



Designing Interactive Systems II

Computer Science Graduate Programme SS 2010

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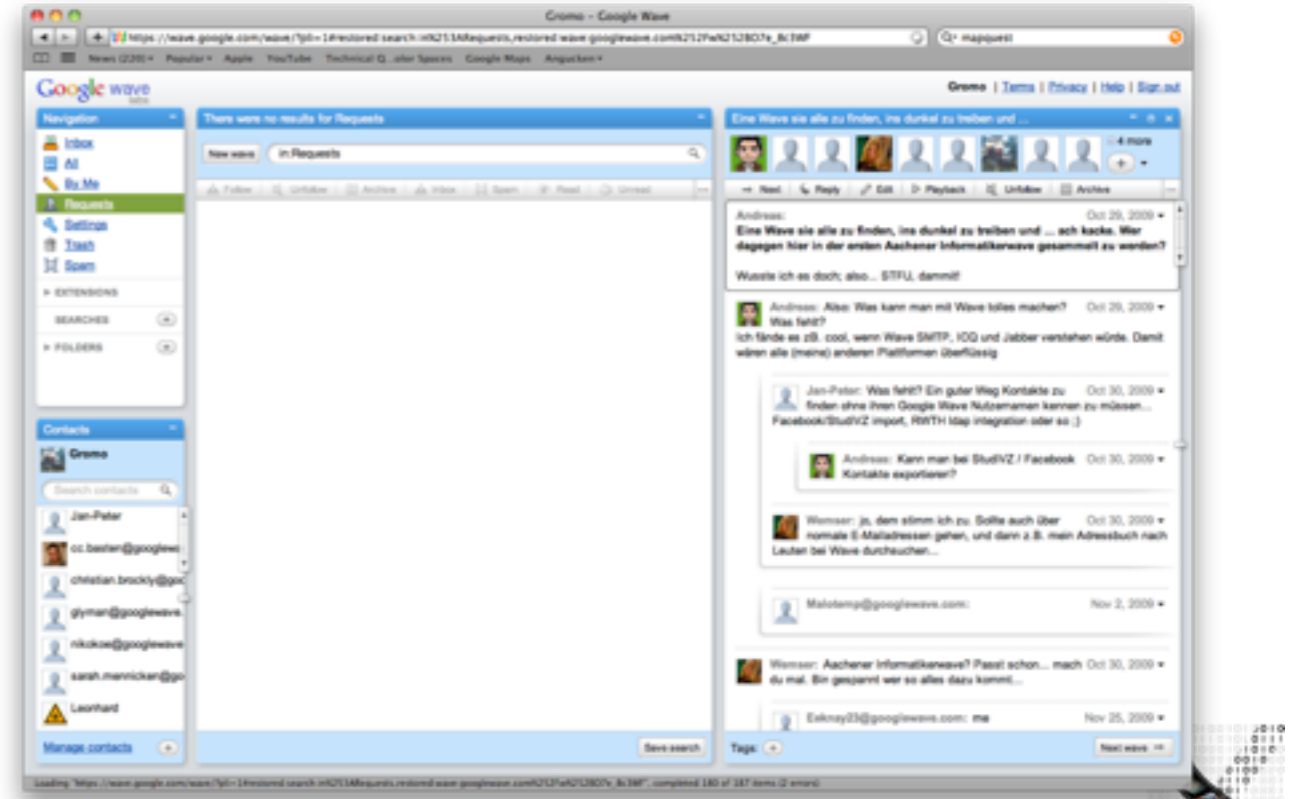
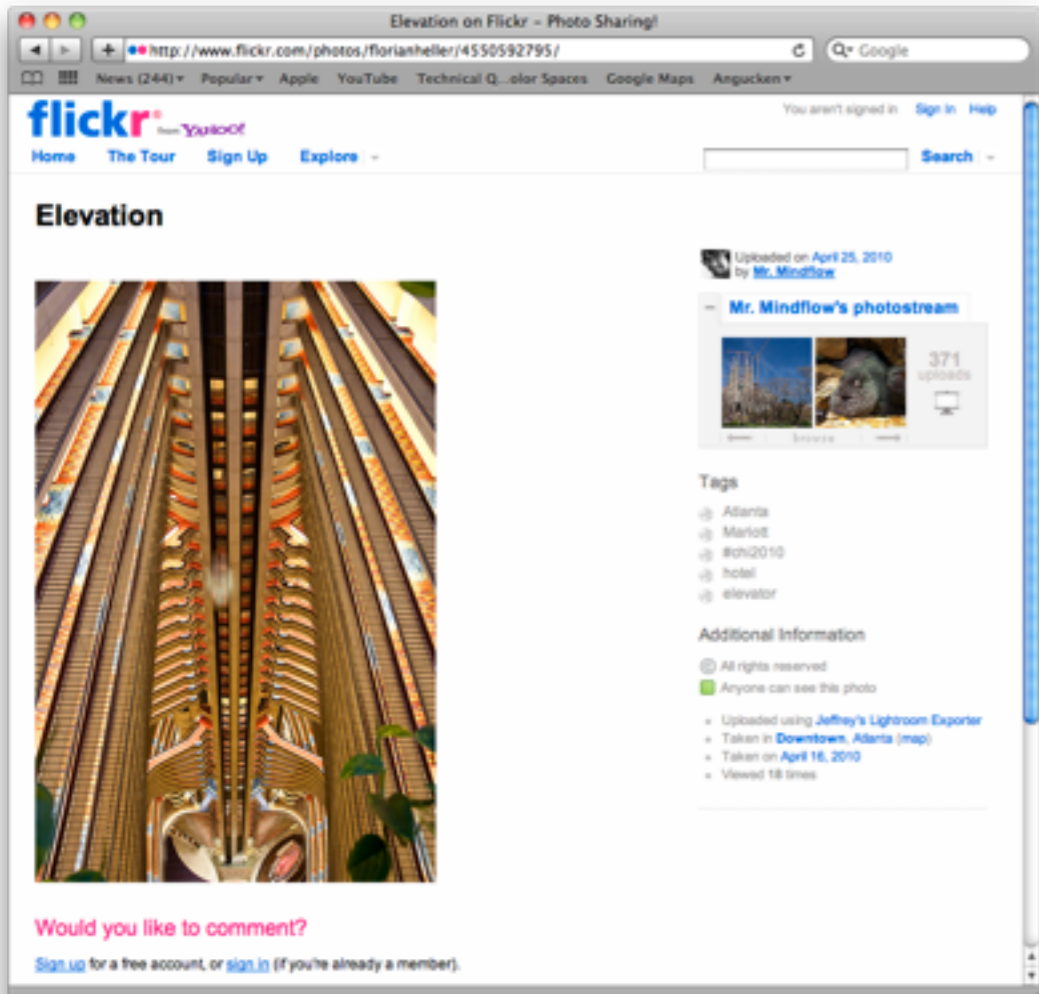
Review: Mobile Window Systems

