

Mobile Hybrid Applications



www.LifeMichael.com

Personal Background



מרצה לקורסי תוכנות
בבסמ"ח ממר"ם (מילואים)

Holon Institute of Technology

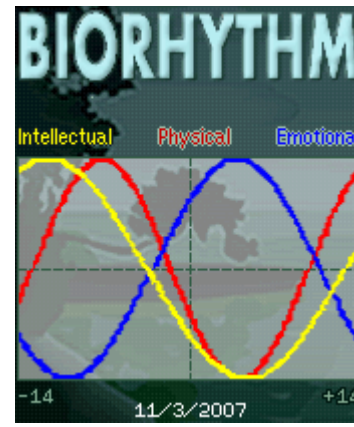
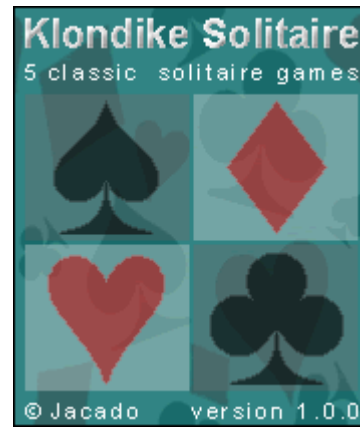
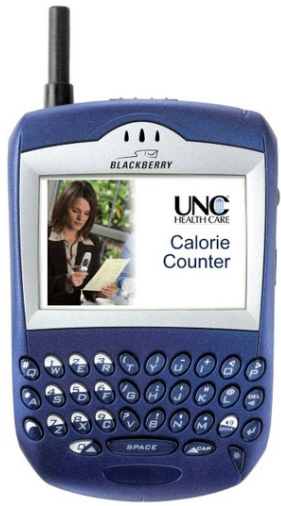
Technion Tel Hai College

Shenkar Software Engineering

SMKB

Tel Aviv College





Mobile Applications Types

Web Applications

- Web based applications. The user uses a web browser. Most mobile telephones' web browsers are based on WebKit.

SMS Based Applications

- Interactivity and content delivery using short text messages.
Excellent market coverage.

MMS Based Applications

- MMS stands for Multimedia Messaging Service. It is the ability to send from a mobile telephone a message composed of text, sound and images.

IVR Applications

- IVR stands for Interactive Voice Response. User calls a phone number and interact with the system and with other users.
- Similarly to SMS, IVR based applications have a good market coverage.

Native Applications

- Native applications for mobile telephones are usually small applications the end user can install on his mobile telephone.



Hybrid Applications

- Hybrid applications include a native part bundled with a web based content.
- The web based content can be either static one, part of the application itself, or dynamically delivered over the web.

Hybrid Applications

- Hybrid applications are usually based on a specific object, implemented based on the phone web browser, that renders the web based content.



WebKit Browser



Development Complexity Comparison

Development Learning Curve	Difficult		Native Applications
	Easy	Web Applications Hybrid Applications	
		Low	High

Development Complexity

Fragmentation Problem Comparison

Fragmentation Problem	Big		Native Applications
	Small	Web Applications Hybrid Applications	
		Fast	Slow
		Development Speed	

Exploiting Device Capabilities Comparison

Fragmentation Problem	Big	Native Applications	
	Small	Hybrid Applications	Web Applications
		Good	Bad

Exploiting Device Capabilities

Maintenance Possibilities Comparison

Piracy Prevention	Difficult		Native Applications
	Possible	Hybrid Applications Web Applications	
		Good	Bad
Keeping Apps Up To Date			

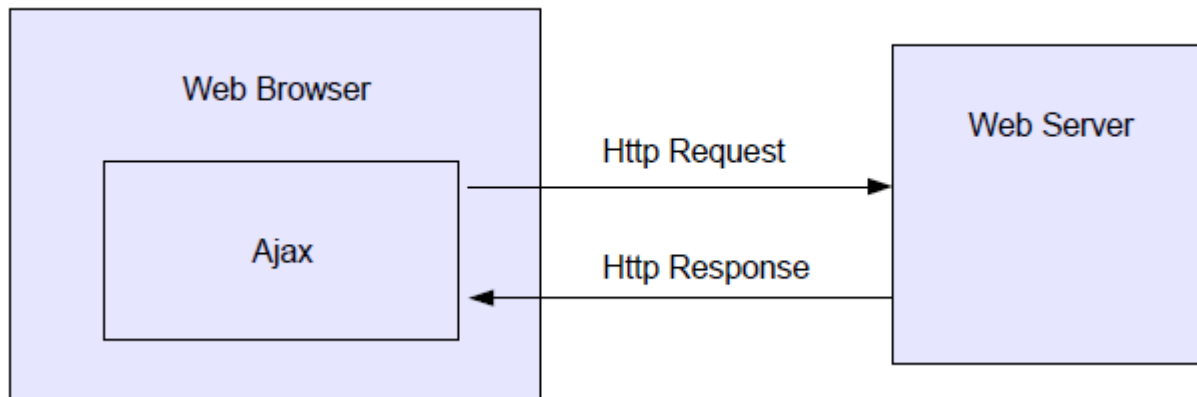
The Power of Java Script

Powerful Language

- JavaScript is an object oriented programming language with functional programming capabilities.

Ajax

- We can develop JavaScript code that perform the HTTP interaction with the server side.



DOM

- The JavaScript programming language allows us to interact with the web page DOM and even change it.

JavaScript Libraries

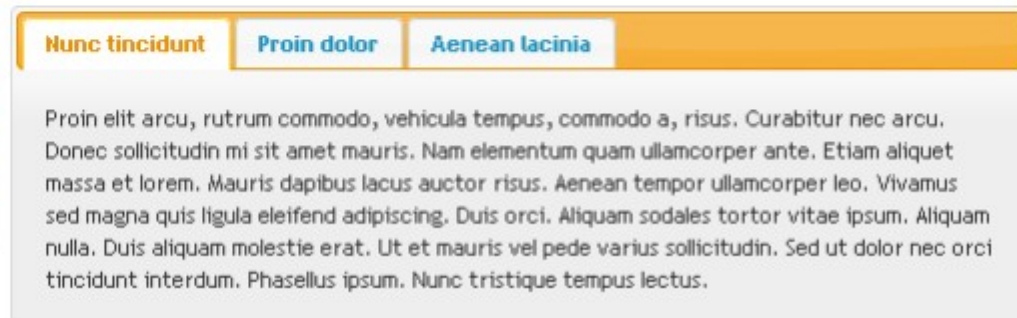
- The web browsers differs in their support for executing JavaScript.
- The result was the emergence of various JavaScript libraries that ease our development process and provide a solution for the web browsers differentiation.

The jQuery Library

- This library allows us to develop cross platform user interface compatible with most available web browsers.



The jQuery Library



The jQuery Mobile Library

- The jQueryMobile is a JavaScript library that enables the creation of unified GUI components across most mobile telephones web browsers, including iPhone, android, Black Berry and others.
- The jQueryMobile library is an open source project. It uses the jQuery library.



