

Designing Interactive Systems II

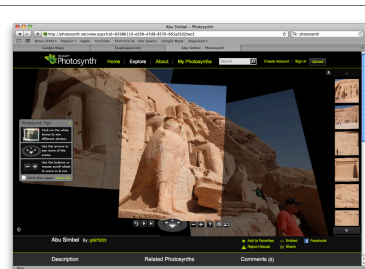
Computer Science Graduate Programme SS 2010

Prof. Dr. Jan Borchers
RWTH Aachen University

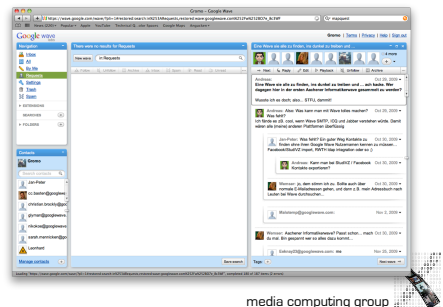
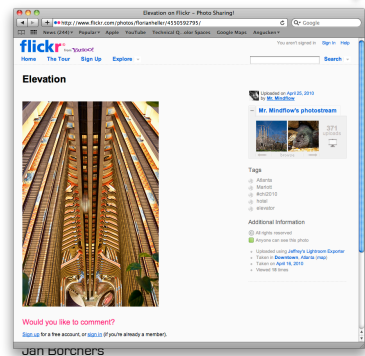
<http://hci.rwth-aachen.de>

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



- 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

ENCYCLOPEDIA
Britannica
eb.com



WIKIPEDIA
Die freie Enzyklopädie



Meme map

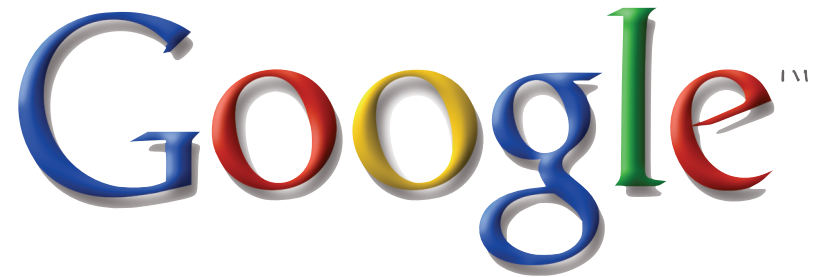
- Tagging, not taxonomy
- Rich User Experiences
- Participation
- Enabling the long tail
- Radical Decentralization
- Radical Trust



I. Web as platform

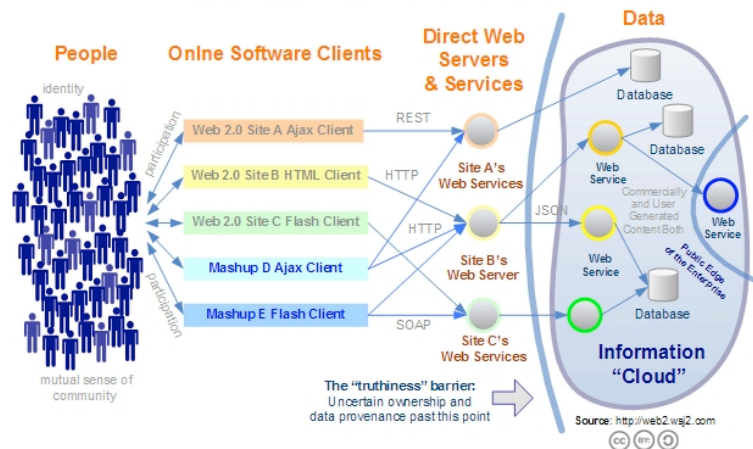


I. The Web as a platform



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

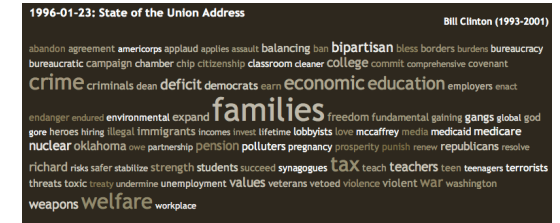


Exercise

- 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



- wordle.com



Enhanced Image Loading

- Photosynth and Seadragon

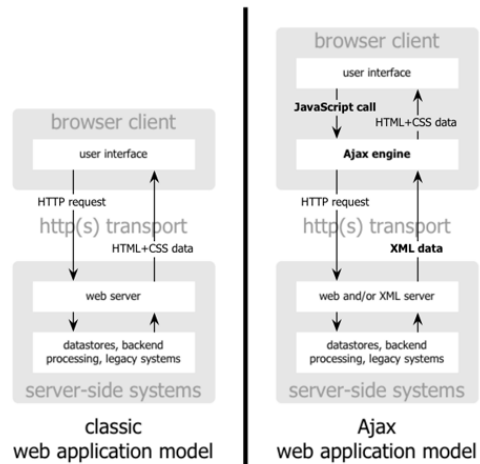


AJAX

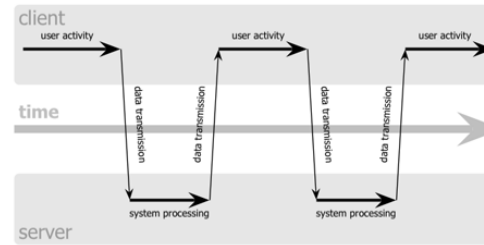
- Asynchronous JavaScript + XML
- What is Ajax?
 - Standards (W3C) using XHTML & CSS
 - Dynamic Display and Interaction using the Document Object Model (DOM)
 - Asynchronous data retrieval: XMLHttpRequest
 - JavaScript is the glue