- Android
 - Reasons for fast growth?
 - Sharing application components
 - Activities, Services, Broadcast Receivers, Content Providers
- iPhone
 - Advantage of the iPhone OS Architecture?
 - Multitasking in iOS 4?
 - Tracking touches?





Web 2.0



Example: 1.0

- Google Maps w/o Java Script



Example: 2.0

- Google Maps





Origin

- Tim O'Reilly and Dale Dougherty at Web 2.0 conference (2004)
- Successful (post dotcom) companies are similar
- Web 2.0 captures this difference



1.0 vs 2.0

double
click



Google AdSense

Kodak Gallery



flickr®

msn
Hotmail



Google
Mail

ENCYCLOPÆDIA
Britannica
eb.com



WIKIPEDIA
Die freie Enzyklopädie



Meme map

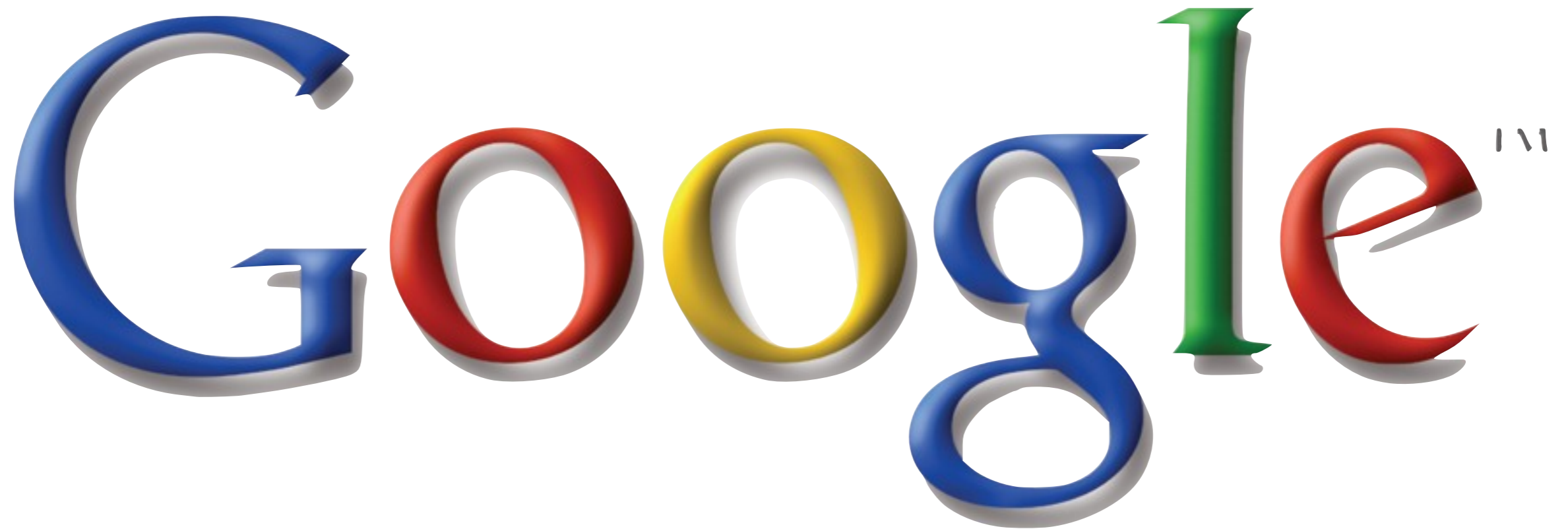
- Tagging, not taxonomy
- Rich User Experiences
- Participation
- Enabling the long tail
- Radical Decentralization
- Radical Trust



