CHAPTER 8

AJAX & JSON

WHAT IS AJAX?

Ajax lets you…

1

1

Request data
from a server

1

Request data
from a server

2

1

Request data
from a server

2

Load it without
refreshing the
entire page

It uses an **asynchronous** processing model.

(Users can do other things while the data is loading.)

1

THE REQUEST

The browser requests information from the server

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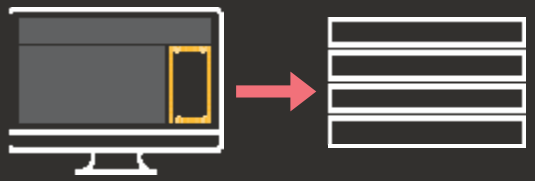
The browser requests information from the server

ON THE SERVER

The server responds with data (usually HTML, XML, or JSON)



1

THE REQUEST

The browser requests information from the server

ON THE SERVER

The server responds with data (usually HTML, XML, or JSON)

2

THE RESPONSE

The browser processes the content and adds it to the page

REQUEST

Web browsers use the `XMLHttpRequest` object to implement Ajax functionality.

Here, an instance of the object is stored in a variable called `xhr`:

```
var xhr = new XMLHttpRequest;
```

The `.open()` method **prepares** the request:

```
var xhr = new XMLHttpRequest;
xhr.open('GET', 'test.json', true);
```

The first argument can be either HTTP `GET` or `POST`:

```
var xhr = new XMLHttpRequest;
xhr.open('GET', 'test.json', true);
```

The second argument specifies the file to be loaded:

```
var xhr = new XMLHttpRequest;
xhr.open('GET', 'test.json', true);
```

The third argument states whether the request is asynchronous or not:

```
var xhr = new XMLHttpRequest;
xhr.open('GET', 'test.json', true);
```

An additional line is then written to send the request:

```
var xhr = new XMLHttpRequest;
xhr.open('GET', 'test.json', true);
xhr.send('search=arduino');
```

RESPONSE

When the server has responded, the `onload` event calls an anonymous function:

```
xhr.onload = function() {
  // process response
};
```

A property of the object called `status` is then used to make sure the data loaded okay:

```
xhr.onload = function() {
  if (xhr.status === 200) {
    // process response
  }
};
```

IE9 was the first version of IE to support this way of dealing with Ajax responses.

DATA FORMATS: HTML

HTML is the simplest way to get data into a page:

```
<div class="event">
  <img src="img/map-ny.png"
       alt="New York, NY" />
  <p><b>New York, NY</b>
  <br>May 30</p>
</div>
```

It is available in the `responseText` property of the object:

```
$el.innerHTML = xhr.responseText;
```

The browser renders this HTML like any other HTML - no extra work required.

DATA FORMATS: XML

XML looks like HTML but the tags contain different words:

```
<event>
  <location>New York, NY</location>
  <date>May 15</date>
  <map>img/map-ny.png</map>
</event>
```

It is available in the `responseXML` property of the object:

```
var events = xhr.responseXML;
```

You need to write JavaScript to convert the XML data into HTML so it can be displayed.

DATA FORMATS: JSON

JSON looks like object literal syntax but it is just data, not an object:

```
{
  "location": "New York, NY",
  "date": "May 30",
  "map": "img/map-ny.png"
}
```

It is available in the `responseText` property of the object:

```
var events = xhr.responseText;
```

You need to write JavaScript to convert the JSON into HTML so it can be displayed.

JSON data is made up of **keys** and **values**:

```
{
  "location": "New York, NY",
  "date": "May 30",
  "map": "img/map-ny.png"
}
```

JSON data is made up of **keys** and **values**:

```
{
  "location": "New York, NY",
  "date": "May 30",
  "map": "img/map-ny.png"
}
```

The value can be a string, number, Boolean, array, **object** or null.

