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
AJAX

- ❑ **Asynchronous JavaScript and XML**
- ❑ **Asynchronous** - sends a request to the server and then continues execution without waiting for the reply
- ❑ **JavaScript** - the core enabling technology
- ❑ **XML** - the primary data format. AJAX uses XML to transfer data back and forth between the client and the server

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What is XML? (the short version)


- ❑ Much like HTML, but you make up your own tag names
- ❑ XML is a metalanguage - you use it to create languages
- ❑ There are many rules and shortcuts (e.g. all tags must be closed)
- ❑ You don't need to know much XML to use AJAX

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An XML document


```
<?xml version="1.0" encoding="utf-8"?>
<note>
  <from>Tim</from>
  <to>Yorgos</to>
  <subject>Reminder</subject>
  <text>We need to talk about the revision lecture</text>
</note>
```

- ❑ **Rules:**
  - ❑ There must be an XML version number
  - ❑ There must be a single root element (i.e. <note>)
  - ❑ All tags must be closed
  - ❑ Many (many) more

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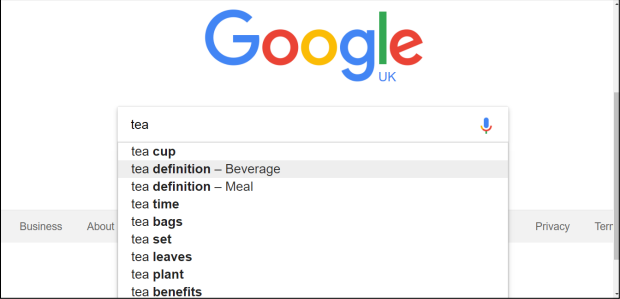
What is AJAX?

- ❑ AJAX is not a programming language
- ❑ It is a way of using existing standards (JavaScript and XML) to build more interactive web applications
- ❑ Popularized by Google in 2005 with Google Suggest

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What is AJAX?

- ❑ Popularized by Google in 2005 with Google Suggest

A screenshot of the Google Suggest interface. At the top is the Google logo with "UK" underneath. Below it is a search bar containing the word "tea". A dropdown menu shows suggestions: "tea cup", "tea definition - Beverage", "tea definition - Meal", "tea time", "tea bags", "tea set", "tea leaves", "tea plant", and "tea benefits". At the bottom of the page, there are links for "Business", "About", "Privacy", and "Terms".

## AJAX Applications

- ❑ **Standard HTTP transactions:**
  1. Client opens connection to server
  2. Client sends request to server
  3. Server sends reply to client
  4. Client and server close connection
- ❑ **After step 4, the client renders the document (and runs JavaScript if there is any)**
- ❑ **In an AJAX application, the JavaScript code then communicates with the server *behind the scenes***

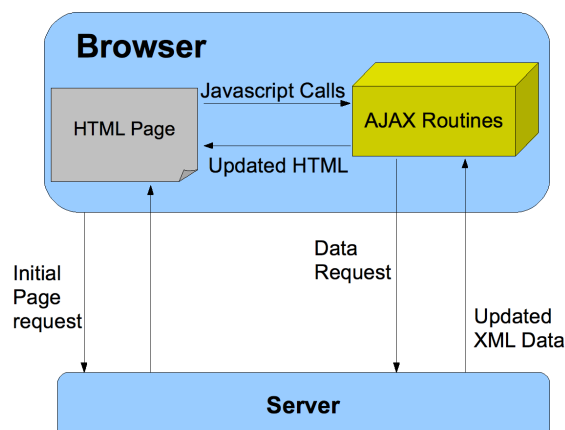
## AJAX Applications (2)

- ❑ **Communication with the server takes place asynchronously, and transparently to the user (and mostly to programmers!)**
- ❑ **Data is exchanged with the server without the need for a page reload**
- ❑ **This is accomplished through a special kind of HTTP request**

## An AJAX Transaction

- ❑ **A typical AJAX transaction**
  1. User triggers an event (presses a key, moves mouse, ...)
  2. Event handler code sends an HTTP request to the server
  3. The server replies, triggering code on client
  4. Reply handler code updates the web page using the server's reply
- ❑ **Between steps 2 and 3 the web page is still usable (i.e. the event is asynchronous)**
- ❑ **At no point during the transaction does the browser open a new web page**

## The AJAX model



## Benefits of AJAX

- ❑ **AJAX applications can interact directly with data on the server**
- ❑ **Avoid GET/POST interfaces - AJAX apps look more like "real" software interfaces**
- ❑ **Some applications could not work without this (e.g. Google Suggest)**
- ❑ **For office type applications the users data is safely stored on a reliable server, and accessible from any web browser**

## Limitations of AJAX

- ❑ **You cannot bookmark pages that are updated with AJAX**
- ❑ **Data will not be visible to search engines unless it is in the first page**
- ❑ **AJAX will not work with old browsers that don't have JavaScript**
- ❑ **AJAX is inaccessible to many adaptive technologies (such as screen readers)**
- ❑ **There can be browser compatibility issues**
- ❑ **AJAX can be slow if the server is busy**
- ❑ **You need a low latency network connection**
- ❑ **It can be server intensive (e.g. Google Suggest generates a search for every keystroke)**

## But despite this...

*Well-written AJAX apps, running with a fast Internet connection and modern browsers, can provide at least as good a user experience as traditional (i.e. non-web) applications*

- ❑ The easiest way to utilise AJAX is with JQuery
- ❑ The JQuery load() method uses AJAX to load data from a server and insert this into HTML elements

```
$(selector).load(URL, data, callback);
```

```
<script>
$(function(){

    $("#button").click(function(){
        $("#demo").load("data.txt");
    });

});
</script>
```

```
<body>

<div id="demo">
    <p>This is the old content!</p>
</div>

<button id="button" >Load data...</button>

</body>
```

ajax-01.html

- ❑ Can be used to query databases without reloading the web page
- ❑ AJAX is used to insert PHP code into HTML

ajax-02.html

- ❑ AJAX can be used to continually update web pages in real time
- ❑ Changes in the database are then instantly displayed on the web
- ❑ This is usually how chat systems and other realtime web applications work
- ❑ AJAX is used to insert PHP code into HTML

- ❑ setInterval() method is automatically fired at specified intervals
- ❑ This method can execute AJAX to do a database query

```
$(function(){

    function doUpdate() {
        $(selector).load(URL);
    }

    setInterval(doUpdate,1500);

});
```

ajax-03.html

## Summary - JQuery and AJAX

- ❑ JQuery is great for UI stuff - especially with JQuery-UI
- ❑ JQuery-UI themes can give your web pages consistent, elegant interfaces
- ❑ AJAX is essential for real-time updates of web sites
- ❑ The JQuery load method makes AJAX easy