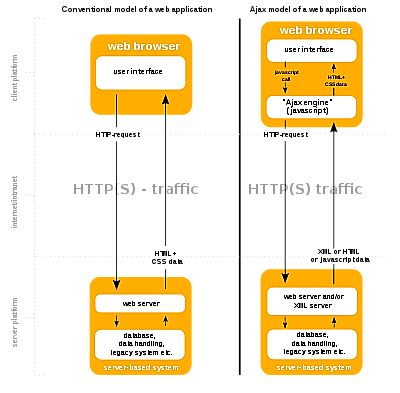
**Ajax** ( short for "[Asynchronous](https://en.wikipedia.org/wiki/Asynchronous_I/O) [JavaScript](https://en.wikipedia.org/wiki/JavaScript) and [XML](https://en.wikipedia.org/wiki/XML)") is a set of [web development](https://en.wikipedia.org/wiki/Web_development) techniques that uses various web technologies on the [client-side](https://en.wikipedia.org/wiki/Client-side) to create asynchronous [web applications](https://en.wikipedia.org/wiki/Web_application). With Ajax, web applications can send and retrieve data from a [server](https://en.wikipedia.org/wiki/Web_server) asynchronously (in the background) without interfering with the display and behaviour of the existing page. By decoupling the data interchange layer from the presentation layer, Ajax allows web pages and, by extension, web applications, to change content dynamically without the need to reload the entire page. In practice, modern implementations commonly utilize [JSON](https://en.wikipedia.org/wiki/JSON) instead of XML



* 1. An event occurs in a web page (the page is loaded, a button is clicked)
* 2. An XMLHttpRequest object is created by JavaScript
* 3. The XMLHttpRequest object sends a request to a web server
* 4. The server processes the request
* 5. The server sends a response back to the web page
* 6. The response is read by JavaScript
* 7. Proper action (like page update) is performed by JavaScript

GET is simpler and faster than POST, and can be used in most cases.

However, always use POST requests when:

* A cached file is not an option (update a file or database on the server).
* Sending a large amount of data to the server (POST has no size limitations).
* Sending user input (which can contain unknown characters), POST is more robust and secure than GET.

To send data with the http request use setRequestHeader

xhttp.open("POST", "demo\_post2.asp", true);  
xhttp.setRequestHeader("Content-type", "application/x-www-form-urlencoded");  
xhttp.send("fname=Henry&lname=Ford");

## Asynchronous - True or False?

Server requests should be sent asynchronously.

The async parameter of the open() method should be set to true:

xhttp.open("GET", "ajax\_test.asp", true);

By sending asynchronously, the JavaScript does not have to wait for the server response, but can instead:

* execute other scripts while waiting for server response
* deal with the response after the response is ready

## The onreadystatechange Property

With the XMLHttpRequest object you can define a function to be executed when the request receives an answer.

The function is defined in the **onreadystatechange** property of the XMLHttpResponse object:

### **Example**

xhttp.onreadystatechange = function() {  
  if (this.readyState == 4 && this.status == 200) {  
    document.getElementById("demo").innerHTML = this.responseText;  
  }  
};  
xhttp.open("GET", "ajax\_info.txt", true);  
xhttp.send();

Synchronous XMLHttpRequest (async = false) is not recommended because the JavaScript will stop executing until the server response is ready. If the server is busy or slow, the application will hang or stop.

Synchronous XMLHttpRequest is in the process of being removed from the web standard, but this process can take many years.

Modern developer tools are encouraged to warn about using synchronous requests and may throw an InvalidAccessError exception when it occurs.

XMLHttpRequest Object Methods

|  |  |
| --- | --- |
| **Method** | **Description** |
| new XMLHttpRequest() | Creates a new XMLHttpRequest object |
| abort() | Cancels the current request |
| getAllResponseHeaders() | Returns header information |
| getResponseHeader() | Returns specific header information |
| open(*method,url,async,user,psw*) | Specifies the request  *method*: the request type GET or POST *url*: the file location *async*: true (asynchronous) or false (synchronous) *user*: optional user name *psw*: optional password |
| send() | Sends the request to the server Used for GET requests |
| send(*string*) | Sends the request to the server. Used for POST requests |
| setRequestHeader() | Adds a label/value pair to the header to be sent |

XMLHttpRequest Object Properties

|  |  |
| --- | --- |
| **Property** | **Description** |
| onreadystatechange | Defines a function to be called when the readyState property changes |
| readyState | Holds the status of the XMLHttpRequest. 0: request not initialized 1: server connection established 2: request received 3: processing request 4: request finished and response is ready |
| responseText | Returns the response data as a string |
| responseXML | Returns the response data as XML data |
| status | Returns the status-number of a request 200: "OK" 403: "Forbidden" 404: "Not Found" For a complete list go to the [Http Messages Reference](https://www.w3schools.com/tags/ref_httpmessages.asp) |
| statusText | Returns the status-text (e.g. "OK" or "Not Found") |

## Using a Callback Function

A callback function is a function passed as a parameter to another function.

If you have more than one AJAX task in a website, you should create one function for executing the XMLHttpRequest object, and one callback function for each AJAX task.

The function call should contain the URL and what function to call when the response is ready.