I. Web as platform

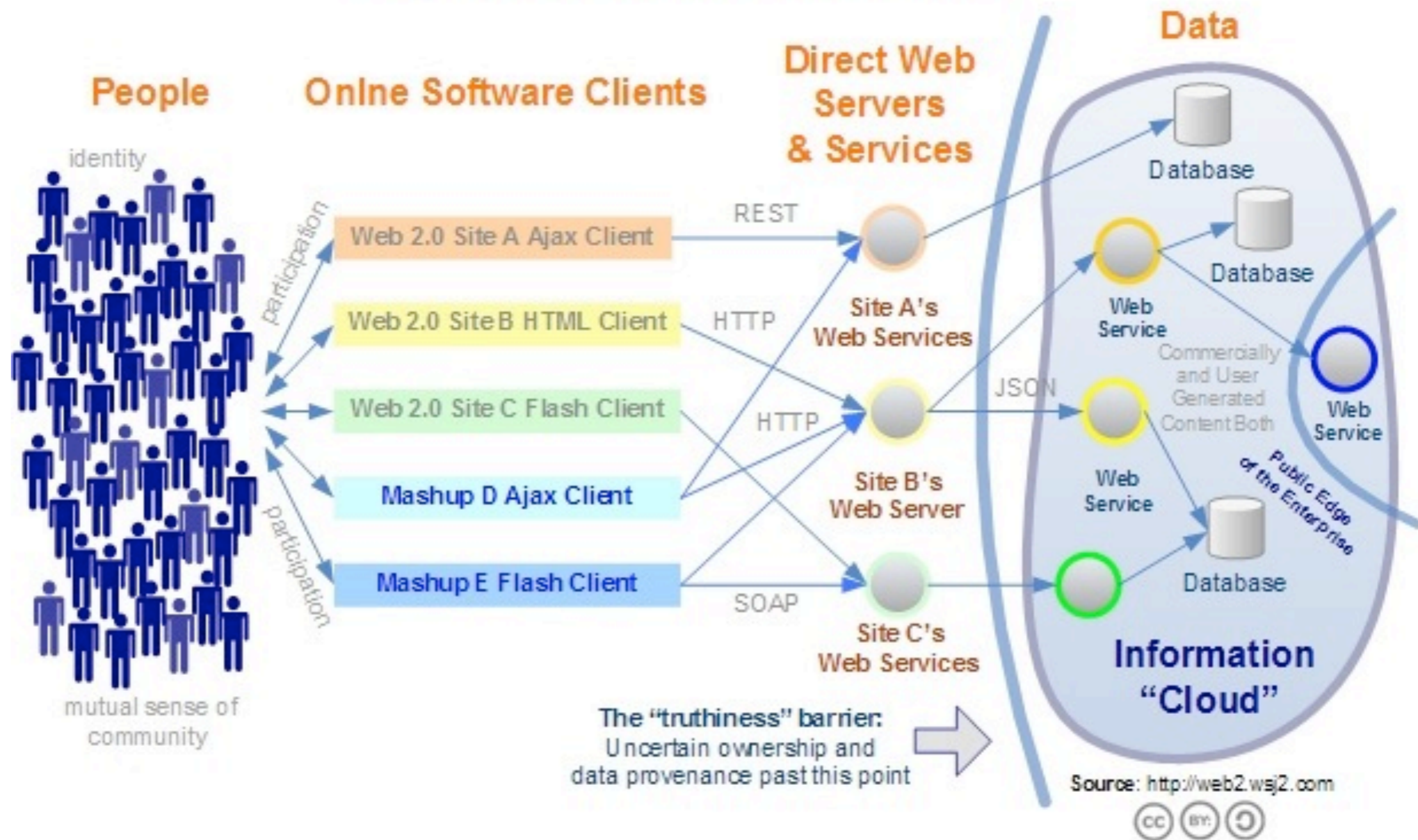


I. The Web as a platform



2. Harnessing Collective Intelligence

The Web 2.0 Architecture of Participation:
"People in the Machine Nurture the Cloud"



3. Data is the next Intel

- Web 2.0 sites have sophisticated databases with valuable information.
- Open APIs for non-commercial use.
- Google Maps API
<http://www.google.com/apis/maps/>



4. End of the software cycle

- Software must be maintained on a daily basis
- Real-time DIA cycle
- Users are treated as co-developers
 - Perpetual beta



5. Lightweight Programming Models

- **Simplicity** in APIs
- Generates new interesting applications of software
- Barrier to entry is **low**



5. Software above the level of single device

- Web offers a common point for many different devices.
- PC as mediator between web and mobile device
- Leverage the power of the Web platform
 - Web becomes invisible



6. Rich User Experience

- Full scale applications
- Fluid movements are appealing
- (Re)implementation on the web vs. specialized desktop applications



Exercise

- Thinking of the design principles we've just discussed, think of a website that demonstrates properties of Web 2.0. Provide examples where this site uses these properties. Be prepared to discuss them.
- Web as a platform
 - Harnessing Collective Intelligence
 - Data is the next Intel
 - End of the software cycle
 - Lightweight programming models



Tag Clouds

2007-01-23: State of the Union Address

George W. Bush (2001-)

abandon accountable affordable afghanistan africa aided ally anbar armed army baghdad bless challenges
chamber chaos choices civilians coalition commanders commitment confident confront congressman constitution
corps debates deduction deficit deliver democratic deploy dikembe diplomacy disruptions earmarks economy
einstein elections eliminates expand extremists falling faithful families freedom fuel funding god haven
ideology immigration impose insurgents iran **iraq** islam julie lebanon love madam marine math medicare
moderation neighborhoods nuclear offensive palestinian payroll province pursuing **qaeda** radical regimes resolve
retreat rieman sacrifices science sectarian senate september shia stays strength students succeed sunni tax
territories **terrorists** threats uphold victory violence violent war washington weapons wesley

1996-01-23: State of the Union Address

Bill Clinton (1993-2001)

abandon agreement americorps applaud applies assault balancing ban bipartisan bless borders burdens bureaucracy
bureaucratic campaign chamber chip citizenship classroom cleaner college commit comprehensive covenant
crime criminals dean deficit democrats earn economic education employers enact
endanger endured environmental expand **families** freedom fundamental gaining gangs global god
gore heroes hiring illegal immigrants incomes invest lifetime lobbyists love mccaffrey media medicaid medicare
nuclear oklahoma owe partnership pension polluters pregnancy prosperity punish renew republicans resolve
richard risks safer stabilize strength students succeed synagogues tax teach teachers teen teenagers terrorists
threats toxic treaty undermine unemployment values veterans vetoed violence violent war washington
weapons **welfare** workplace

