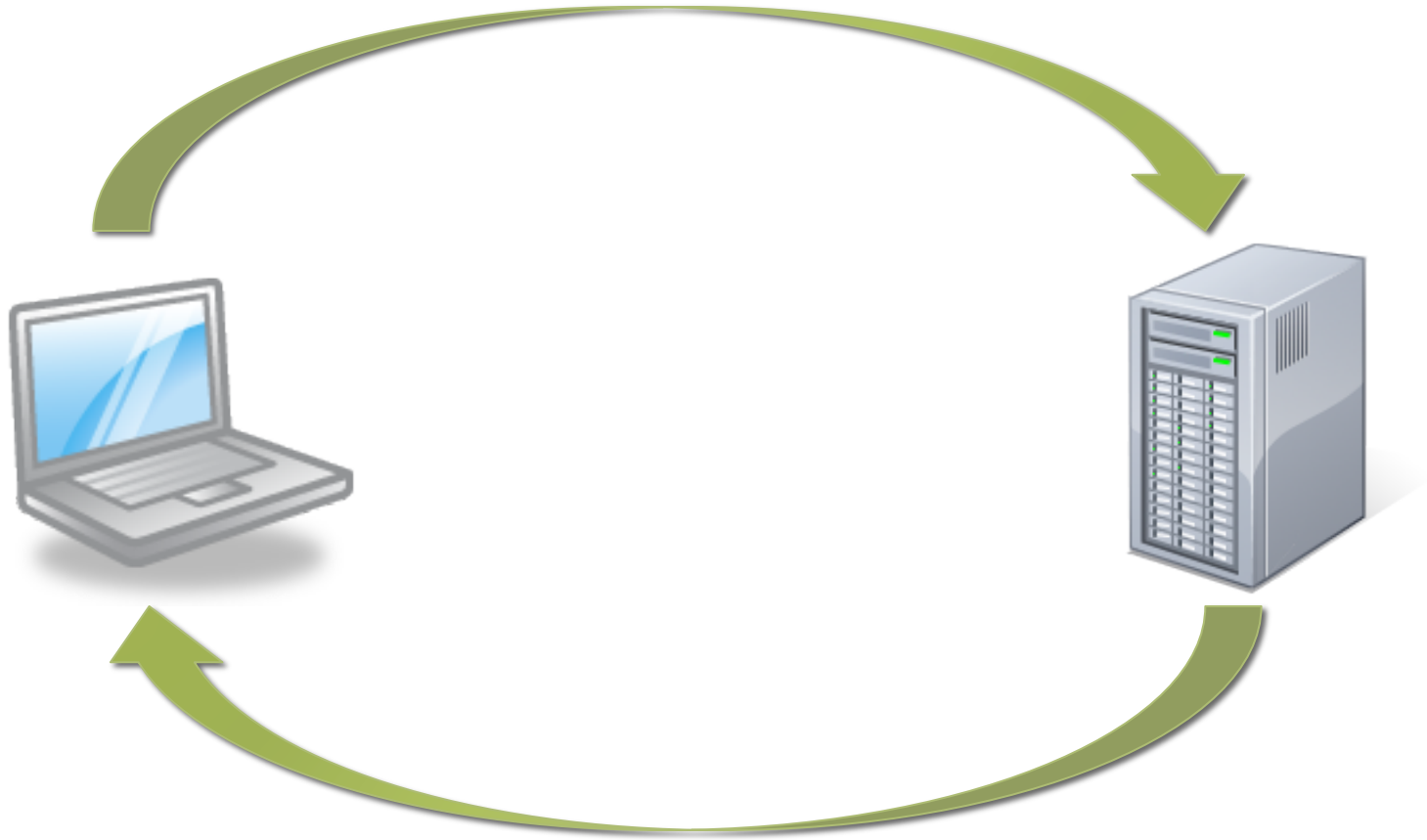
Introduction to Ajax

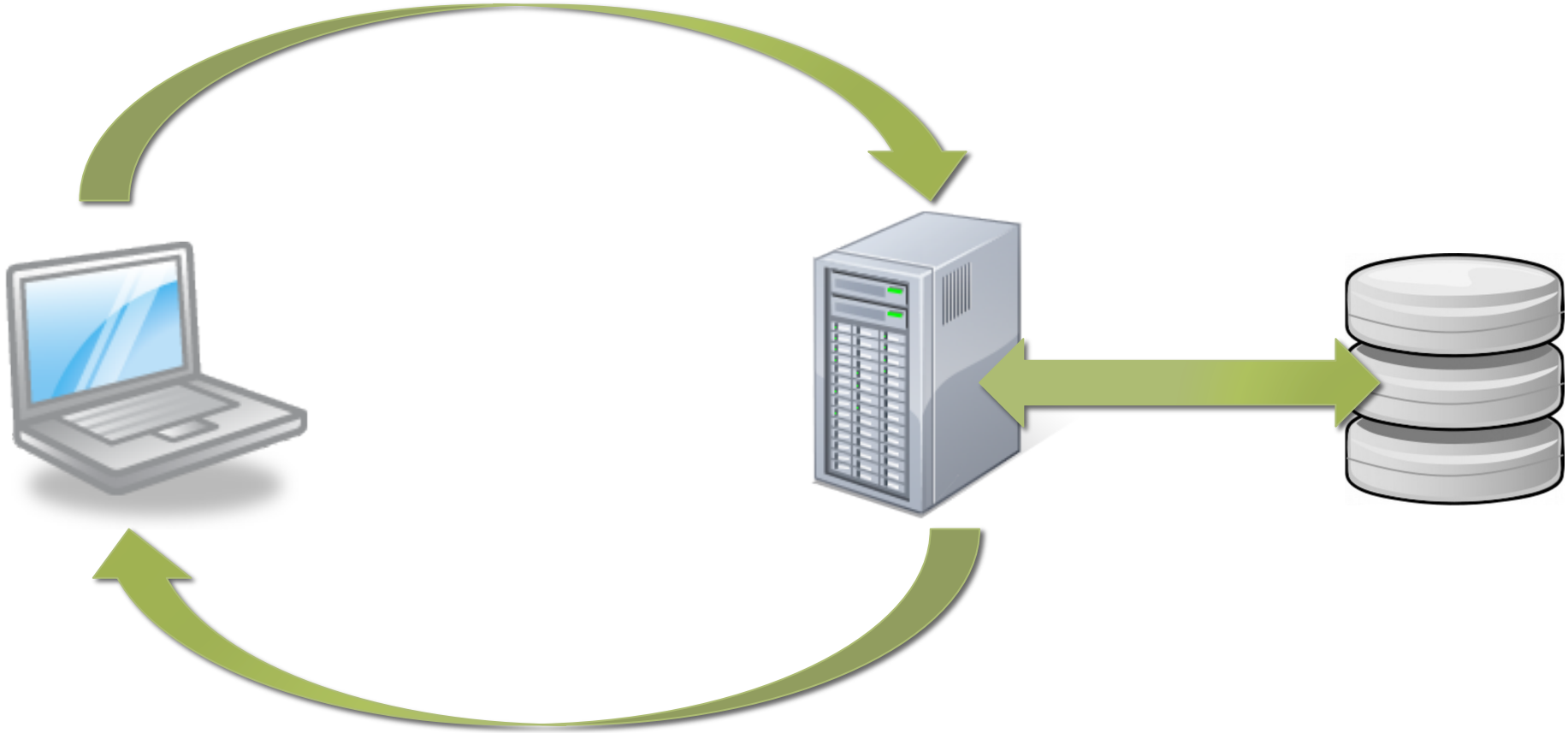
Making Ajax calls at the lowest possible level

Remember that the web is a thin-client technology



The history of server-side processing is like a yo-yo dieter.

So we clearly need some way to tell the server we want to send data to it and a way to receive data from it.



