

AJAX

Asynchronous JavaScript and XML

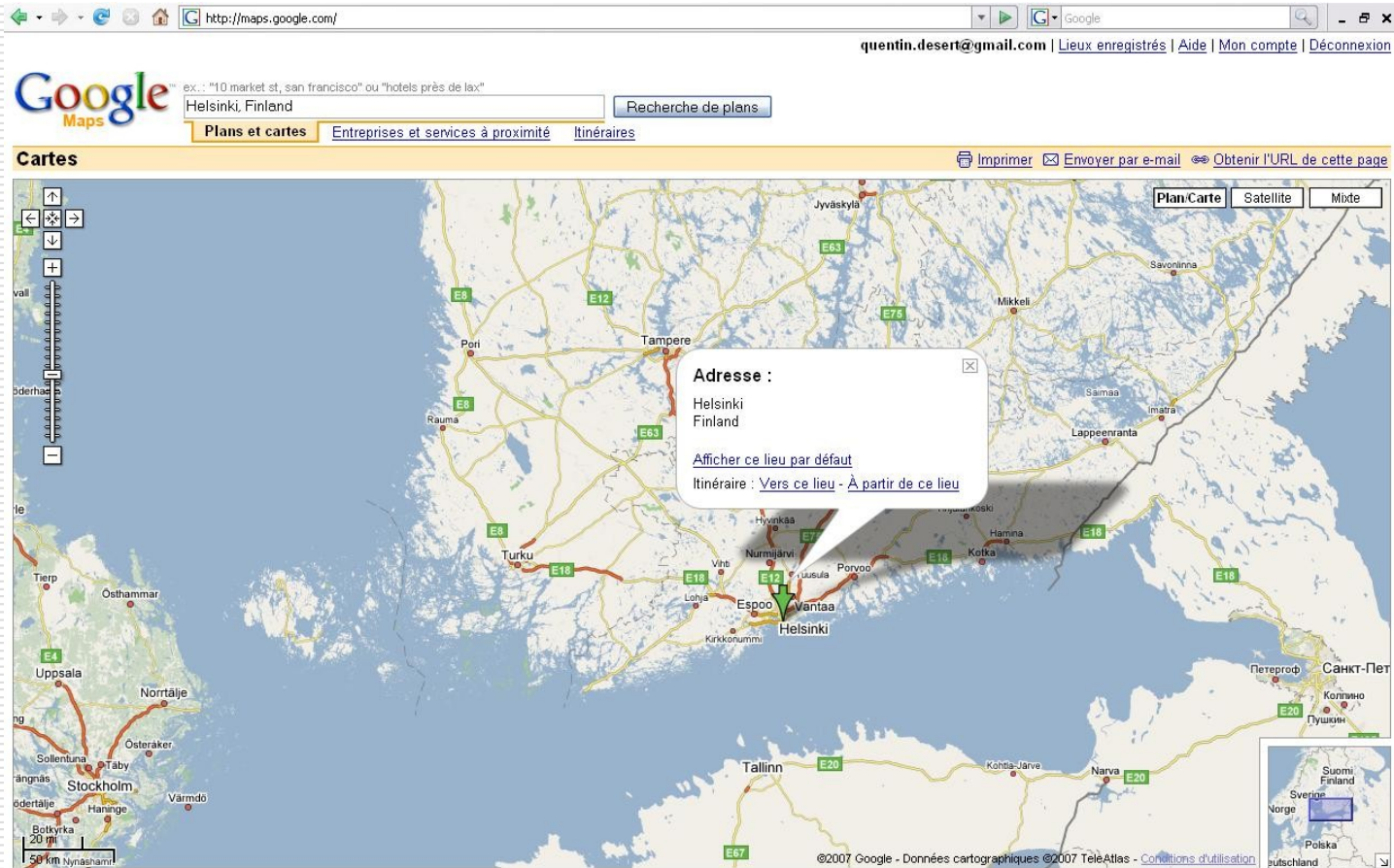
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Introduction



Content Plan

- Presentation of AJAX
 - Technologies used
 - Mechanisms of AJAX
 - Pros & Cons
 - Examples
 - Future of AJAX
-

Presentation of AJAX

- History
 - What is AJAX?
-

History

- The term AJAX came up from Jesse James Garrett in Feb 2005
 - Most of the technologies used in AJAX already existed before (Remote Scripting from Microsoft)
 - Nowadays, a lot of websites using AJAX, and more and more tools
-

What is AJAX?