The jQuery Mobile Library

The screenshot shows the jQuery Mobile website homepage. At the top, there is a navigation menu with links for jQuery, UI, Mobile, Meetups, Forum, Events, About, and Donate. Below this is a secondary menu with links for Docs and Demos, Download, Platforms, Contribute, Forum, and Blog. The main content area features the jQuery logo and a central announcement for 'JQUERY MOBILE 1.0 BETA 1 RELEASED!'. The announcement text describes jQuery Mobile as a 'Touch-Optimized Web Framework for Smartphones & Tablets' and highlights its unified user interface across mobile devices. To the right of the text are images of a tablet and two smartphones displaying the jQuery Mobile interface. Below the announcement is a section titled 'Project Goals and Strategy' with the sub-heading 'Seriously cross-platform & cross-device'. The browser's address bar shows 'jquerymobile.com' and the Windows taskbar at the bottom displays the date and time as 11:48 AM on 6/29/2011.

jQuery Mobile | jQuery Mo x +

jquerymobile.com

jQuery UI Mobile Meetups Forum Events About Donate

jQuery mobile framework

Docs and Demos Download Platforms Contribute Forum Blog

JQUERY MOBILE 1.0 BETA 1 RELEASED!

jQuery Mobile: Touch-Optimized Web Framework for Smartphones & Tablets

A unified user interface system across all popular mobile device platforms, built on the rock-solid jQuery and jQuery UI foundation. Its lightweight code is built with progressive enhancement, and has a flexible, easily themeable design.

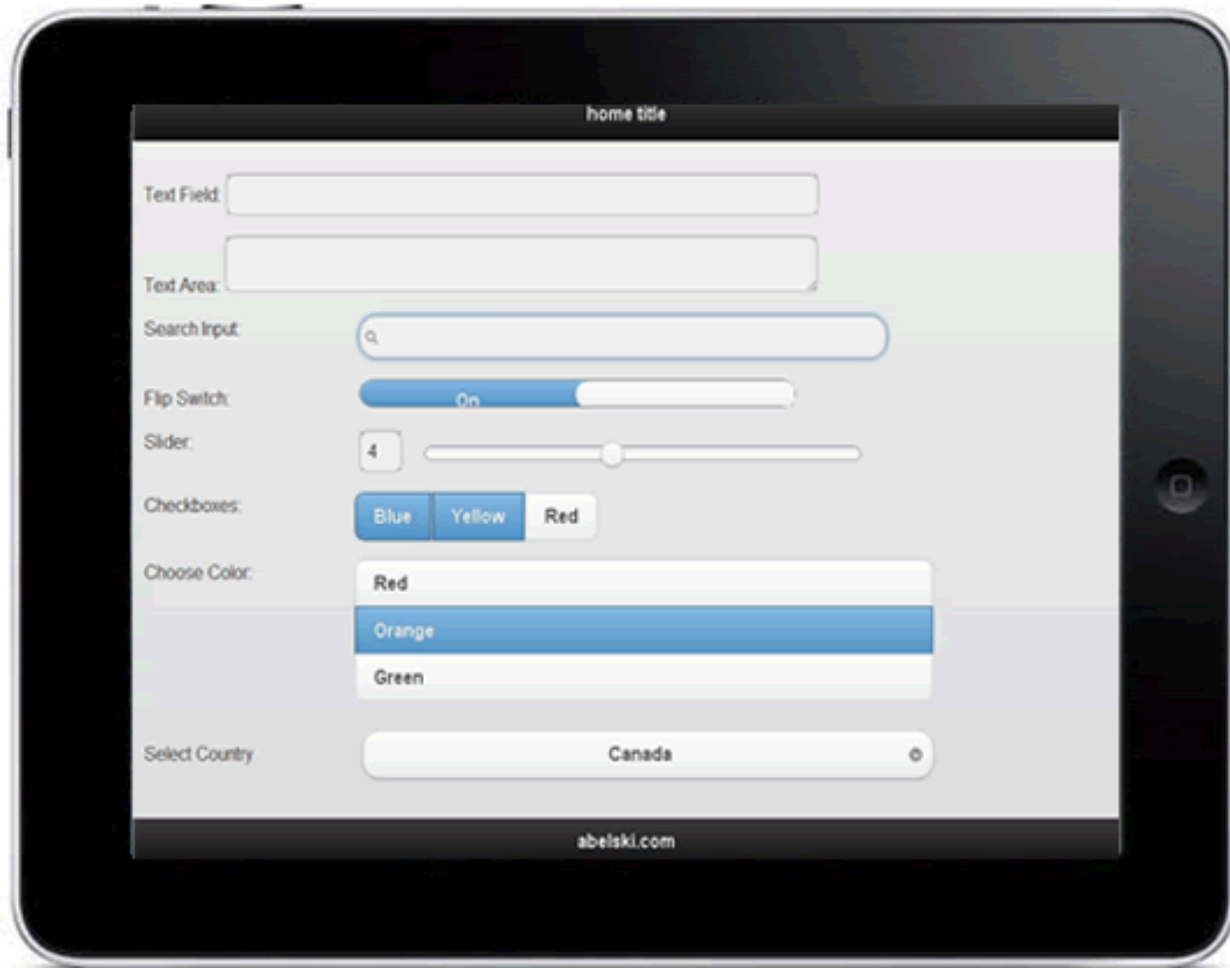
[Beta 1 Release Notes](#)

Project Goals and Strategy

Seriously cross-platform & cross-device

EN 100% 11:48 AM 6/29/2011

The jQuery Mobile Library



Sencha Touch

- The SenchaTouch JavaScript library provides us with an alternative for the jQueryMobile.

<http://dev.sencha.com/deploy/touch/examples/>

Sencha Touch

The screenshot shows the Sencha Touch product page. At the top, there is a navigation bar with links for 'Log in / Register', 'Forum', 'Learn', and 'API Docs'. Below this is a secondary navigation bar with 'Products', 'Support', 'Training', 'Company', 'Blog', and 'Store'. The main content area features the Sencha logo and the product name 'Sencha Touch Mobile JavaScript Framework'. There are two buttons: 'Buy Support' and 'Download'. Below the product name, there are four mobile devices (BlackBerry, iPhone, Android, and another BlackBerry) displaying different app screens. To the right of the devices, the text reads: 'The First HTML5 Mobile Web App Framework'. Below this, it says: 'Sencha Touch allows you to develop mobile web apps that look and feel native on iPhone, Android, and BlackBerry touch devices. View Examples'. There is also a link to 'Read about our Sencha Touch Theme Contest'. At the bottom of the page, there is a navigation bar with links for 'Overview', 'Demos', 'Style & Design', 'Testimonials', 'Road Map', and 'Licensing'. The Windows taskbar is visible at the very bottom, showing the time as 11:52 AM on 6/29/2011.

The MooTools Library

- This library is known as the JavaScript programming language extension.