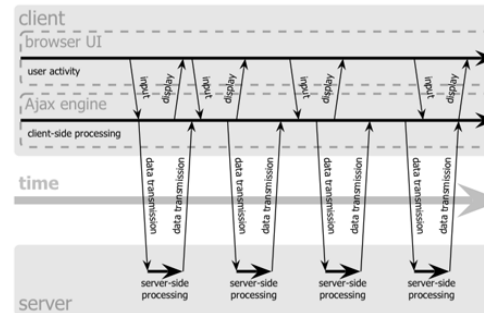
Architecture



classic web application model (synchronous)



Ajax web application model (asynchronous)



Interaction Model

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

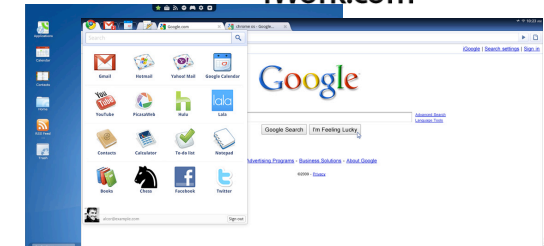


From Web to Desktop

- 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

```

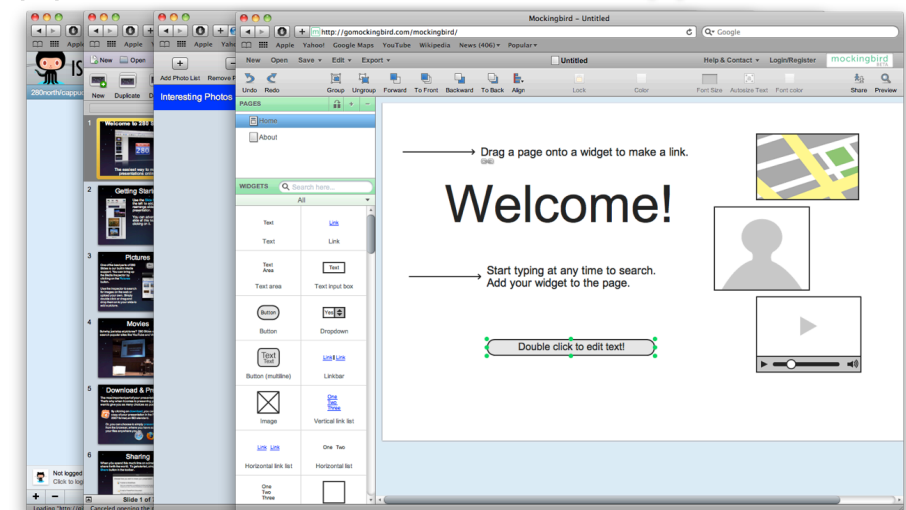
- (void)applicationDidFinishLaunching:(CPNotification)aNotification
{
    var theWindow = [[CPWindow alloc]
                    initWithContentRect:CGRectMakeZero()
                    styleMask:CPBorderlessBridgeWindowMask],
        contentView = [theWindow contentView];

    [theWindow orderFront:self];
}

```



Cappuccino





Cappuccino Demo



Atlas (beta)

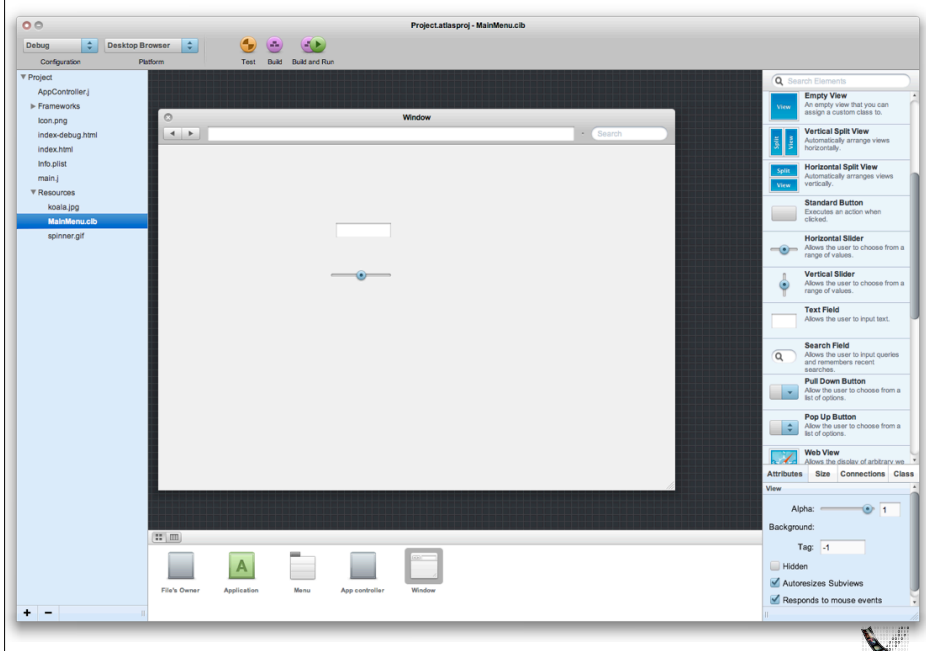
- Cappuccino IDE
- Written in Cappuccino
- Code editor
- Interface builder
- Standalone application for OS X



```

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

```





Atlas Demo



HTML 5



Evolution of Web Technologies

- HTML 1991
- HTML 2 1992
- CSS + JS 1996
- HTML 4 1997
- CSS 2 1998
- XHTML I 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