You can nest objects.

```
{
  "events": [
    {
      "location": "Austin, TX",
      "date": "May 15",
      "map": "img/map-tx.png"
    },
    {
      "location": "New York, NY",
      "date": "May 30",
      "map": "img/map-ny.png"
    }
  ]
}
```

```
{
  “events”: [
    {
      “location”: “Austin, TX”,
      “date”: “May 15”,
      “map”: “img/map-tx.png”
    },
    {
      “location”: “New York, NY”,
      “date”: “May 30”,
      “map”: “img/map-ny.png”
    }
  ]
}
```

```
{
  “events”: [
    {
      “location”: “Austin, TX”,
      “date”: “May 15”,
      “map”: “img/map-tx.png”
    },
    {
      “location”: “New York, NY”,
      “date”: “May 30”,
      “map”: “img/map-ny.png”
    }
  ]
}
```

```
{
  “events”: [
    {
      “location”: “Austin, TX”,
      “date”: “May 15”,
      “map”: “img/map-tx.png”
    },
    {
      “location”: “New York, NY”,
      “date”: “May 30”,
      “map”: “img/map-ny.png”
    }
  ]
}
```

JavaScript has a `JSON` object with two important methods:

1: Convert a JavaScript object to a string:

`JSON.stringify();`

2: Convert a string to a JavaScript object:

`JSON.parse();`

JSONP

Ajax only works with data from the same domain. To get around this, you can use **JSONP**.

First, a function is included in the HTML page to process the JSON data and display it on the page:

```
<script>
  function showEvents(data) {
    // code to process & display data
  }
</script>
```

Next, a `<script>` element calls the JSON data from a remote server:

```
<script>
  function showEvents(data) {
    // code to process & display data
  }
</script>

<script
  src="http://example.org/jsonp">
</script>
```

The script then calls the function that was in the browser and passes the data to it as an argument:

```
showEvents({
  "events": [
    {
      "location": "New York, NY",
      "date": "May 30",
      "map": "img/map-ny.png"
    }...
  ]
});
```

JQUERY & AJAX

jQuery provides methods to handle Ajax requests / responses:

WORKS ON SELECTION	GLOBAL METHODS OF `jQuery` OBJECT
`.load()`	`$.get()`
	`$.post()`
	`$.getJSON()`
	`$.getScript()`
	`$.ajax()`

The `.load()` method returns the content into the jQuery selection:

```
$('#text').load('ajax.html #text');
```

The element the content will be loaded into:

```
$('#text').load('ajax.html #text');
```

The URL of the file to load comes first in the argument:

```
$('#text').load('ajax.html #text');
```

You can specify a fragment of the page to show (not the whole page):

```
$('#text').load('ajax.html #text');
```

The other global Ajax methods return their data in the `jqxhr` object.

The `jqxhr` object has the following properties and methods:

PROPERTIES	METHODS
responseText	.done()
responseXML	.fail()
status	.always()
statusText	.abort()

jQuery provides four shorthand methods to handle specific types of Ajax requests.

`url`	where the data is fetched from
`data`	extra information for the server
`callback`	function to call when data returned
`type`	type of data to expect from server

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```
$.get(url[, data][, callback][, type])
```

`url`	where the data is fetched from
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```
$.get(url[, data][, callback][, type])
$.post(url[, data][, callback][, type])
```

`url`	where the data is fetched from
`data`	extra information for the server
`callback`	function to call when data returned
`type`	type of data to expect from server

```
$.get(url[, data][, callback][, type])
$.post(url[, data][, callback][, type])
$.getJSON(url[, data][, callback])
```

`url`	where the data is fetched from
`data`	extra information for the server
`callback`	function to call when data returned
`type`	type of data to expect from server

```
$.get(url[, data][, callback][, type])
$.post(url[, data][, callback][, type])
$.getJSON(url[, data][, callback])
$.getScript(url[, callback])
```


There are also methods that help you deal with an Ajax reponse if it fails:

`.done()`	when request complete
`.fail()`	when request fails
`.always()`	complete / fail