- Asynchronous JavaScript and XML

 - Not a technology → set of technologies

 - Allows the creation of web **applications**
 - User-friendly
 - Dynamic
 - Close to Desktop applications
-

Technologies used

- XHTML
 - CSS
 - DOM
 - XML
 - XSLT
 - XMLHttpRequest
 - JavaScript
-

XHTML

eXtensible HyperText Markup Language

- Markup language, **successor of HTML**
 - Based on **XML syntax**
 - First (XHTML 1.0), only change the syntax of HTML
 - Then (XHTML 1.1), division into **modules**, and use of **CSS** for presentation
 - XHTML 2.0 is in development, but might bring compatibility issues with previous versions, notably with introduction of XForms and XFrames
-

CSS

Cascading Style Sheets

- Language used to describe the **presentation** of an HTML/XHTML or XML document

 - Allows to define presentation characteristics, such as **colors, fonts, layout...**

 - CSS1 published in 1996, CSS3 in development

 - With CSS:
 - Structure and presentation are separated
 - Conception can be made without thinking of presentation
 - Uniform presentation
 - User can change the style sheet
 - HTML code is a lot simplified (no presentation)
-

DOM

Document Object Model

- ❑ Interface, independent from any platform or language, allowing programs or scripts to **access** or **update content, structure** or **style** of HTML or XML documents.
 - ❑ Before, each web browser had its own DOM → **standardization** by W3C
 - ❑ DOM constructs a **logical tree** from a HTML or XML document
 - ❑ Divided in levels. Level1 published in 1998, level2 in 2000, and level3 in development
-

XML

eXtensible Markup Language

- ❑ Generic markup language, facilitating **interoperability** between information systems on Internet
 - ❑ Simplified subset of **SGML** (Standard Generalized Markup Language)
 - ❑ XML's aim is to create a structure for exchanging data reliably (**XML schema**)
 - ❑ An XML document can be **transformed** in another XML document (with XSLT)
-

XSLT

eXtensible Stylesheet Language Transformations

- The aim is to **transform an XML document** to another one or an XML dialect (XHTML, HTML...)
 - Mostly used to **convert data** between XML schemas, or into XHTML/HTML for web pages
 - Part of the XSL development (W3C), producing also XPath language
 - XSLT 1.0 published in 1999, XSLT 2.0 current version
-

XMLHttpRequest

- ❑ **API** used by **JavaScript** language
 - ❑ Allows **getting** XML, HTML or text **data** from (and to) a server with **HTTP requests**
 - ❑ Mainly used for developing **AJAX** applications
 - ❑ Was firstly developed in 1998 by Microsoft (ActiveX object) for IE5; then implemented in Mozilla, Safari, Konqueror and Opera
 - ❑ Became a W3C specification in 2006
-