If only we could send a request while the page remains loaded and displayed

- Precondition – a page is loaded

1. The page sends a request for some data
2. The page listens for a response while the user continues to work (multithreading)
3. The page receives a response
4. It runs a callback function which usually processes the data and injects it into the DOM

- Postcondition – the same page is loaded but has new data

So we use JavaScript to send an XML request asynchronously and process the XML response

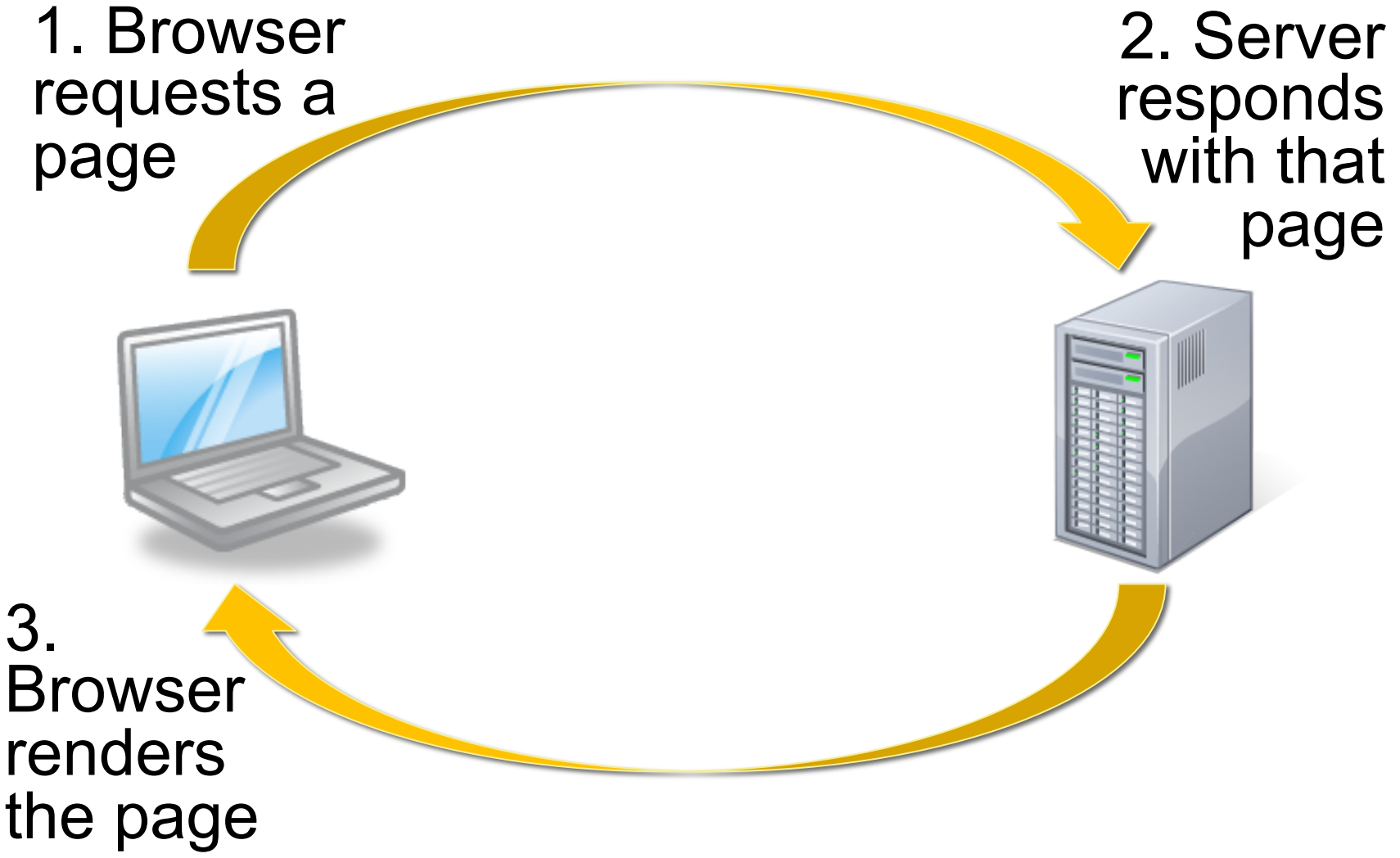
We call this technology …

JXAA!