- wordle.com



Enhanced Image Loading

- Photosynth and Seadragon

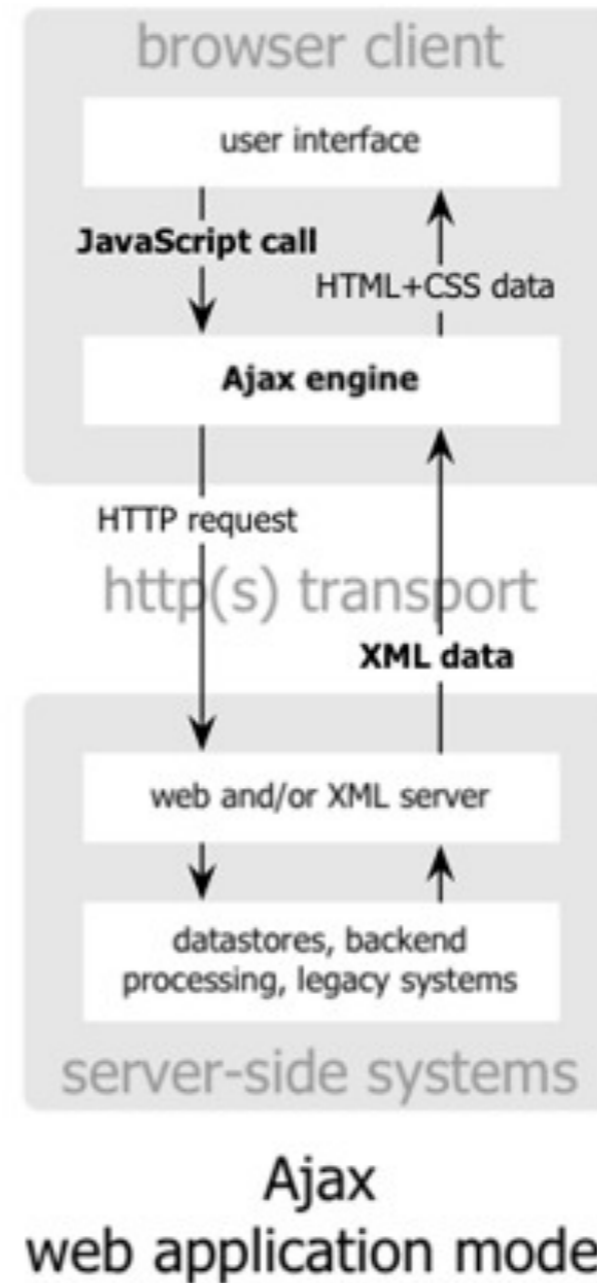
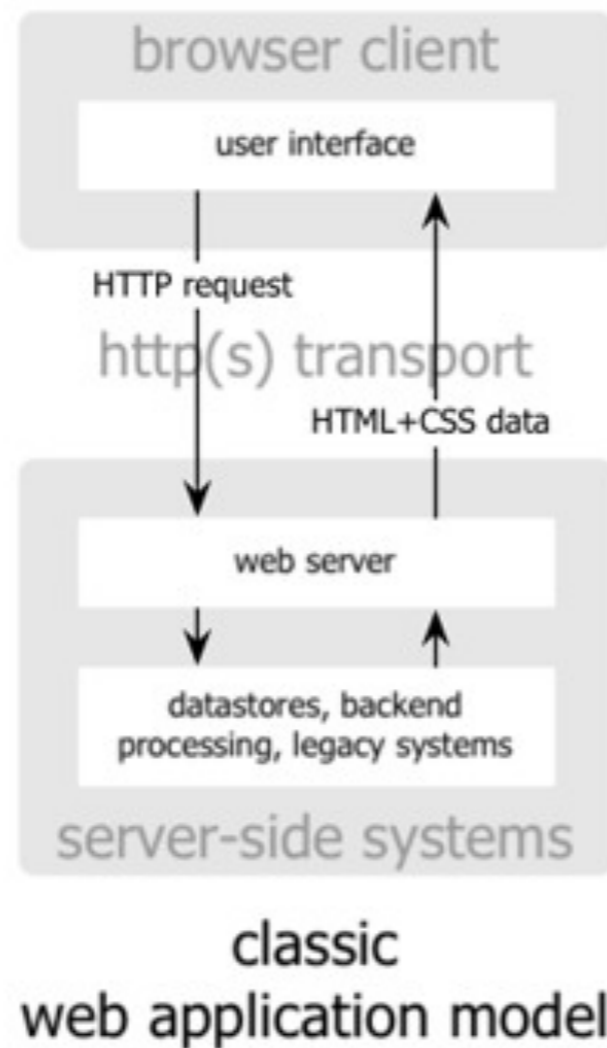