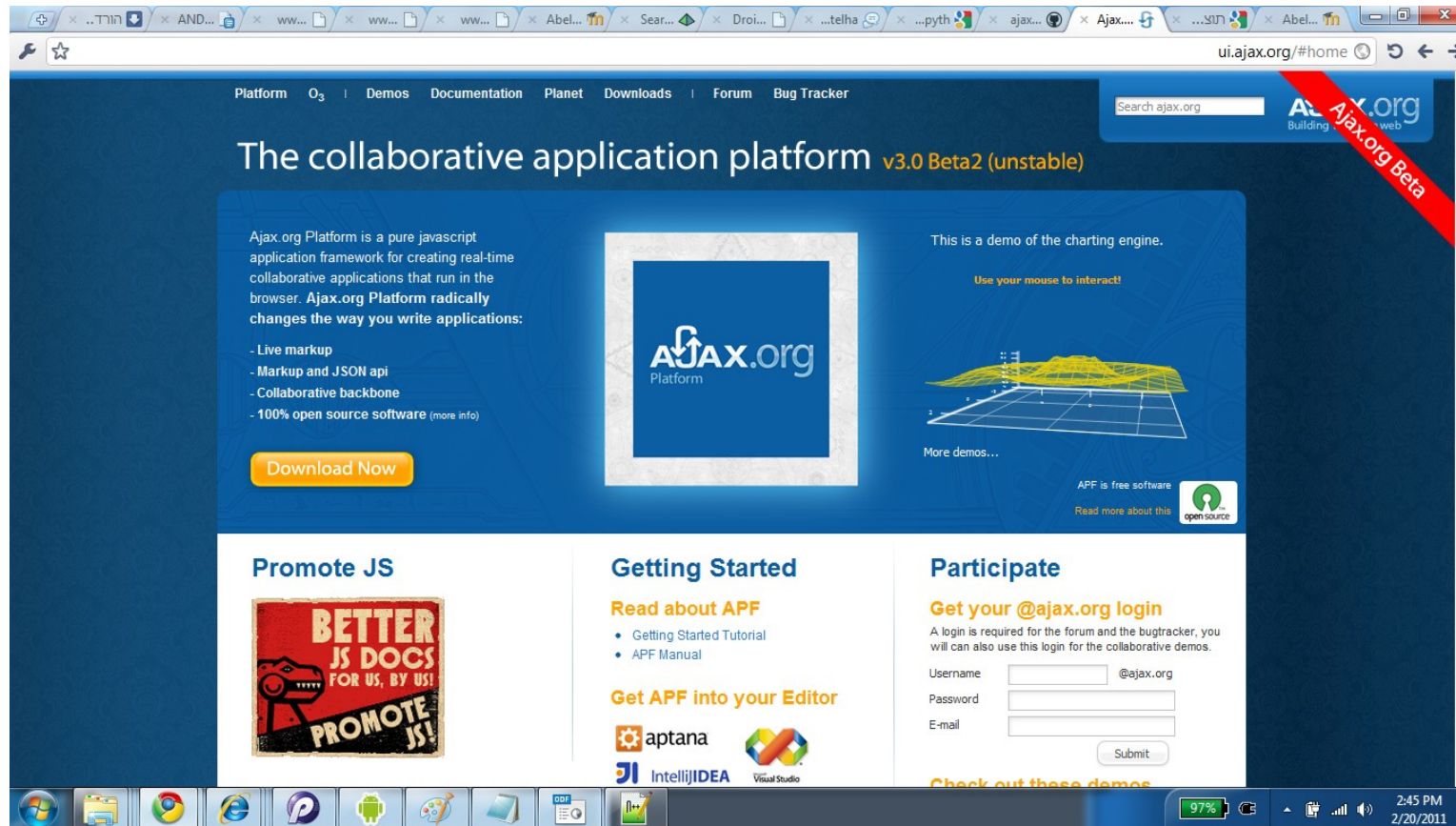
The MooTools Library

```
<script type="text/javascript" src="mootools-core-1.3-full-
compat.js"></script>
<script type="text/javascript">
var Rectangle = new Class({
// properties
width: 0,
height: 0,
// methods
initialize: function(wVal,hVal)
{
    this.width = wVal;
    this.height = hVal;
},
details: function()
{
    alert("width=" + this.width + " height=" + this.height);
},
});
var rec = new Rectangle(5,4);
rec.details();
</script>
```

The ajax.org Library

- This library is known for its various capabilities and especially the one that allows us to develop 3D rich charts models.

The ajax.org Library



<http://ui.ajax.org/#home>

Coco2SD

- The Cocos2d-javascript is a 2D game/graphics engine based on cocos2d-iphone designed to run in a web browser.
- Cocos2D-javascript uses HTML 5 for creating 2D graphics without the need for plug-ins such as Adobe Flash.

Coco2SD



<http://cocos2d-javascript.org/about>

Angry Birds Show Case

The screenshot shows the Chrome Web Store interface for the Angry Birds app. The browser address bar displays the URL: <https://chrome.google.com/webstore/detail/aknpkdffaafgjchaibgeefbgmgeghlj?hl=en-US>. The page header includes the Chrome Web Store logo, the user's email (haim.michael@gmail.com), and a search bar. The app's category is listed as 'Games > Angry Birds'. The main app card features a large image of the game, the title 'Angry Birds', a verified website badge from chrome.angrybirds.com, and the price 'Free'. Below the title, it says 'Birds! Slingshots! Destruction! Feathers! Fun!'. The app has a 5-star rating from 21,000 users and over 1,000,000 users. A blue 'Installed' button is visible in the bottom right corner of the app card. The 'Description' section contains the following text: '**** Surprise! New web-exclusive Chrome-inspired levels ****', 'Want to play the Chrome Dimension levels? Find the Chrome balls hidden in other levels and knock them down with the birds. Good luck!', 'The survival of the Angry Birds is at stake. Dish out revenge on the green pigs who stole the Birds' eggs. Use the unique destructive powers of the Angry Birds to lay waste to the pigs' fortified castles. Angry Birds features hours of gameplay, challenging physics-based castle demolition, and lots of replay value. Each of the 70 levels requires logic, skill, and brute force to crush the enemy.', and a quote: 'Lemme tell ya, these ain't no ordinary finches we're talkin' about. These here are the Angry Birds, the ones that's gonna kick you in the 'nads. And they're the ones on your side. They must be from Galapadapados, or sumptin'.' – Col. Angus, Bird Expert. Below the description is a link to 'Protect wildlife or play Angry Birds!'. The right sidebar shows 'Version: 1.1.2', 'Updated: Tuesday, June 7, 2011', 'Languages: Bahasa Indonesia, Deutsch, English, Filipino, Français, Nederlands, Show all', '1,000,000+ users', '100,000+ weekly installs', and links for 'App support', 'Report abuse', and 'Report an issue'. The Windows taskbar at the bottom shows the system tray with the date and time: 8:27 AM, 6/30/2011.

HTML5 Was Born for Mobile

What is HTML 5.0?

- HTML 5.0 is the new coming specification that aims at replacing HTML 4.01 and XHTML 1.0.
- The main target of HTML 5.0 is to reduce the need for proprietary plug-in-based rich internet application technologies, such as JavaFX, Silverlight and Adobe Flash.

The Standardization Process

- The work on HTML 5.0 has started in June 2004. As of June 2010 it is still in a working draft state at W3C.
- The development of HTML 5.0 is lead by Ian Hickson from Google.
- Parts of HTML 5.0 are already supported by some of the web browsers.

Markup Language

- HTML 5.0 introduces new elements and new attributes that aims at assisting with the development of web applications in accordance with today standards.
- Some of the new tags are semantic only, such as the `<nav>` and the `<footer>` tags that replace `<div>`.
- Some of the new tags, such as the `<audio>` and the `<video>` tags, provide new functionality.

Markup Language

- Some of the HTML 4.01 deprecated tags, such as `` and `<center>` were dropped.

Application Programming Interface

- In addition to the new markup elements, HTML 5.0 specifies new scripting application programming interfaces (APIs).

Canvas 2D Graphics

Browser History Management

Offline Storage Database

Media Playback

Drag & Drop

Geo Location API

- The Geo Location API allows the users to share their location with web sites they trust.
- HTML 5.0 allows us to write JavaScript code that finds out the latitude and the longitude.