No, wait …

Ajax

Here's how Ajax works



Here's how Ajax works

4. An Ajax call requests *data* (maybe sending some data)

5. Server process that data & responds with more *data*

6. Ajax callback function fires, processing the server's response

The key is the XMLHttpRequest* object

Methods	Properties	Events
open(httpMethod, url, async)	readyState	onreadystatechange
setRequestHeader(header, value)	status	
send(string)	statusText	
getResponseHeader(header)	responseText	
abort()	responseXML	

*The XMLHttpRequest object is often abbreviated "xhr"

The open() method prepares the Ajax call

```
xhr.open(httpMethod, url, async)
```

- where
  - httpMethod = "GET" or "POST" or "PUT" or "DELETE"
  - url = address we're hitting
  - async = true for asynchronous (default is true)

send() instructs the system to make the actual call

- send() usually has no arguments

```
xhr.send();
```

- You can pass in form/querystring data using send …

```
xhr.send('Artist=CeeLo');
```

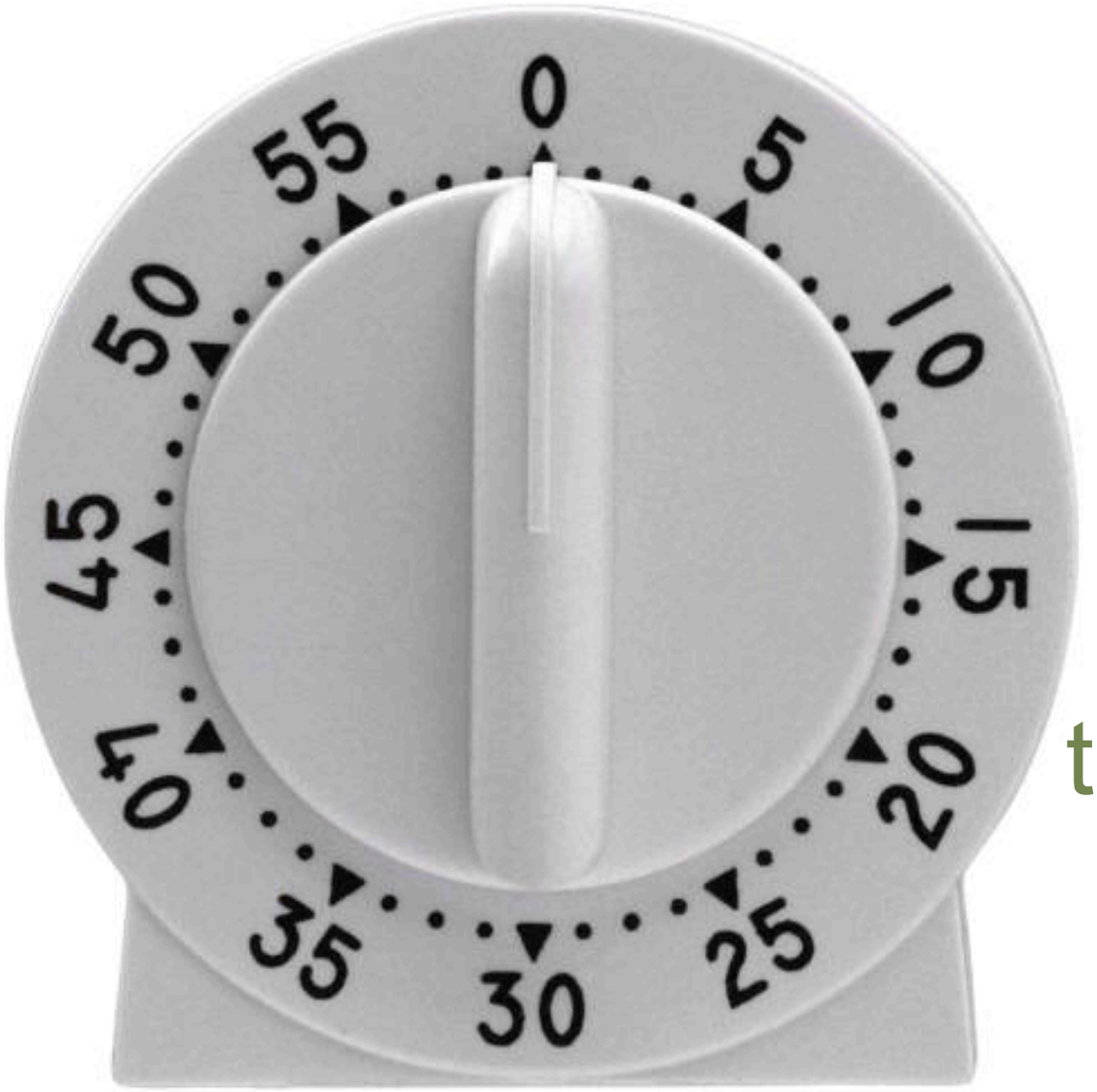
Are we ready? readyState knows!