AJAX

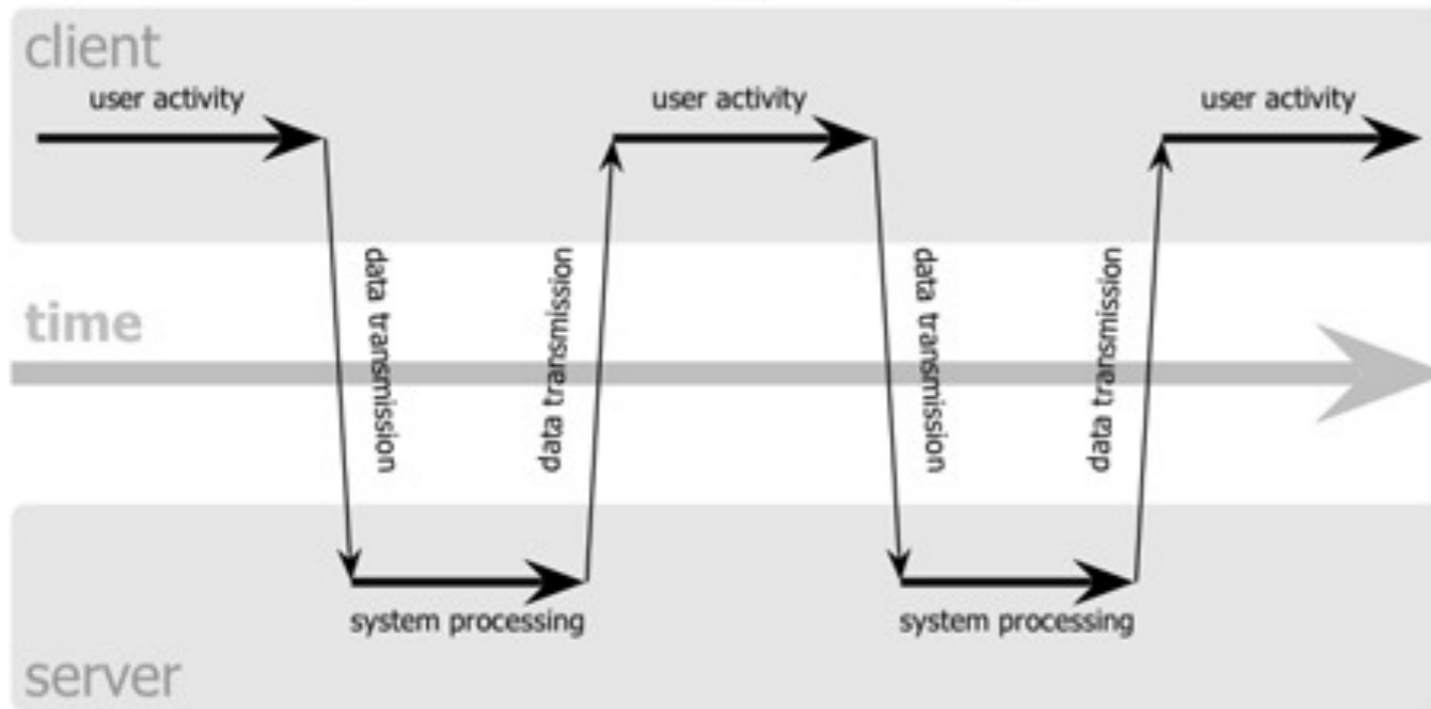
- Asynchronous JavaScript + XML
- What is Ajax?
 - Standards (W3C) using XHTML & CSS
 - Dynamic Display and Interaction using the Document Object Model (DOM)
 - Asynchronous data retrieval: XMLHttpRequest
 - JavaScript is the glue



Architecture

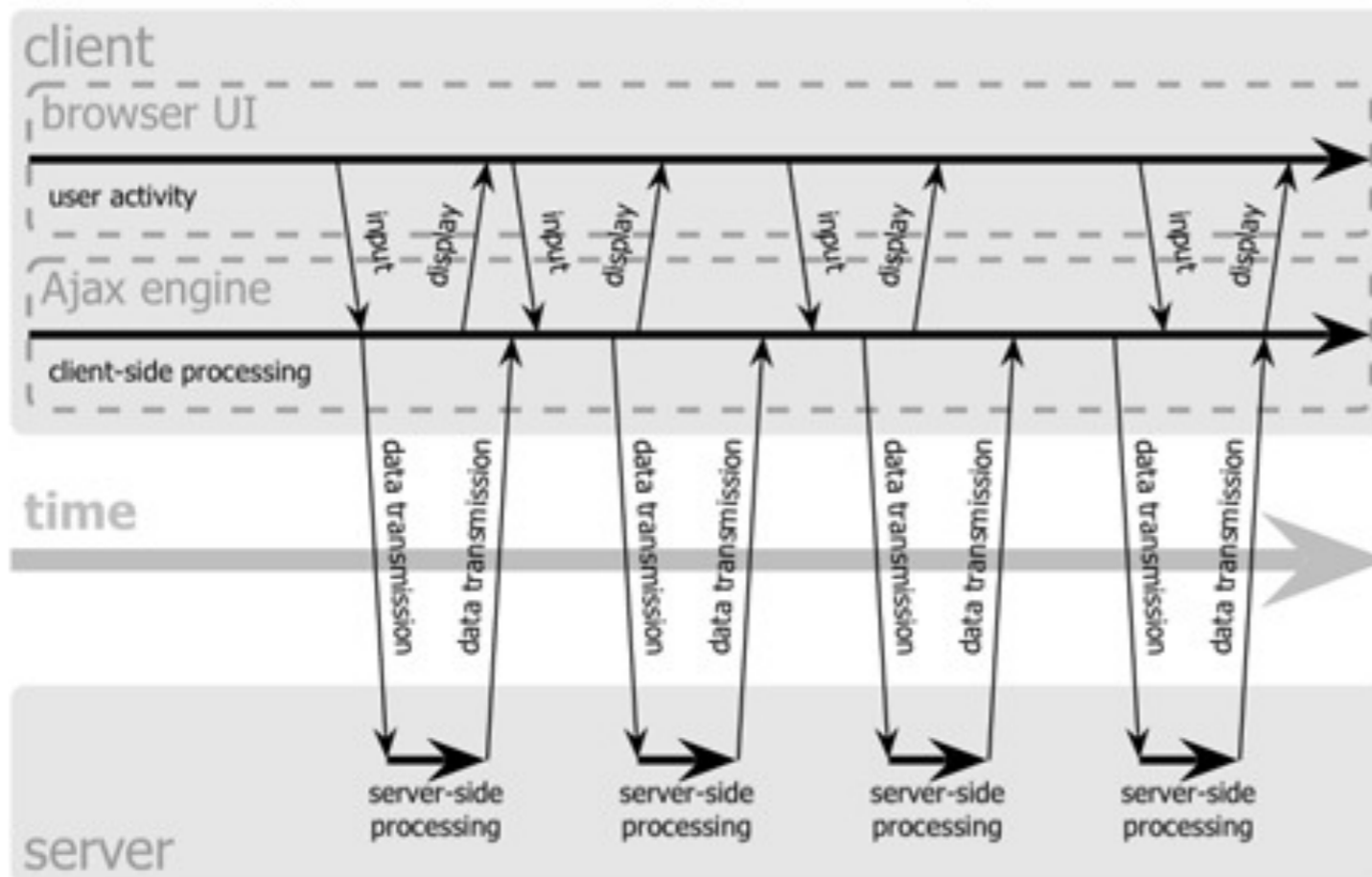


classic web application model (synchronous)