Geo Location API

```
<html>
  <head>
    <title>Just Simple Title</title>
    <script language="javascript">
      function myfunc(ob)
      {
        alert("latitude="+ob.coords.latitude+" longitude="+ob.coords.longitude);
      }
      function errfunc(ob)
      {
        alert(ob.message);
      }
      if(window.navigator.geolocation)
      {
        window.navigator.geolocation.getCurrentPosition(myfunc,errfunc);
      }
      else
      {
        alert("geolocation is not supported");
      }
    </script>
  </head>
  <body>
    </body>
</html>
```

the support for this api doesn't exist on every browser and those that do support this api still don't support it 100%.

Offline Storage

- The HTML 5.0 specification supports a well structured offline storage solution.
- There are different types of offline storages:
 - Session Storage
 - Local Storage

Offline Storage

```
<html>
  <head>
    <title>session storage page 1</title>
  </head>
  <body>
    <h2>page 1</h2>
    <script language="javascript">
      sessionStorage.setItem('company', 'Zindell Technologies');
    </script>
    The 'company' (id) and 'Zindell Technologies' (value) were set as a key
    value pair in the session storage mechanism.
    <p>
      <a href="session_storage_2.html">next</a>
    </p>
  </body>
</html>
```

Offline Storage

```
<html>
  <head>
    <title>session storage page 2</title>
  </head>
  <body>
    <h2>page 2</h2>
    <script language="javascript">
      function showData()
      {
        alert(sessionStorage.getItem('company'));
      }
    </script>
    <form>
      <input type="button" value="click me" onClick="showData()">
    </form>
  </body>
</html>
```

Web Sockets

- HTML 5 WebSockets defines a communication channel that operates over the web and allows both direction communication over a single socket.
- Using HTML 5 WebSockets we can dramatically reduce unnecessary network traffic and latency.

Web Sockets

- Using HTML 5 WebSockets, when data changes on the web server the web server can send a request to the client. We no longer need to implement a client that polls the server.

Canvas

- The Canvas element allows us to draw 2D graphics on our web page.
- It is a rectangular area we control each one of its pixels.

...

```
<canvas id="myCanvas" width="200" height="100"></canvas>
```

...

Canvas

Once the Canvas was created we can draw various graphics by calling various JavaScript methods on its context.

...

```
<canvas id="my_canvas" width="800" height="600">
</canvas>
```

...

```
<script type="text/javascript">
  var c=document.getElementById("my_canvas");
  var context=c.getContext("2d");
  context.fillStyle="#FFAA00";
  context.fillRect(0,0,120,80);
</script>
```

...

WebGL

- WebGL is an API for 3D graphics within the web browser. OpenGL leads the WebGL standard.
- Similarly to 2D graphics we should call the `getContext` method on our canvas in order to get the context object we can later use for creating the 3D graphics.

WebGL

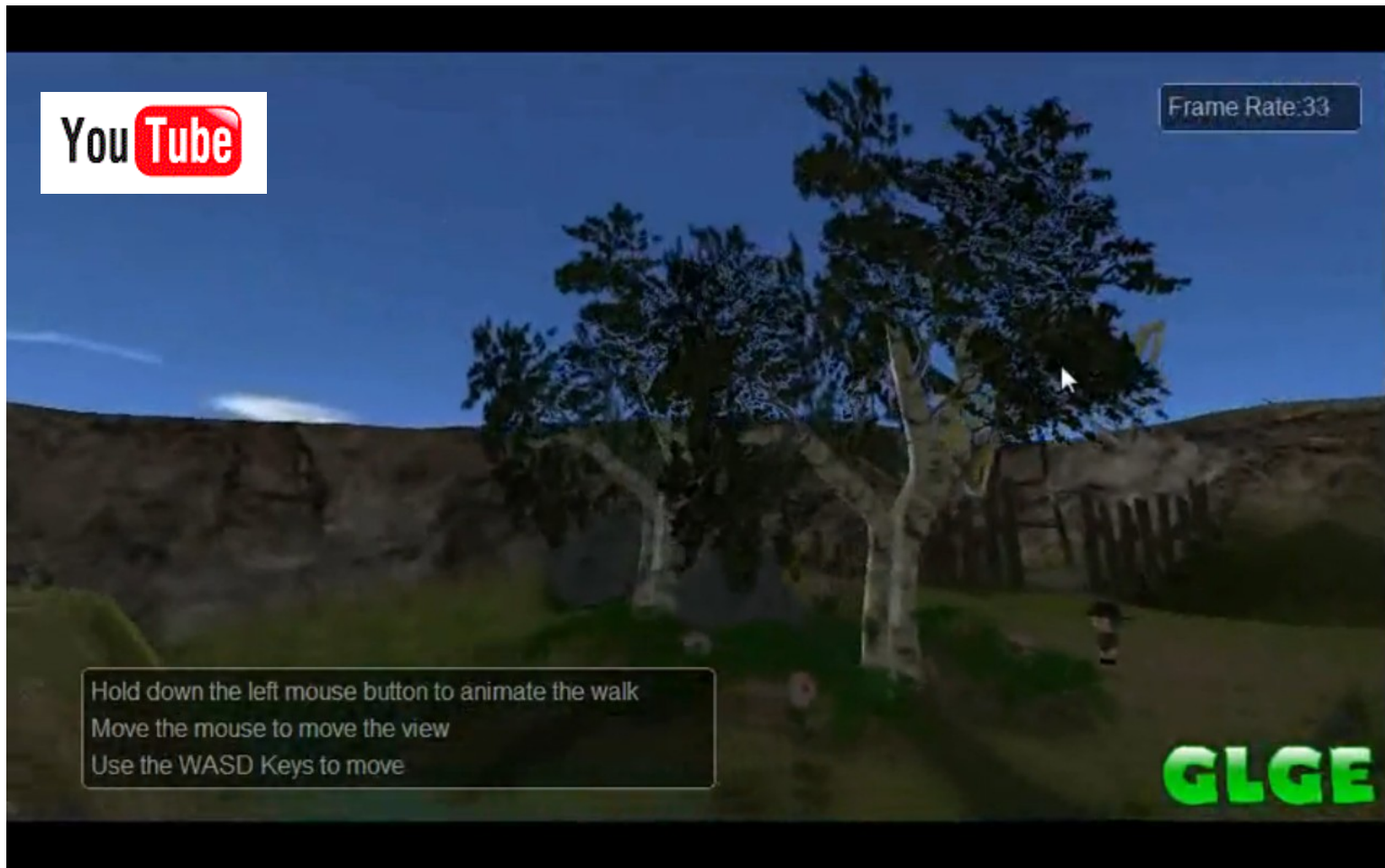
- Similarly to DOM that served as a fundamental layer for the evolve of JavaScript libraries, so is expected with the WebGL.

