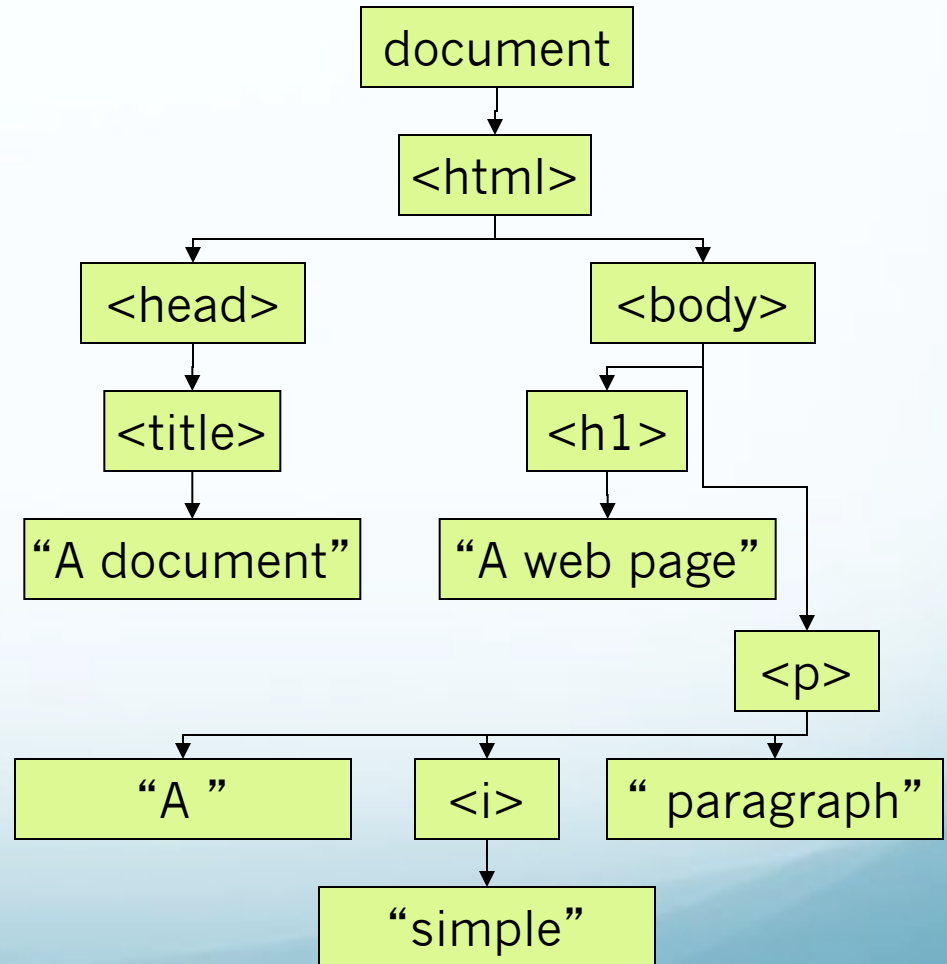
- Using the `<script>` `</script>` tag
  - Text between tags is JavaScript program
  - Can specify external file using `src` attribute
  - Executed as the document is loading
- Value of an attribute such as `onclick`
  - This type of code is called event handler
  - Executed when event happens
  - Can define event handlers for almost any HTML element in page

# Document Object Model

- Describes how the document object from JavaScript can be traversed and modified
  - Represented as tree structure
  - Can add new elements to the page
  - Can change attributes of existing elements
- DOM has levels 0-3 and many sub-standards
- The DOM interface used in other contexts with other languages (C++, Java, python, etc.)