Interaction Model

Ajax web application model (asynchronous)



AJAX: Implications

- High Interactivity: Rich Applications.
- Usability?
 - Expert Users (coders).
 - How will this affect the Long Tail?
 - Accessibility not being considered
 - Changed Web behavior





Google Web Toolkit (GWT)

- Build AJAX apps in Java
 - <http://code.google.com/webtoolkit/>
- GWT takes care of client-server communication





Developing for the GWT

- Using **Java**
 - Known development process
 - Easy to understand concepts (**events**, **listeners**)
 - Simple distinction between **server** and **client** side code
 - Translation into **high performance** AJAX code
- **Abstraction** of complex processes
 - Image Caching
 - Remote Calls





Model-View-Presenter

- Strict decoupling of Model and View
 - Contrast to MVC



Prototype JS + Script.aculo.us

- Object-oriented browser-independent JavaScript Framework (PrototypeJS)
- User Interface Widgets and Effects (Scriptaculous)
- <http://www.prototypejs.org> + <http://script.aculo.us>



Cappuccino





What is Cappuccino

- Application development framework
- Build web-based applications
- Introduces new language: Objective J
- Two frameworks: AppKit and Foundation



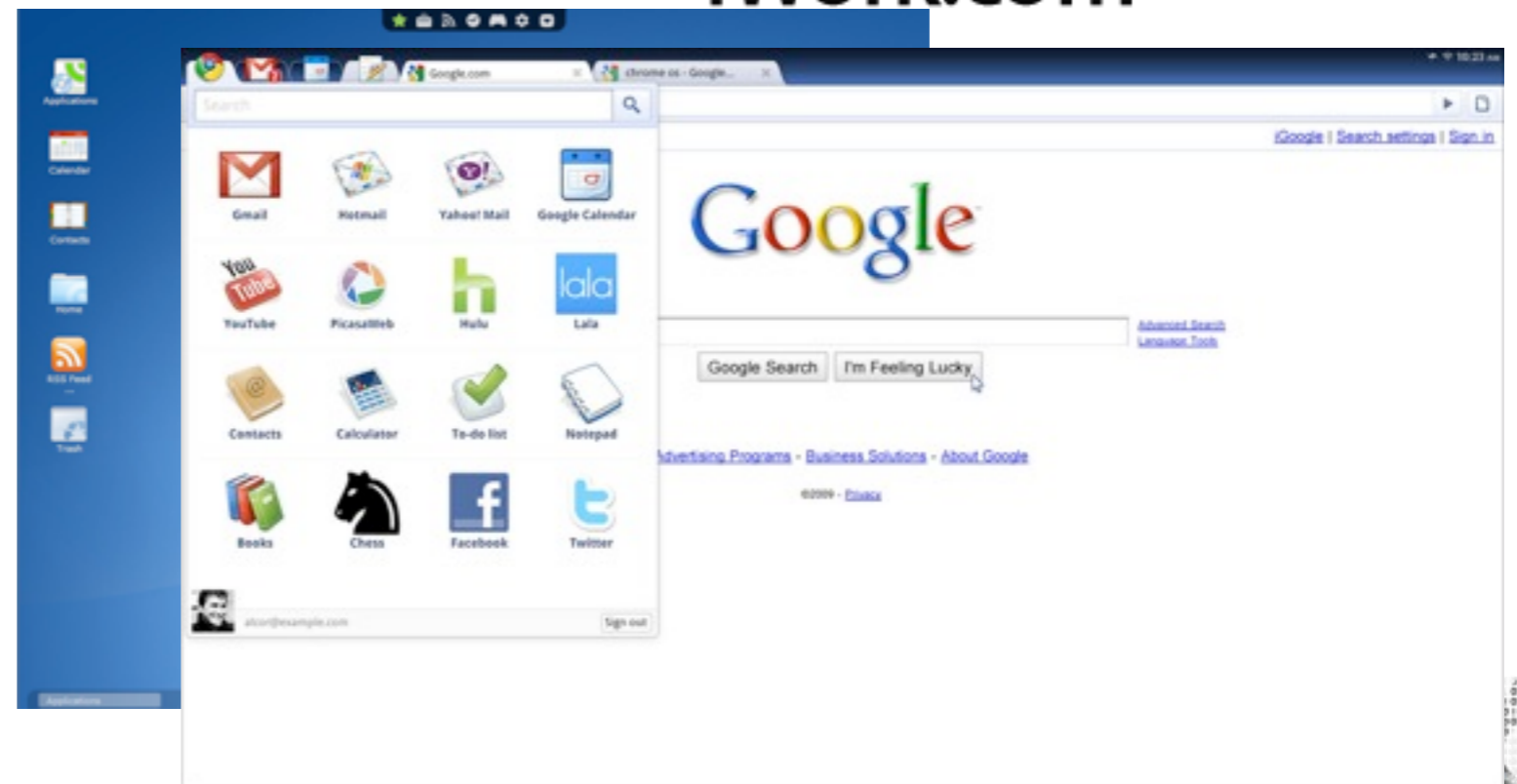


From Web to Desktop

- Mozilla Prism
- NativeHost
- MS Office Live
- iWork.com
- eyeOS
- Chrome OS



iWork.com^{beta}





Objective J

- Strict superset of JavaScript
- Compiled at runtime in the browser
- Adds inheritance, message calls, delegation
- Undo/Redo manager, Layer-backed views

```
- (void)applicationDidFinishLaunching:(CPNotification)aNotification
{
    var theWindow = [[CPWindow alloc
                      initWithContentRect:CGRectMakeZero()
                      styleMask:CPBorderlessBridgeWindowMask],
                    contentView = [theWindow contentView];

    [theWindow orderFront:self];
}
```





Cappuccino

The screenshot displays the Cappuccino web browser interface. The main window, titled "Mockingbird - Untitled", shows a web page with the URL "http://gomockingbird.com/mockingbird/". The page content includes a "Welcome!" message and a "Double click to edit text!" button. A widget palette on the left side of the browser window lists various widgets such as Text, Text Area, Button, Image, and Linkbar. The browser's address bar shows "http://gomockingbird.com/mockingbird/" and the search bar contains "Google". The browser's menu bar includes "New", "Open", "Save", "Edit", and "Export". The browser's toolbar includes "Undo", "Redo", "Group", "Ungroup", "Forward", "To Front", "Backward", "To Back", "Align", "Lock", "Color", "Font Size", "Autosize Text", "Font color", "Share", and "Preview".