WebGL

- ❖ The GLGE is a javascript library intended to ease the use of WebGL.

www.glge.org

WebGL

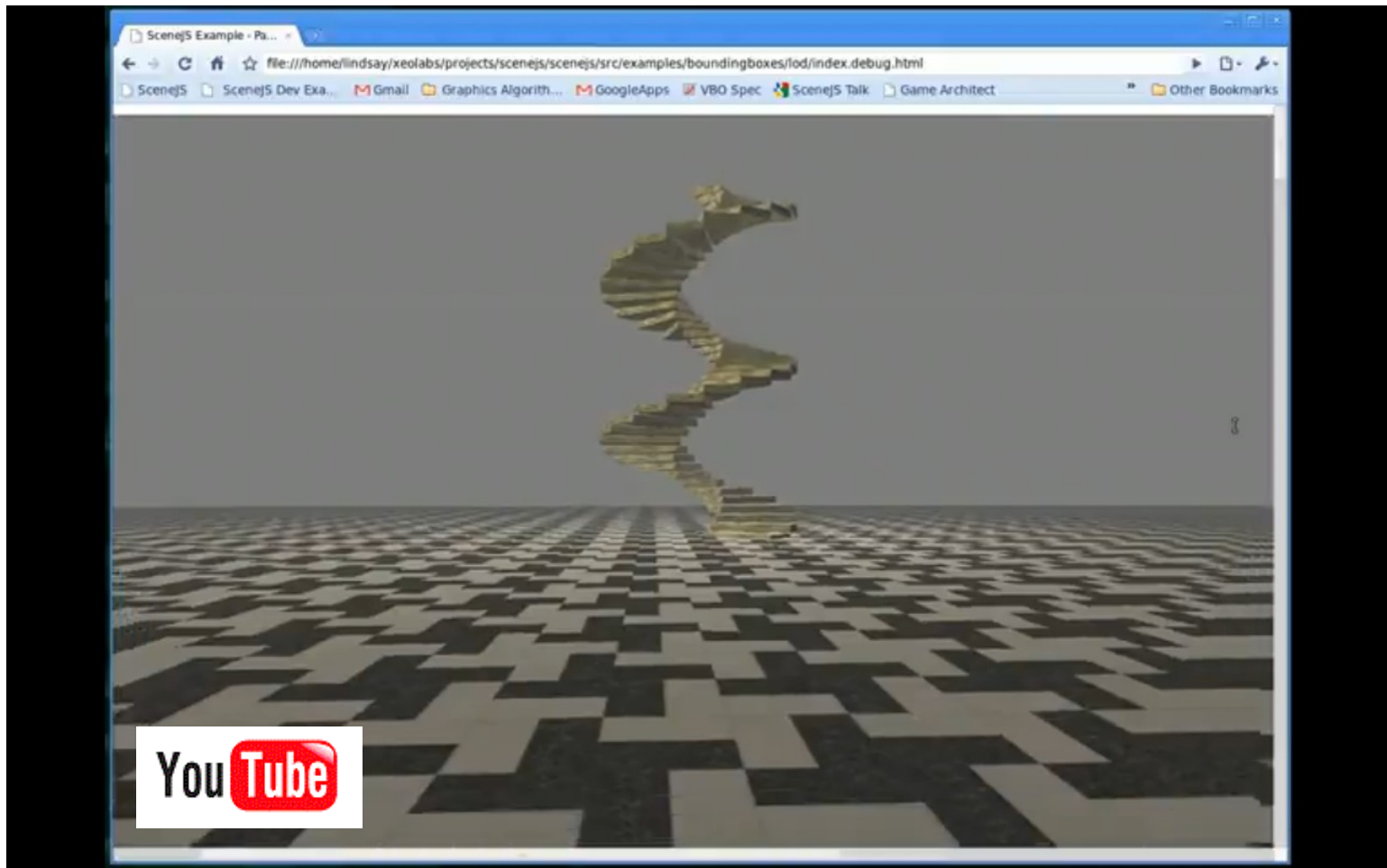


WebGL

- ❖ The SceneJS is a javascript library intended to ease the use of WebGL.

www.scenejs.org

SceneJS



Video

- HTML 5.0 provides a standard for showing video. Using the `<video>` element we can easily embed video within our web page.
- The video formats the `<video>` element supports include the following:
 - MPG4 (with H.264 video codec and AAC audio codec)
 - OGG (with Theora video codec and Vorbis audio codec)

Video

Content we place in between the tags will be displayed when the browser doesn't support displaying video

```
<video src="myvid.ogg" controls="controls">
```

```
</video>
```

We can use the `width` and `height` attributes in order to specify the size

the `control` attribute is for adding the play, pause and volume controls

Video

```
<h1>HTML 5 Playing Video Sample</h1>
```

```
<video
```

```
  src="http://mirror.bigbuckbunny.de/peach/bigbuckbunny_movies/big_buck_bunny_480p_stereo.ogg"  
  controls="controls"  
  width="854"  
  height="480">
```

```
  browser does not support html 5.0
```

```
</video>
```



Audio

- The HTML 5.0 specification allows us playing sound using the `<audio>` element.

...

```
<audio src="mymusic.ogg" controls="controls">
```

```
</audio>
```

...

the control attribute adds the play, pause and volume controls

- The `<audio>` element can play sound files or an audio stream.

Audio

- The HTML 5.0 specification aims at supporting the following sounds formats: MP3, WAV and Ogg Vorbis.

Audio

- We can add the `<source>` child elements in between the audio element tags. The browser will use the first supported format.

...

```
<audio controls="controls">
```

```
  <source src="mymusic.ogg" type="audio/ogg" />
```

```
  <source src="mymusic.mp3" type="audio/mpeg" />
```

```
  browser does not support html 5.0
```

```
</audio>
```

...

Web Workers API

- The HTML 5 Web Workers provides background processing capabilities. We can use the Web Workers API for running separated threads concurrently with the main scripts in our web page.
- The Web Workers API is especially useful in the prevention of user messages such as the 'unresponsive script' message.

Web Workers API

- ❖ In order to get a specific JavaScript code executed concurrently in a separated thread we should instantiate the `Worker` type passing over the name of the file that includes the JavaScript code we want to execute in a separated thread.

Web Workers API

```
<h2>Simple Web Worker Code Sample</h2>
<p>calculating the total number of prime numbers in between 1 and 100000</p>
<div id="total">1</div>
<script>
  var worker = new Worker('background.js');
  worker.onmessage = updateResult;
  function updateResult(event)
  {
    document.getElementById('total').innerHTML = event.data;
  };
</script>
```



Web Workers API

```
var total = 2;
outer: for (var n=1;n<=100000;n++)
{
    for (var i = 2; i <= Math.sqrt(n); i += 1)
    {
        if (n % i == 0) continue outer;
    }
    total++;
    postMessage(total);
}
```

Communication API

- Using the Communication API we can communicate between separated windows, tabs and iframes.

Device Capabilities

Native Code Interaction

- Most platforms already allows us to interact between the native part (Java\C#\ObjectiveC\C++) and the web part (JavaScript) of our application in order to allow code in JavaScript to invoke methods on objects that reside within the native part and vice versa.

Android Web View

- The android platform allows us to embed the built-in web browser as a widget within the user interface of our application.
- Instantiating the `WebView` class we get an object that represents an embedded web browser.
- The `WebView` widget is implemented based on the web kit web browser the android platform includes.