JavaScript

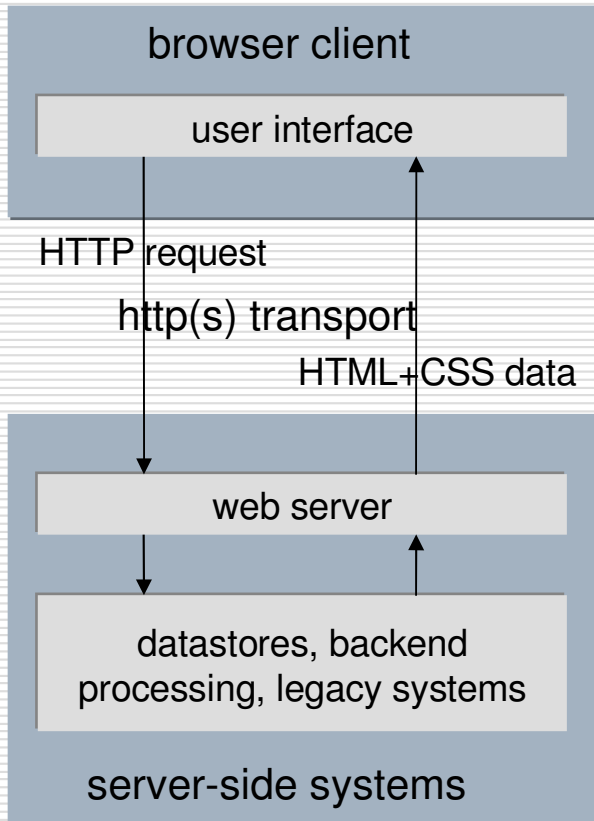
- ❑ **Scripting programming language**, prototype-based, mainly used in websites
 - ❑ Implementation of the ECMAScript standard in Netscape in 1995; latest version is 1.7
 - ❑ Syntax based on C; JavaScript engine is **embedded** in a **host environment** (such as HTML pages)
 - ❑ Used to **control data** in HTML, **interact** with HTML document via DOM, or to perform **dynamical services**
 - ❑ One of the main components of **AJAX**, using **XMLHttpRequest**
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Mechanisms of AJAX

- Design
 - AJAX engine
 - How the technologies are used?
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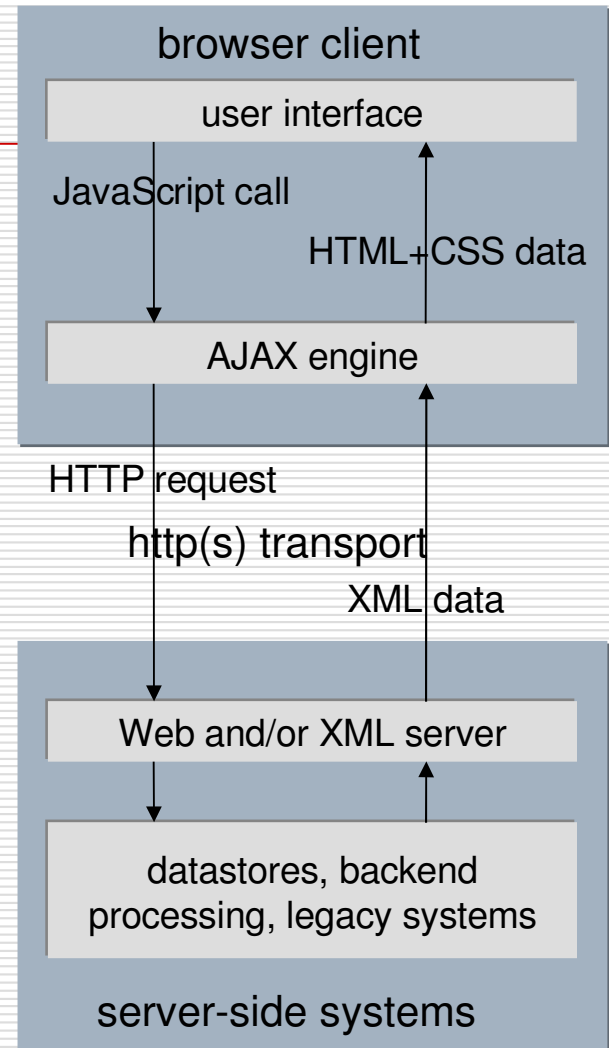
Design