Drag a page onto a widget to make a link.

Welcome!

Start typing at any time to search.
Add your widget to the page.

Double click to edit text!

PAGES	
Home	
About	

WIDGETS	
Search here...	
All	
Text	Link
Text	Link
Text Area	Text input box
Button	Yes
Button	Dropdown
Text (multiline)	Linkbar
Image	Vertical link list
Horizontal link list	Horizontal list





Cappuccino Demo





Atlas (beta)

- Cappuccino IDE
- Written in Cappuccino
- Code editor
- Interface builder
- Standalone application for OS X



Project.atlasproj - AppController.j

Debug Desktop Browser

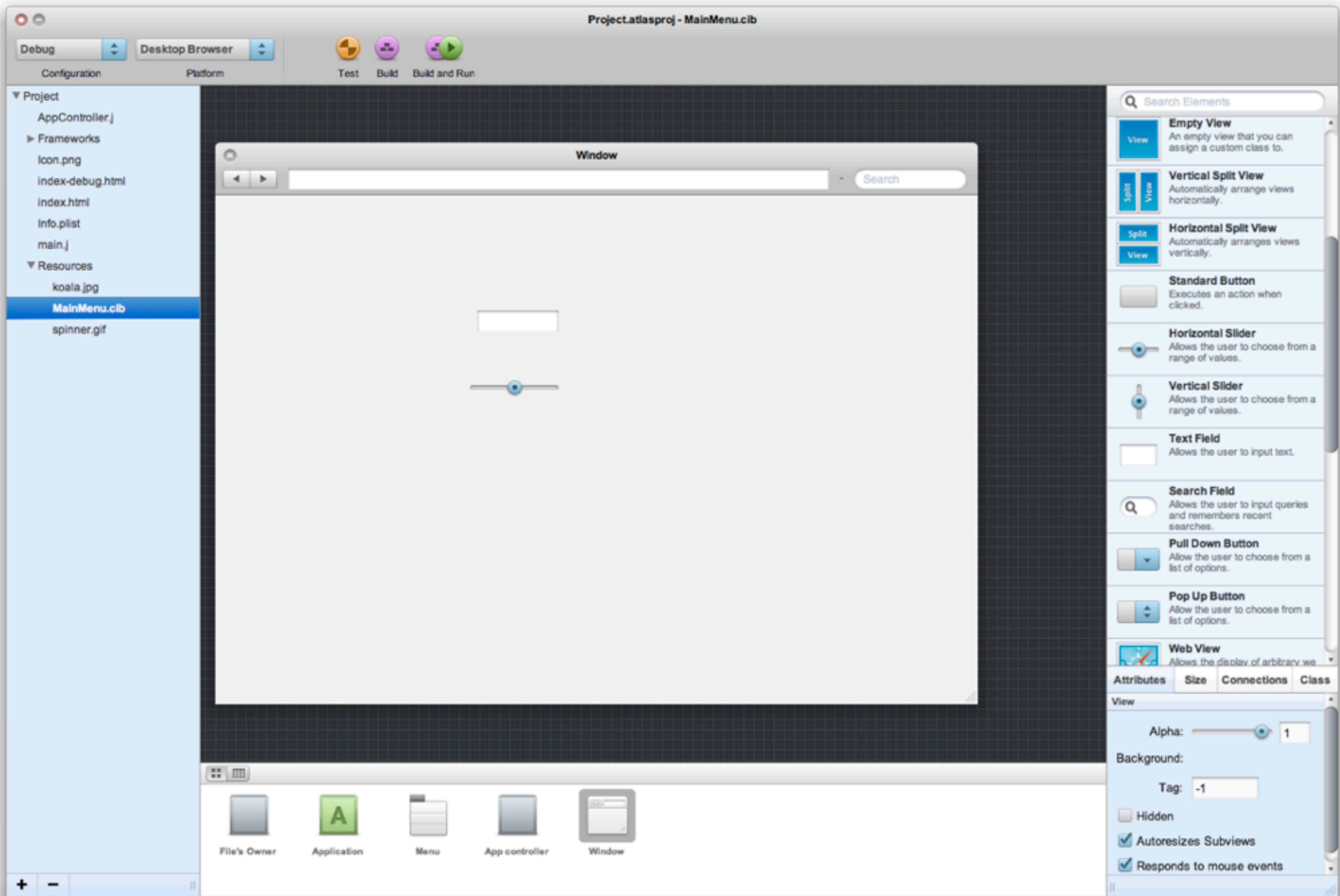
Configuration Platform Test Build Build and Run

```
1 /*
2  * AppController.j
3  * AtlasDemo
4  *
5  * Created by You on July 6, 2010.
6  * Copyright 2010, Your Company All rights reserved.
7  */
8
9 @import <Foundation/CPObject.j>
10
11
12 @implementation AppController : CPObject
13 {
14     @outlet CPWindow    theWindow; //this "outlet" is connected automatically by the Cib
15 }
16
17 - (void)applicationDidFinishLaunching:(CPNotification)aNotification
18 {
19     // This is called when the application is done loading.
20 }
21
22 - (void)awakeFromCib
23 {
24     // This is called when the cib is done loading.
25     // You can implement this method on any object instantiated from a Cib.
26     // It's a useful hook for setting up current UI values, and other things.
27 }
28
29 @end
30
```

Project

- AppController.j
- Frameworks
- loon.png
- index-debug.html
- index.html
- Info.plist
- main.j
- Resources
 - MainMenu.cib
 - spinner.gif