# The document as a tree

```
<html>
  <head>
    <title>A Document</title>
  </head>
  <body>
    <h1>A web page</h1>
    <p>A <i>simple</i>
paragraph</p>
  </body>
</html>
```





# Web Services

# What are web services?

- A form of remote procedure call (RPC): your app (the client) asks another computer (the server) to run a procedure for you
  - Parameters sent over the network from client to server
  - Results sent over network from server to client
- Why would you ever want to do a remote procedure call?
  - Data needed for answer not (easily) accessible in app
  - You want to re-use existing procedures that run in a different environment than your app
  - Your device lacks the resources (i.e. processor capacity, memory, network connection speed) to compute the result
- There are many other forms of RPC older than web services
  - CORBA, DCOM, SunRPC, RMI

# Internals of an RPC framework

- Code for marshalling/un-marshalling – encoding and decoding parameters/results
  - A.k.a. serializing objects
- Description of the available procedures (methods)
  - Using an interface description language (IDL)
- Framework that turns these descriptions into “stubs”
  - On the client the stub makes it look to your program like the stub is executing the procedure locally
  - On the server the stub invokes the procedure
  - The client and server stub interact over the network

# Specific to web services

- They run over http
  - Procedure call is in an http request
  - Result is in an http response
- They use XML to
  - Encode responses
  - Encode requests (sometimes)
  - Describe the procedures (incl. arguments and results)
- Client and server often use different languages
  - Client may be JavaScript code in browser – AJAX
- Client and server are often in different organizations



# JQuery

- Powerful JavaScript library
  - Access parts of a page using CSS or XPath-like expressions
  - Modify the appearance of a page
  - Alter the content of a page
  - Change the user's interaction with a page
  - Rich library of methods for AJAX development (AJAX = Asynchronous JavaScript and XML)
  - With jQuery and AJAX, you can request text, HTML, XML, or JSON from a remote server using both HTTP Get and HTTP Post.

# Basic JQuery

- Selecting part of a document is a fundamental operation
- A JQuery object is a wrapper for a selected group of DOM nodes
- `$()` function is a factory method that creates JQuery objects
- `$("dt")` is a JQuery object containing all the “dt” elements in the document

# Basic JQuery

- `.addClass()` method changes the DOM nodes by adding a 'class' attribute
- The 'class' attribute is a special CSS construct that provides a visual architecture independent of the element structures
- `$("dt").addClass("emphasize")` will change all occurrences of `<dt>` to `<dt class="emphasize">`



# Basic JQuery

- To make this change, put it in a function and call it when the document has been loaded and the DOM is created. Example Function:

```
function doEmph() {  
    $("dt").addClass("emphasize")  
}  
<body onLoad="doEmph()">
```

- Structure and appearance should be separated!

# Basic JQuery

- JQuery provides an independent scheduling point after DOM is created and before images are loaded:  
`$(document).ready(doEmph);`
- No HTML changes required. All done in the script.
- Better solution:

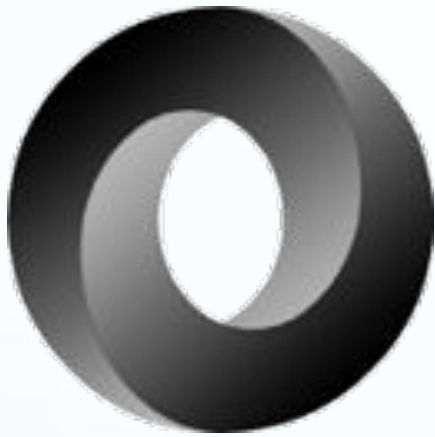
```
$(document).ready(function(){  
    $("dt").addClass("emphasize")  
});
```

```
<html><head>  
<script src="jquery.js" type="text/javascript"></script>  
<script src="test.js" type="text/javascript"></script>  
...
```

# JQuery Changes DOM

- `.attr({ 'name', 'value' })`
  - sets a new attribute (or many)
- `$(' <i>hello</i>')`
  - Creates a new element
- `$(' <i>hello</i>').insertAfter('div.chapter p');`
  - Creates element and inserts it into the document
- `.html()` or `.text()` or `.empty()`
  - will replace matched elements with newly created elements

# Have you met JSON?



- JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate.
- Based on a subset of JavaScript
- JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others.
- These properties make JSON an ideal data-interchange language.

Questions?