Source: Adaptive Path



classic web application model

Mechanisms of AJAX



AJAX web application model

AJAX engine (1/3)

- The AJAX engine contains **JavaScript code**, which allows making **requests** to the server **asynchronously**
 - An instance of the **XMLHttpRequest** object is created
 - This object will be able to **send, receive and process HTTP requests** to and from the server without refreshing the entire page
-

AJAX engine (2/3)

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head><title>Ajax test</title>
    <script type="text/javascript">
      function getXMLHttpRequest () {
        try { return new ActiveXObject("Msxml2.XMLHTTP"); } catch(e) {};
        try { return new ActiveXObject("Microsoft.XMLHTTP"); } catch(e) {};
        try { return new XMLHttpRequest(); } catch(e) {};
        return null;
      }
      function parseHttpResponse() {
        alert("entered parseHttpResponse");
        if (xhr.readyState == 4) {
          alert("readystate == 4");
          if (xhr.status == 200) {
            alert(xhr.responseText);
          }
          else
          {
            alert("xhr.status == " + xhr.status);
          }
        }
      }
    </script>
  </head>
  <body>
  </body>
</html>
```

AJAX engine (3/3)

```
var xhr = getXMLHttpRequest();
alert("xhr = " + xhr);
xhr.open("GET", "atf.html", true);
xhr.onreadystatechange = parseHttpResponse;
xhr.send(null);
</script>
</head>
<body>
  <h2>Headline</h2>
  <p>Paragraph</p>
</body>
</html>
```



How the technologies are used?

- **JavaScript** is the main technology used in AJAX, it performs multiple roles:
 - Control HTTP requests made using **XMLHttpRequest**
 - Parse the results coming back from the server (mostly **XML** files), using:
 - **DOM** manipulation methods
 - **XSLT** to convert XML messages into XHTML
 - Custom methods, depending on the data exchange format used
 - Present the data in the user interface:
 - Using **DOM** manipulation methods to insert the content into the webpage
 - Changing **CSS** properties of the element
-

Pros & Cons

- Pros
 - Cons
-

Pros

- ❑ High dynamical content
 - ❑ Faster, richer interaction
 - ❑ Lower bandwidth use
 - ❑ Save server processing
 - ❑ More user-friendly interface
 - ❑ Separation of data from layout and style
 - ❑ Use of JavaScript and XML (almost independent of platforms)
 - ❑ Possibility of user customization
-

Cons

- ❑ Browser implementation's problems (history, bookmarks, ...)
 - ❑ JavaScript use
 - ❑ Part of the "Hidden Web"
 - ❑ Accessibility problems
 - ❑ Need of ActiveX in certain circumstances
-

Examples

- Google Suggest
 - Gmail
 - Meebo
 - AjaxTrans
-



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As you type, Good

ajax	
ajax tutorial	25,800,000 results
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ajax php	138,000,000 results
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ajax amsterdam	3,530,000 results

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Archive Archived conversations are searchable and easily accessible in 'All Mail'

Starred Identify important messages by starring them

All Mail The holding place for all the messages you've sent or received, but not deleted

Spam Email that has been marked as spam

Quick Contacts The people you email most often show up automatically. Customize this area to email and IM the friends you want with just one click

Labels Identify conversations with one or more labels instead of filing them in folders

Search Mail/Search Web Quickly access the information in your email and on the web

Create a filter Set filters for messages to bypass the inbox or be automatically labeled or trashed

Settings Change settings, such as your reply-to address

Help Access help information or the Gmail support team

tester@gmail.com | [Settings](#) | [Help](#) | [Sign out](#)