Atlas Demo





HTML 5





Evolution of Web Technologies

- HTML 1991
- HTML 2 1992
- CSS + JS 1996
- HTML 4 1997
- CSS 2 1998
- XHTML 1 2000
- AJAX 2005
- HTML 5 2009





New JavaScript Selectors

Finding elements by class (DOM API)

```
var element = document.getElementById('section1');  
element.focus();  
  
var elements = document.getElementsByTagName('div');  
elements[0].focus();  
  
var elements = document.getElementsByClassName('section');  
elements[0].focus();
```

Finding elements by CSS syntax (Selectors API)

```
var elements = document.querySelectorAll("ul li:nth-child(odd)");  
var elements = document.querySelectorAll("table.test > tr > td");
```





Web Storage

```
// use localStorage for persistent storage  
  
// use sessionStorage for per tab storage  
textarea.addEventListener('keyup', function () {  
    window.localStorage['value'] = area.value;  
    window.localStorage['timestamp'] = (new Date()).getTime();  
}, false);  
textarea.value = window.localStorage['value'];
```





Web SQL, Application Cache

//Web SQL

```
var db = window.openDatabase("Database Name", "Database Version");  
db.transaction(function(tx) {  
    tx.executeSql("SELECT * FROM test", [], successCallback, errorCallback);  
});
```

//Application Cache API

```
<html manifest="cache-manifest">  
window.applicationCache.addEventListener('checking', updateCacheStatus, false);
```

CACHE MANIFEST

```
# version 1
```

```
CACHE:
```

```
/html5/src/refresh.png
```

```
/html5/src/logic.js
```

```
/html5/src/style.css
```

```
/html5/src/background.png
```





Web Workers

```
//main.js:
```

```
var worker = new Worker('extra_work.js');
```

```
worker.onmessage = function(event) { alert(event.data); };
```

```
//extra_work.js:
```

```
// do some work; when done post message.
```

```
postMessage(some_data);
```





Web Sockets

```
var socket = new WebSocket(location);  
socket.onopen = function(event) {  
    socket.postMessage("Hello, WebSocket");  
}  
socket.onmessage = function(event) { alert(event.data); }  
socket.onclose = function(event) { alert("closed"); }
```





Drag'n'Drop , Geolocation

//Drag'n'Drop

```
document.addEventListener('dragstart', function(event) {  
    event.dataTransfer.setData('text', 'Customized text');  
    event.dataTransfer.effectAllowed = 'copy';  
}, false);
```

//Geolocation

```
if (navigator.geolocation) {  
    navigator.geolocation.getCurrentPosition(function(position) {  
        var lat = position.coords.latitude;  
        var lng = position.coords.longitude;  
        var options = { position: new google.maps.LatLng(lat, lng) }  
        var marker = new google.maps.Marker(options);  
        marker.setMap(map);  
    });  
}
```





HTML5 Audio & Video

```
<audio src="sound.mp3" controls></audio>  
document.getElementById("audio").muted = false;
```

```
<video src='movie.mp4' autoplay controls></video>  
document.getElementById("video").play();
```



Play Pause Mute Unmute





HTML5 Graphics

```
<canvas id="canvas" width="838" height="220"></canvas>
```

```
<script>
```

```
var canvasContext = document.getElementById("canvas").getContext("2d");  
canvasContext.fillRect(250, 25, 150, 100);
```

```
canvasContext.beginPath();  
canvasContext.arc(450, 110, 100, Math.PI * 1/2, Math.PI * 3/2);  
canvasContext.lineWidth = 15;  
canvasContext.lineCap = 'round';  
canvasContext.strokeStyle = 'rgba(255, 127, 0, 0.5)';  
canvasContext.stroke();
```

```
</script>
```





Typography with CSS

```
/* Loading fonts */
@font-face {
  font-family: 'LeagueGothic';
  src: url(LeagueGothic.otf);
}

@font-face {
  font-family: 'Droid Sans';
  src: url(Droid_Sans.ttf);
}

/* Text Wrapping */
div {
  text-overflow: ellipsis;
}

/* Text Columns */
-webkit-column-count: 4;
-webkit-column-rule: 1px solid #bbb;
-webkit-column-gap: 2em;
```

The quick brown fox...





Opacity, HSL, Rounded Corners

```
/* Opacity */
```

```
color: rgba(255, 0, 0, 0.88);
```

```
background: rgba(0, 0, 255, 0.80);
```

```
/* HSL Color Model */
```

```
color: hsla(128, 75%, 33%, 1.00);
```

```
/* Rounded Corners */
```

```
border-radius: 39px;
```





CSS Transitions

```
/* Transitions */
```

```
#box {
```

```
    -webkit-transition: margin-left 1s ease-in-out;
```

```
}
```

```
/* Transforms */
```

```
-webkit-transform: rotateY(45deg);
```

```
-webkit-transform: scaleX(25deg);
```

```
-webkit-transform: translate3d(0, 0, 90deg);
```

```
-webkit-transform: perspective(500px)
```





CSS Animations

```
@-webkit-keyframes pulse {  
  from {  
    opacity: 0.0;  
    font-size: 100%;  
  }  
  to {  
    opacity: 1.0;  
    font-size: 200%;  
  }  
}  
div {  
  -webkit-animation-name: pulse;  
  -webkit-animation-duration: 2s;  
  -webkit-animation-iteration-count: infinite;  
  -webkit-animation-timing-function: ease-in-out;  
  -webkit-animation-direction: alternate;  
}
```



Conclusion

- It's good usability to make interfaces more reactive.
 - Web 2.0 approach offers tricks to provide it in a faster way
- Offers a richer experience in the web browser
- It's a continuum (Desktop Application versus Web Browser vs. hosting data online for mobile access)
 - “Computing in the Cloud”
- Still have basic usability issues in websites
 - Jeff Johnson: Web Bloopers