Android Web View

```
package com.abelski.samples;

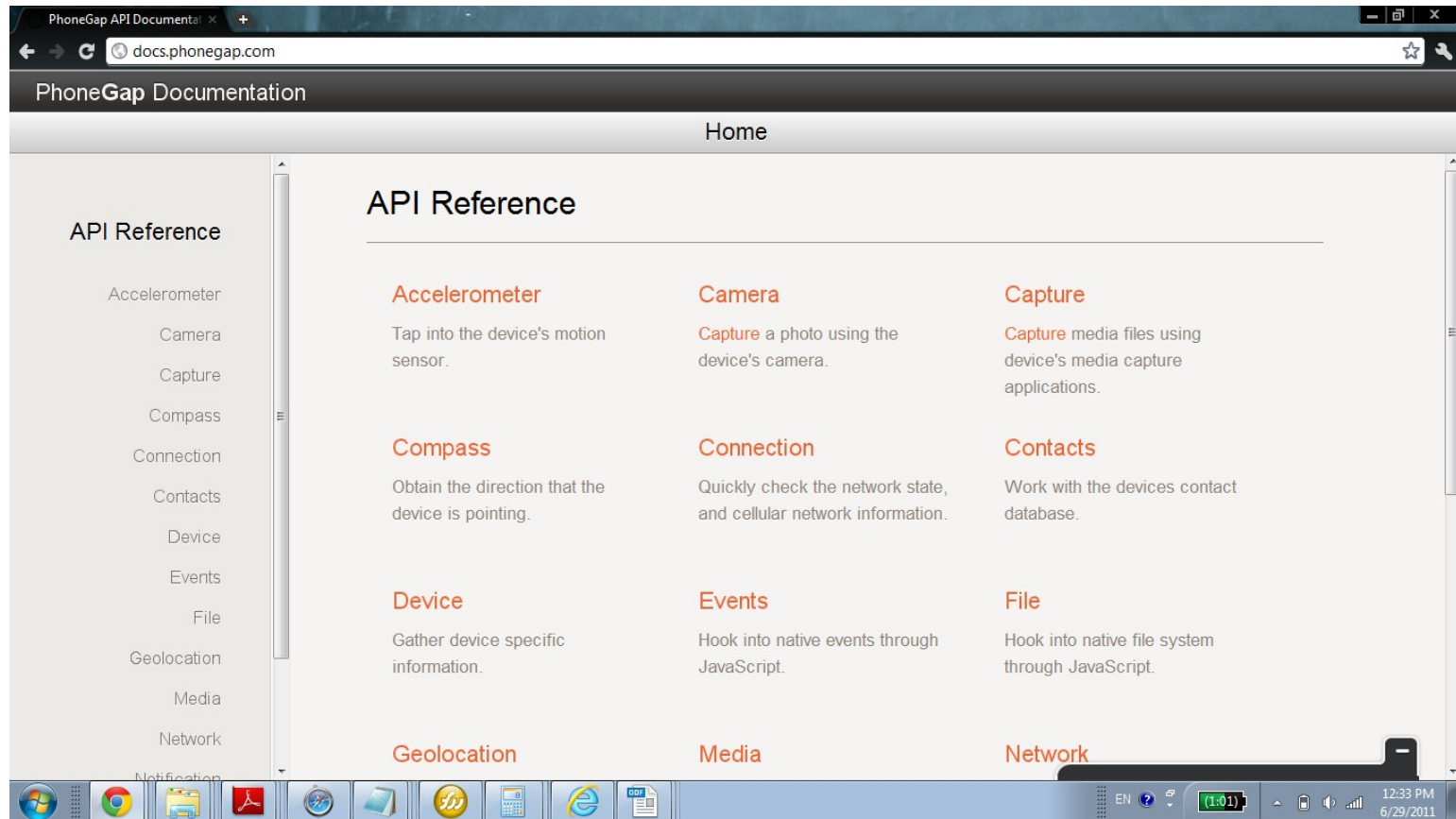
import android.app.Activity;
import android.os.Bundle;
import android.webkit.WebView;

public class WebViewSampleActivity extends Activity
{
    @Override
    public void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(bndl);
        WebView browser = new WebView(this);
        setContentView(browser);
        browser.getSettings().setJavaScriptEnabled(true);
        browser.loadUrl("http://www.lifemichael.com");
    }
}
```


Phone Gap

- The Phone Gap library includes two parts. One in JavaScript and the other in Java\C#\C++\ObjectiveC in according with the platform we target.
- The Phone Gap library allows us to exploit the mobile telephone native capabilities.

Phone Gap



Open Source Projects

What is Open Source Software?

“Open source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in.”

(Open Source Initiative)

[The Open Source Definition](#)

PHP Open Source Projects

- Huge range of ready-to-use web applications. Simple installation. Easy to configure. Free.