Compose Mail

Fodor's Travel Wire - [Bite the Big Apple During NYC's Restaurant Week](#) - 5 days ago Web Clip

Archive Report Spam Delete More Actions ... Refresh 1 - 11 of 11

Select: All, None, Read, Unread, Starred, Unstarred

<input type="checkbox"/>	me, Nicola (2)	Photo - Can you send me that photo you mentioned earlier	11/30/05
<input type="checkbox"/>	me, Alex (7), Draft	Harry Potter reviews... - Hey Alex, check out these reviews	10/20/05
<input type="checkbox"/>	Nathan Woodward	Jessica's birthday Re: Birthday dinner - Hi there, Just wanted to see if you	8/9/05
<input type="checkbox"/>	Mitchell, me (3)	Good Camera - You can borrow mine and try it. I already bought it. Or	5/10/04
<input type="checkbox"/>	Karen, me (2)	friends Cancelling Tennis on Tuesday - No big deal. I was probably goi	5/10/04
<input type="checkbox"/>	Todd, me (2)	friends, Jessica's birthday, work jessica's birthday dinner - Hi Ana, What	5/10/04
<input type="checkbox"/>	Mitchell Tarver	Bruce Springsteen concert? - Did you know the Boss is coming to to	5/10/04
<input type="checkbox"/>	Paige Stevens	sony v1 - Hi, Did you get the link for the camera I wanted to buy? I can'	5/10/04
<input type="checkbox"/>	Nicola Brennan	Fishing - Hi guys, Mark and I have arranged the fishing trip for the guy	5/10/04
<input type="checkbox"/>	Allison, me (4)	Rolling Stones - I could really go for a trip to Paris next week. I am not	4/27/04
<input type="checkbox"/>	Lizzie Astley	friends Trip to Africa - Hey, so do you still want to go? It's going to be so	4/26/04

Select: All, None, Read, Unread, Starred, Unstarred

Archive Report Spam Delete More Actions ... 1 - 11 of 11

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identification

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plus de réseaux: se connecter "invisible"

English | Afrikaans | Albanian | Arabic | ????? | Euskara | Božič | Bosanski | Bãlgarski | Català | ??? | ??? | Creole | hrvatski jezik | Āesky | Dansk
 Nederlands | British English | Esperanto | Eesti keel | Filipino | Suomi | Français | Galego | Deutsch | Ελληνική | עברית | Hebrew | हिन्दी | Magyar
 íslenska | Ilokano | Indonesian | Italiano | ??? | Bahasa Jawa | ಕನ್ನಡ | ??? | Latine | 1337 | Lietuvių kalba | Македонски | Malagasy | Malayalam
 Bahasa Melayu | मराठी | Монгол | Li Niha | Norsk bokmål | Persian | Igpay Atinlay | Polski | Português Brasileiro | Português | Română | Русский
 српски језик | Slovensky | Español | Castellano | Kiswahili | Svenska | Schwyzerdütsch | Tagalog | தமிழ் | తెలుగు | తెలుగు | Türkçe | Українська
 Ӱзбекча | tiếng Việt | Cymraeg | Help translate!

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English Spanish German French Italian Portuguese Chinese Japanese Korean Russian

Bonjour, voici un site web en AJAX!

1965/2000 characters remaining

Identify a e i o u Others Translate

English German

Hello, here a Web site in AJAX!

[Search for Translated Text]

AjaxTrans

by: joel parish

Start typing any text you want to be translated into the first box. The words should be automatically translated into the language of your choice and appear in the lower box. To switch languages, simply click on the language you would like to translate from and then proceed to select the language you would like to translate into. In order to swap the contents of the two boxes, use a double click.



Future of AJAX

- Why are there difficulties to see a future to AJAX ?
 - Evolution of XMLHttpRequest ?
 - Other promising technologies: Xforms, SVG, ATOM
 - What about Flash/Flex ?
-

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 - CSS: <http://www.w3.org/Style/CSS/>
 - DOM: <http://www.w3.org/DOM/>
 - XML: <http://www.w3.org/XML/>
 - XSLT: <http://www.w3.org/Style/XSL/>
 - XMLHttpRequest: <http://www.w3.org/TR/XMLHttpRequest/>
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Thank you!