- xhr.readyState holds a number between 0 and 4

Value	Meaning
0	Request not initialized
1	We are connected to the server
2	The request was received
3	The server is processing the request
4	Request is finished and the response has been sent back

The xhr.status is like the http response state

- 100 Informational only
- 200 OK
- 300 Moved
- 400 Not found
- 500 Server error



So, when xhr.status is 200 and xhr.readyState is 4, we know that the request is ready

readystatechange points to a function that fires when the readyState changes

- We can use this to determine when a response comes back from the server.
- Then we test it to see if readyState=4 and status=200

Next, we process the response

xhr.responseText

- For JSON

xhr.responseXML

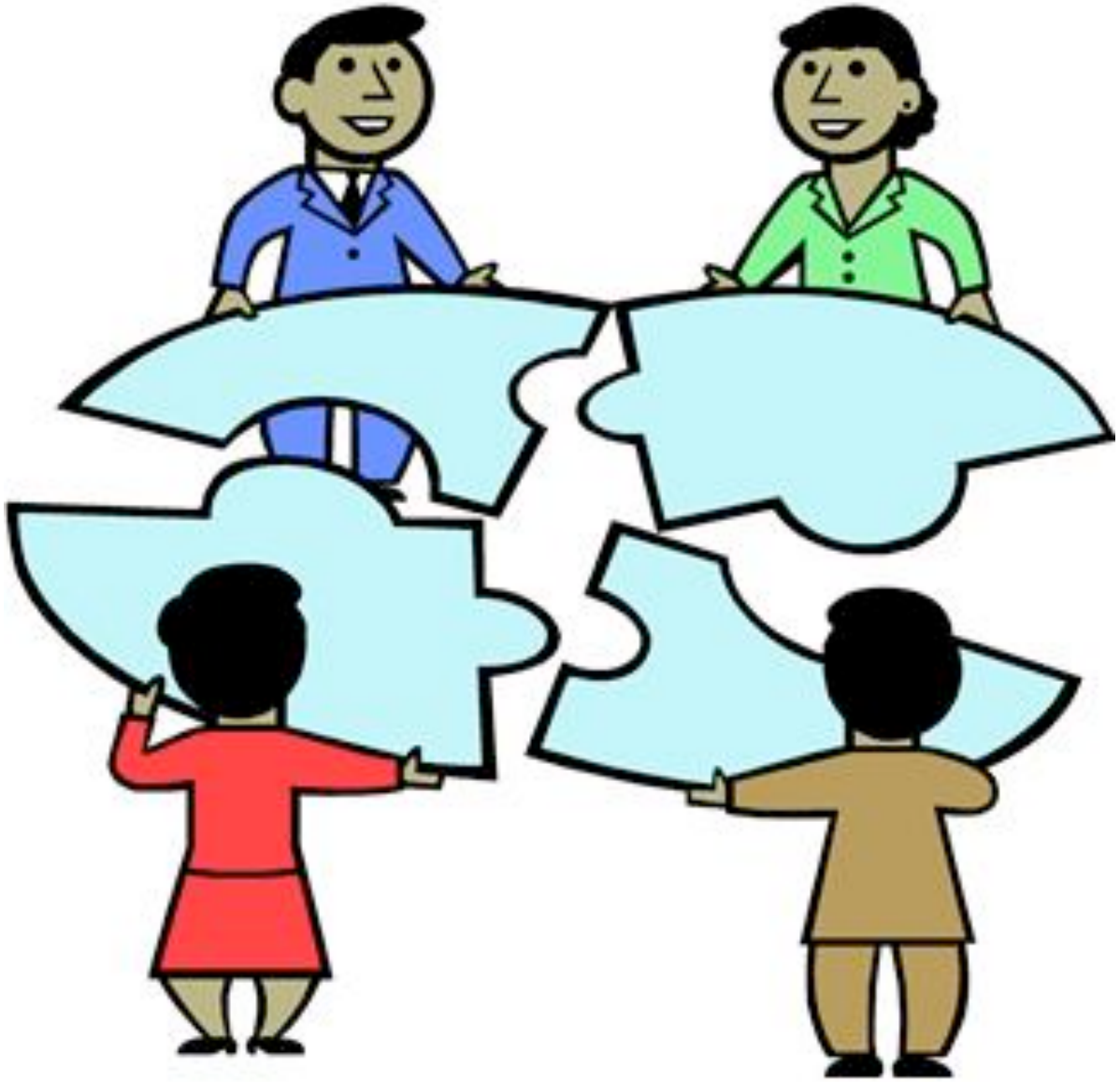
- For XML

But responseText is just a string

And we need it to be an object.

Converting JSON to a string and back

- Client to server
  - object to string
  - var string = JSON.stringify(object);
- Server to client
  - string to object
  - var object = JSON.parse(stringfromServer);



Let's put it all together in a very basic sample

First, let's create a page with all the hooks built in

```
<html>
<head>
  <script src='SayHello.js'></script>
</head>
<body>
  <input id="personId" />
  <button onclick='getPerson()'>Go!</button>