Learning Management Systems

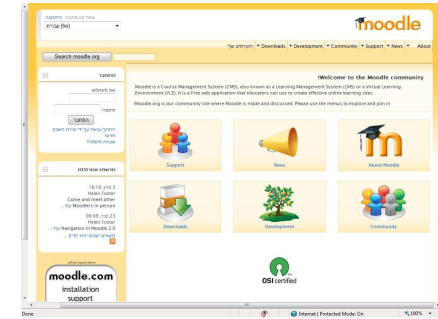
www.caroline.net



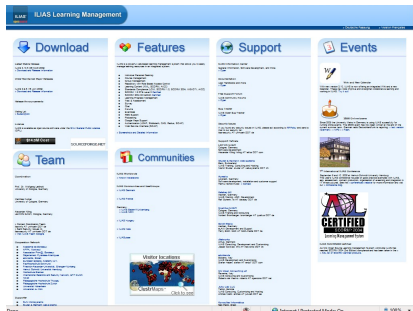
www.atutor.ca



www.moodle.org



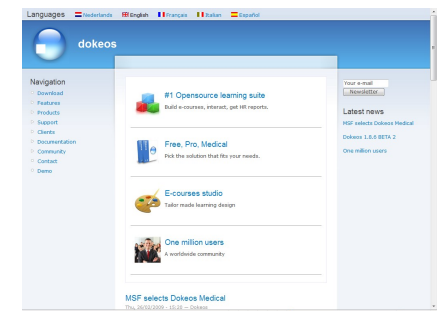
www.ilias.de



www.edocebo.org

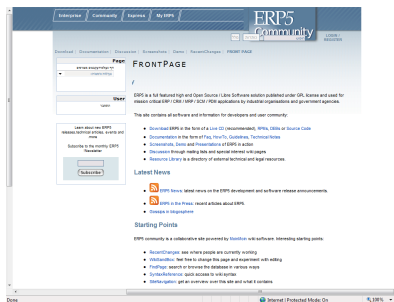


www.dokeos.com



Enterprise Resources Planning

www.erp5.org



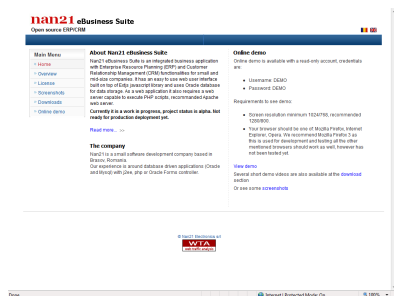
www.dolibarr.org



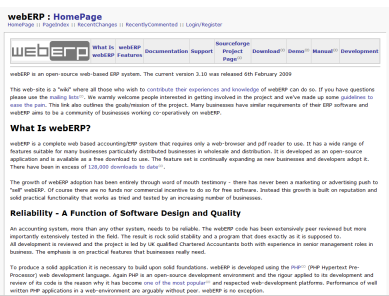
www.openpro.com



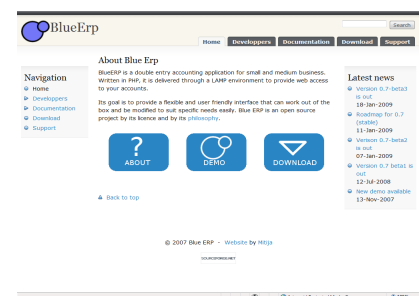
www.erp21.eu



www.weberp.org

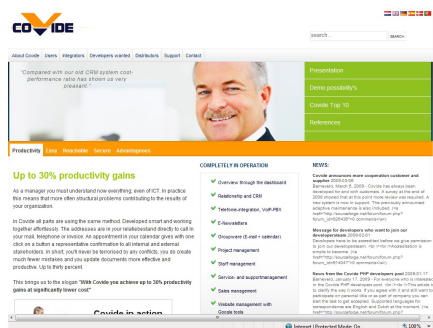


open.mitija.com

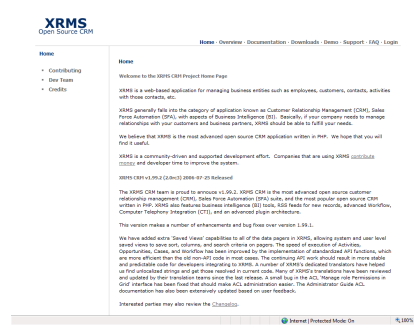


Customers Relationships Management

www.covide.net



xrms.sourceforge.com



www.sugarcrm.com



www.fireflyseo.com



www.civCRM.org



www.vtiger.com



Content Management Systems

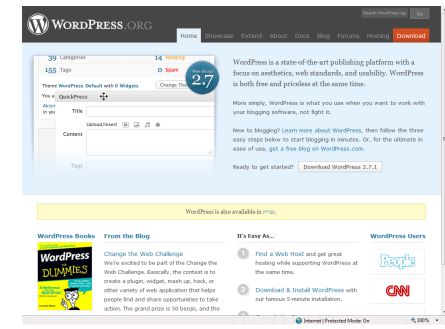
www.phpbb.com



www.drupal.org



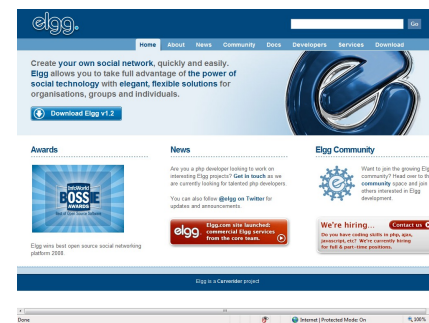
www.wordpress.org



www.pligg.com



www.elgg.org

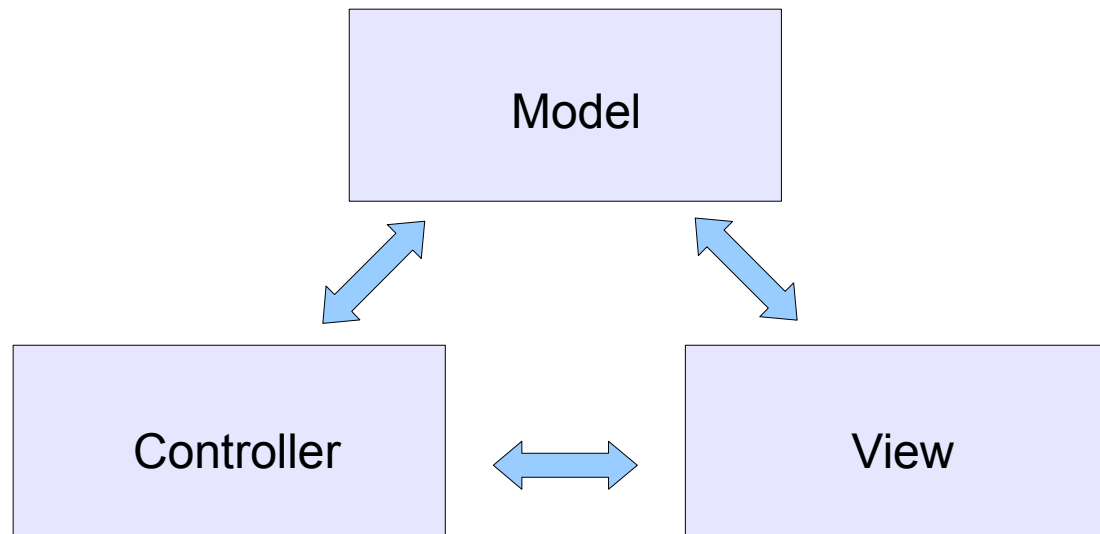


www.joomla.org



Model View Controller

The Model View Controller architecture stands for a clear separation between the view, the model and the controller parts. In many cases the clear separation exists between the view and the rest only.



Plugin Architecture

Most open source projects are extensible by allowing others to develop plugin small pieces of software that extends the basic product.

For more open source projects it is possible to find a huge number of plug ins components developed by third parties. In most cases those plug ins are available for free.

Web Based Administration

Once the open source project is installed, in most cases it is possible to administer it via a web based interface.

That allows non developers to administer the product without getting developers' professional support.

Localization Language Files

Most open source projects support an easy localization mechanism based on language files. Separated files for each language.

That allows such project to be easily localized to any language.

Customizable Look & Feel

Most open source projects allow replacing their look & feel (theme) with another. Simple as click on a button.

In most cases, the web based administration panel allows replacing the theme with another in one button click. Most open source projects allow other designers to develop themes independently. In most cases those themes are available either for free or for a small fee. Huge range of free resources are available for getting themes for free or for a small fee.

Mobile Themes

- We can find a growing number of themes for various open source projects that were optimized for touch screen devices. We can develop our own themes.
- We can use these themes by developing an hybrid application based on open source project we install on our server.

Mobile Themes

WordPress > Smoozi 2 < Fre...
wordpress.org/extend/themes/smoozi-2

Search WordPress.org Go

WordPress.ORG

Home Showcase **Extend** About Docs Blog Forums Hosting **Download**

Free Themes Directory

Username Password Log in (forgot?) or Register

Extend Home
Plugins
Themes

- Commercial
- More Info
- Contact Us

Mobile
Ideas
Kvetch!

Search Themes


Search

Smoozi 2

Description Stats

Author: dmarius

Smoozi is a WordPress theme for mobile phones and devices. Use Smoozi - WordPress on Mobiles



(<http://wordpress.org/extend/plugins/smoozi-wordpress-on-mobiles/>) to display the theme when your WordPress site is visited on mobiles.

Download

Preview

FYI

Version: 2.1.3
Last Updated: 2010-04-11
[Author Homepage >](#)
[Theme Homepage >](#)
[Theme SVN >](#)