<!DOCTYPE html>

<html>

<body>

<div id="demo">

<h1>The XMLHttpRequest Object</h1>

<button type="button"

onclick="loadDoc('ajax\_info.txt', myFunction)">Change Content

</button>

</div>

<script>

function loadDoc(url, cFunction) {

var xhttp;

xhttp=new XMLHttpRequest();

xhttp.onreadystatechange = function() {

if (this.readyState == 4 && this.status == 200) {

cFunction(this);

}

};

xhttp.open("GET", url, true);

xhttp.send();

}

function myFunction(xhttp) {

document.getElementById("demo").innerHTML =

xhttp.responseText;

}

</script>

</body>

</html>

## Server Response Properties

|  |  |
| --- | --- |
| **Property** | **Description** |
| responseText | get the response data as a string |
| responseXML | get the response data as XML data |

## Server Response Methods

|  |  |
| --- | --- |
| **Method** | **Description** |
| getResponseHeader() | Returns specific header information from the server resource |
| getAllResponseHeaders() | Returns all the header information from the server resource |

The **getAllResponseHeaders()** method returns all header information from the server response.

var xhttp = new XMLHttpRequest();  
xhttp.onreadystatechange = function() {  
  if (this.readyState == 4 && this.status == 200) {  
    document.getElementById("demo").innerHTML =  
    this.getAllResponseHeaders();  
  }  
};

HTTP status messages that might be returned:

Information

|  |  |
| --- | --- |
| **Message:** | **Description:** |
| 100 Continue | The server has received the request headers, and the client should proceed to send the request body |
| 101 Switching Protocols | The requester has asked the server to switch protocols |
| 103 Checkpoint | Used in the resumable requests proposal to resume aborted PUT or POST requests |

Successful

|  |  |
| --- | --- |
| **Message:** | **Description:** |
| 200 OK | The request is OK (this is the standard response for successful HTTP requests) |
| 201 Created | The request has been fulfilled, and a new resource is created |
| 202 Accepted | The request has been accepted for processing, but the processing has not been completed |
| 203 Non-Authoritative Information | The request has been successfully processed, but is returning information that may be from another source |
| 204 No Content | The request has been successfully processed, but is not returning any content |
| 205 Reset Content | The request has been successfully processed, but is not returning any content, and requires that the requester reset the document view |
| 206 Partial Content | The server is delivering only part of the resource due to a range header sent by the client |

Redirection

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| --- | --- |
| **Message:** | **Description:** |
| 300 Multiple Choices | A link list. The user can select a link and go to that location. Maximum five addresses |
| 301 Moved Permanently | The requested page has moved to a new URL |
| 302 Found | The requested page has moved temporarily to a new URL |
| 303 See Other | The requested page can be found under a different URL |
| 304 Not Modified | Indicates the requested page has not been modified since last requested |
| 306 Switch Proxy | *No longer used* |
| 307 Temporary Redirect | The requested page has moved temporarily to a new URL |
| 308 Resume Incomplete | Used in the resumable requests proposal to resume aborted PUT or POST requests |

Client Error

|  |  |
| --- | --- |
| **Message:** | **Description:** |
| 400 Bad Request | The request cannot be fulfilled due to bad syntax |
| 401 Unauthorized | The request was a legal request, but the server is refusing to respond to it. For use when authentication is possible but has failed or not yet been provided |
| 402 Payment Required | *Reserved for future use* |
| 403 Forbidden | The request was a legal request, but the server is refusing to respond to it |
| 404 Not Found | The requested page could not be found but may be available again in the future |
| 405 Method Not Allowed | A request was made of a page using a request method not supported by that page |
| 406 Not Acceptable | The server can only generate a response that is not accepted by the client |
| 407 Proxy Authentication Required | The client must first authenticate itself with the proxy |
| 408 Request Timeout | The server timed out waiting for the request |
| 409 Conflict | The request could not be completed because of a conflict in the request |
| 410 Gone | The requested page is no longer available |
| 411 Length Required | The "Content-Length" is not defined. The server will not accept the request without it |
| 412 Precondition Failed | The precondition given in the request evaluated to false by the server |
| 413 Request Entity Too Large | The server will not accept the request, because the request entity is too large |
| 414 Request-URI Too Long | The server will not accept the request, because the URL is too long. Occurs when you convert a POST request to a GET request with a long query information |
| 415 Unsupported Media Type | The server will not accept the request, because the media type is not supported |
| 416 Requested Range Not Satisfiable | The client has asked for a portion of the file, but the server cannot supply that portion |
| 417 Expectation Failed | The server cannot meet the requirements of the Expect request-header field |

Server Error

|  |  |
| --- | --- |
| **Message:** | **Description:** |
| 500 Internal Server Error | A generic error message, given when no more specific message is suitable |
| 501 Not Implemented | The server either does not recognize the request method, or it lacks the ability to fulfill the request |
| 502 Bad Gateway | The server was acting as a gateway or proxy and received an invalid response from the upstream server |
| 503 Service Unavailable | The server is currently unavailable (overloaded or down) |
| 504 Gateway Timeout | The server was acting as a gateway or proxy and did not receive a timely response from the upstream server |
| 505 HTTP Version Not Supported | The server does not support the HTTP protocol version used in the request |
| 511 Network Authentication Required | The client needs to authenticate to gain network access |