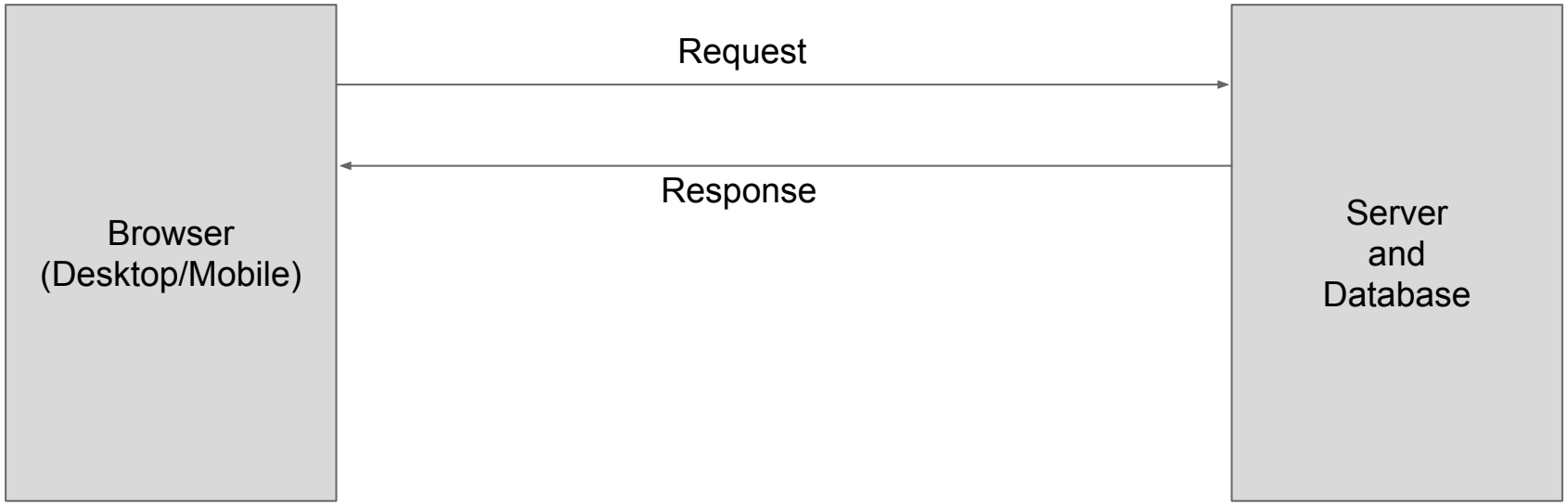
How the Web Works?

Basic Model


Request
Response
Browser
(Desktop/Mobile)
Server
and
Database

HTTP

- HTTP is an application-level protocol for distributed, collaborative, hypermedia information systems
- HTTP is a request/response standard of a client and server
- Typically, an HTTP client (such as a browser) initiates a request
- Resources to be accessed by HTTP are identified using Uniform Resource Identifiers (URIs)

Request message

The request consists of:

1. Request line
2. Headers
3. Optional message

```
GET /index.html HTTP/1.1
Host: www.example.com
```

Request methods

HTTP defines eight methods/verbs indicating the desired action to be performed on the identified **resource**

This is the basis for REST APIs

• **HEAD** • **GET** • **POST** • **PUT**	• **DELETE** • **TRACE** • **OPTIONS** • **CONNECT**

Status codes

First line of the HTTP response is called status line

- Success: 2xx
- Redirection: 3xx
- Client-Side Error: 4xx
- Server-Side Error: 5xx

Example request

```
GET /index.html HTTP/1.1
Host: www.example.com
```

```
HTTP/1.1 200 OK
Date: Mon, 23 May 2005 22:38:34 GMT
Server: Apache/1.3.3.7 (Unix)  (Red-Hat/Linux)
Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT
Etag: "3f80f-1b6-3e1cb03b"
Accept-Ranges: bytes
Content-Length: 438
Connection: close
Content-Type: text/html; charset=UTF-8
```

HTTP is STATELESS

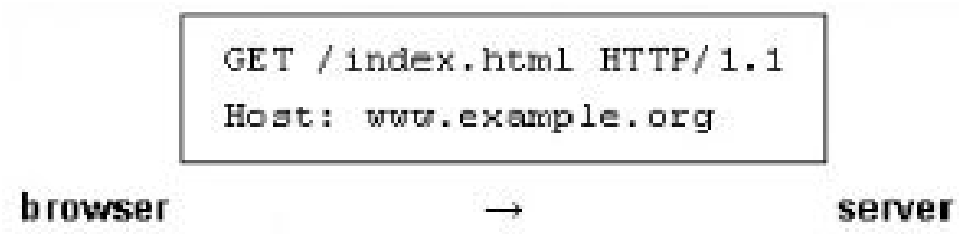
- HTTP is a stateless protocol
- Hosts do not retain information between requests
- When a host need to customize the content for a user, he uses:
  - Cookies
  - Sessions
  - Hidden variables (forms)
  - URL encodeded parameters (?param=someString&otherParam=otherString)