Average Rating

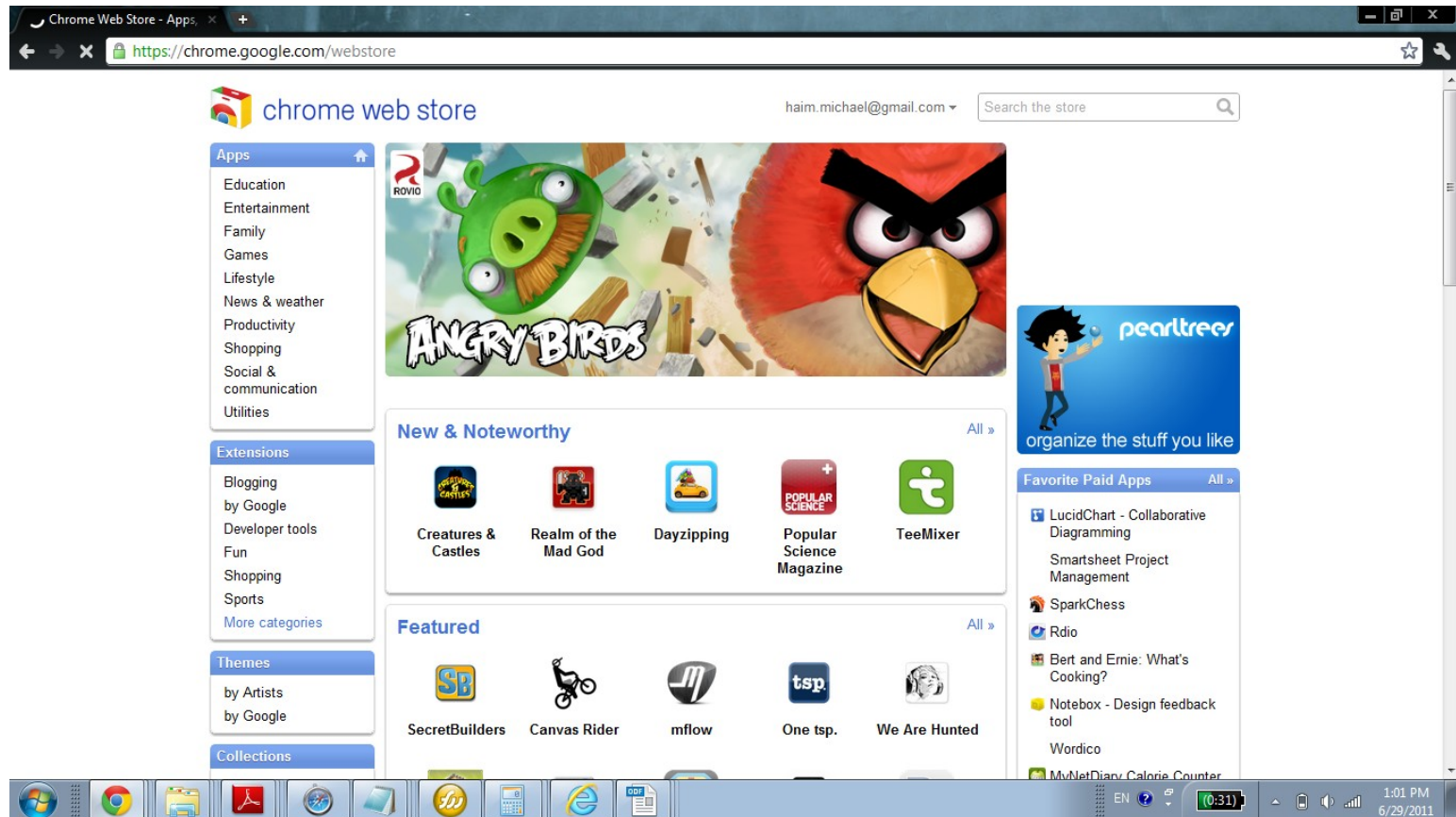
EN (0:30) 12:55 PM 6/29/2011

Multiple Platforms

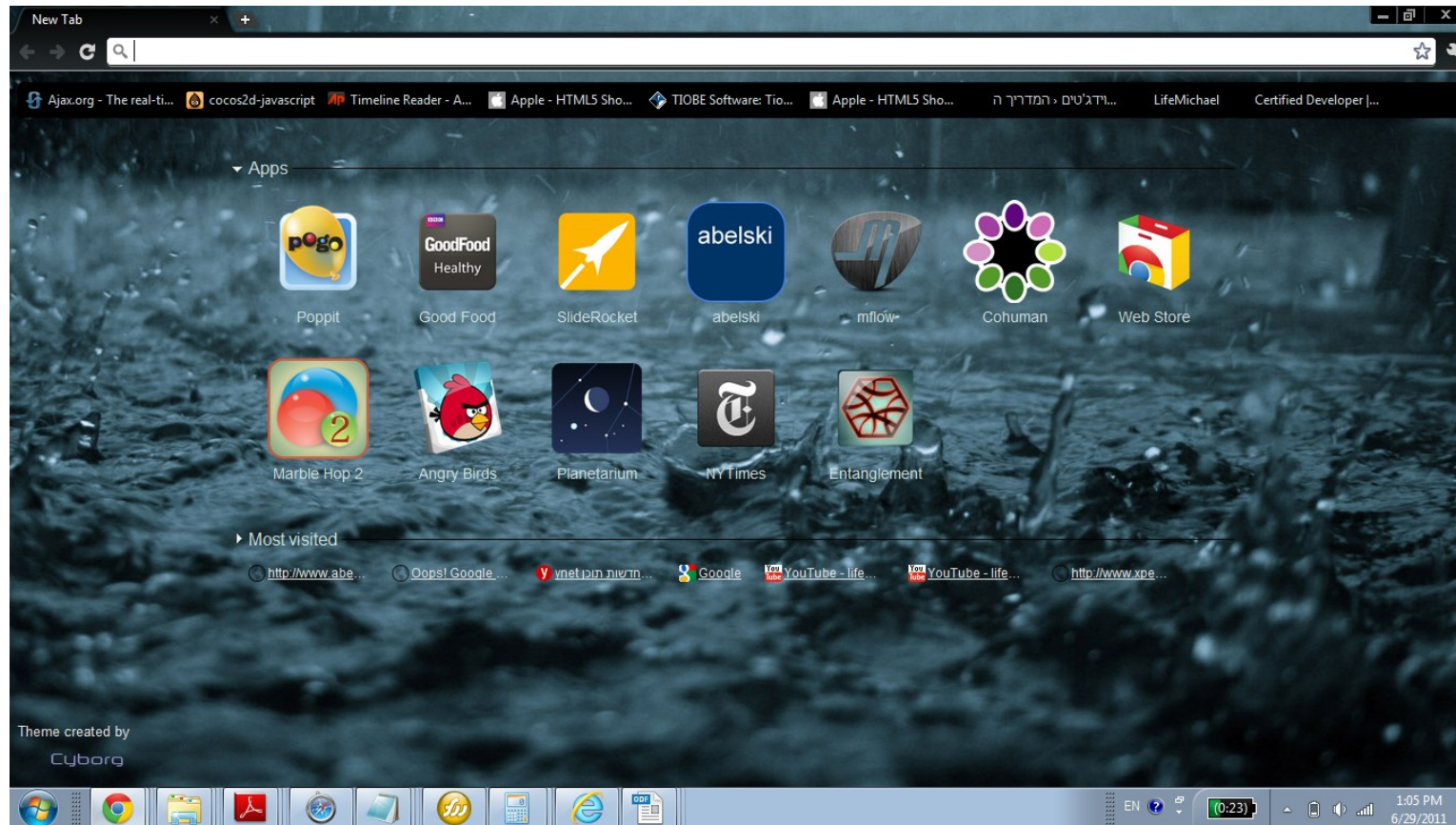
The Same Code

- Whether we develop an application for a mobile platform, facebook application, applications for the new coming chrome os platform, web browsers extensions.. we can use the same server side and the same core developed in Java Script.

Chrome OS Platform



Chrome OS Platform



Facebook Applications



Yahoo TV



http://www.youtube.com/watch?v=l_MyEAMyftw

Appliances



<http://www.youtube.com/watch?v=ISMerma7nBY>

Cars



<http://www.youtube.com/watch?v=8BOd9oX1p4s>

Google TV



<http://www.youtube.com/watch?v=vS0la9SmqWA>

Questions & Answers

Thanks for your time:)

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