  <div id='pDiv'>
    <p>Hello there!</p>
  </div>
</body>
</html>
```

Next, we'll create the server-side program

```
<?php
$person= get_person($_GET['personId']);
echo($person);
?>
```

Then we write the call to the service

```
function getPerson() {
  var textbox =
    document.getElementById('personId');
  var personId = textbox.value;
  xh = new XMLHttpRequest();
  xh.open('GET','GetPerson.php', true);
  xh.addEventListener('readystatechange',
    changePersonInfo);
  xh.send('personId=' + personId);
}
```

And we write the callback function

```
function changePersonInfo() {
  if (xh.readyState==4 && xh.status==200) {
    var p = JSON.parse(xh.responseText);
    var d = document.getElementById('pDiv');
    d.innerHTML = `<p>Person: ${p.firstName}
                   ${p.lastName}</p>`;
  }
}
```

Piece of cake, right?

```
$('#theButton').click(function() {
  $.getJSON('GetPerson.php', function (person) {
    $('#theDiv').html("<p>"+person.firstname+person.lastname+"</p>";
  });
});
```

tl;dr

- Ajax allows more efficient and pleasing pages
- It requires several steps

1. Instantiate an XmlHttpRequest() object
2. Set the location with open()
3. Define a callback function with onreadystatechange
4. send() the request
5. Process the response in your callback

- Libraries like jQuery simplify this greatly