Cookies

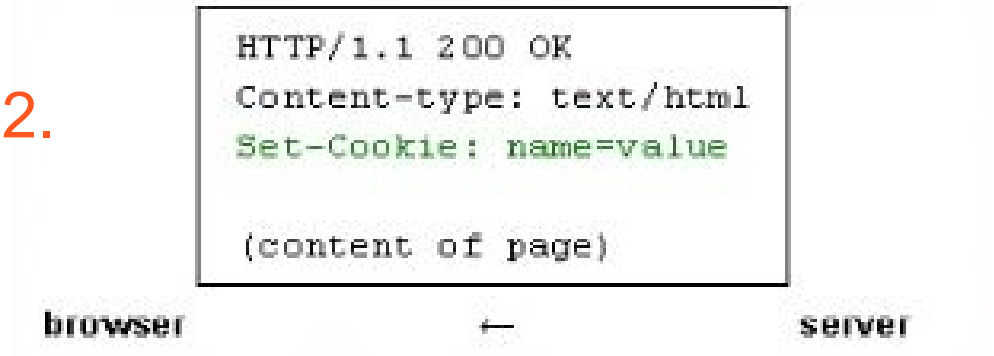
- Cookie is a small piece of text stored on a user's computer by a web browser
- A cookie consists of one or more name-value pairs containing bits of information
- It is sent as an HTTP header by a web server to a web browser and then sent back unchanged by the browser each time it access the server
- Cookies can also be managed by the javascript
- Usage example:
    - Session tracking
    - User preferences
    - Shopping cart
    - And more..

Cookie example (server)

1.



2.



3.

Sessions

Problem

Cookies and URL parameters are not good in case you don't want that data to be readable/editable on client side.

Solution

Store that data on the server side, give it an "id", and let the client only know (and pass back at every http request) that id.

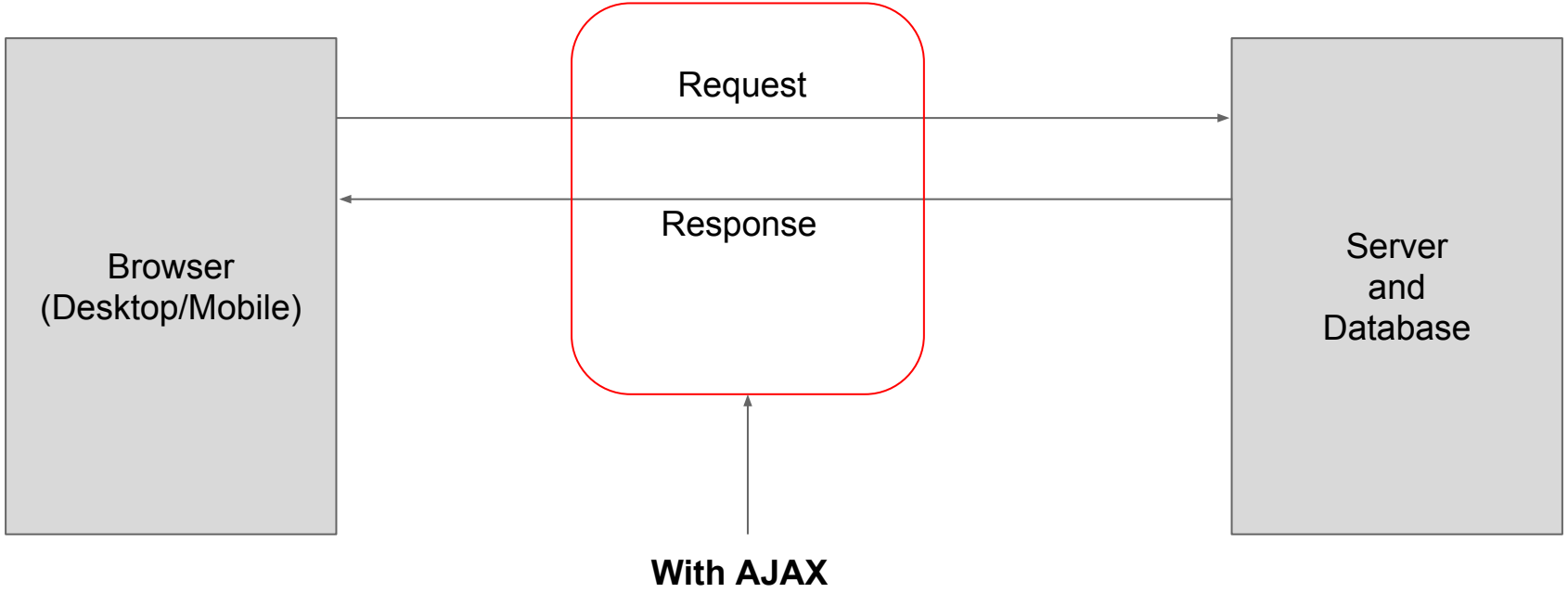
Javascript

“JavaScript is a scripting language designed for creating dynamic, interactive Web applications that link together objects and resources on both clients and servers”

AJAX

“Asynchronous JavsaScript and XML”

Basic Model + AJAX



XML

e**X**tensible **M**arkup **L**anguage

- XML is a universally agreed markup language primarily used for information exchange.
- The two primary building blocks of XML are elements and attributes
- Elements are tags and have values
- Elements are structured as a tree
- Alternatively, elements may have both attributes as well as data
- Attributes help you to give more meaning and describe your element more efficiently and clearly.

XML Example

```
<?xml version="1.0" encoding="UTF-8"?>
<person>
  <id type="integer">1111</id>
  <last_name>Smith</last_name>
 <first_name>John</first_name>
  <address>
    <city>New York</city>
    <street>21 2nd Street</street>
    <postal_code type="integer">10021</postal_code>
    <state>NY</state>
  </address>
</person>
```

JSON

JavaScript **O**bject N**o**tatio**n**

- JSON is a lightweight computer data interchange format
- JSON is based on a subset of the JavaScript programming language
- It is considered to be a language-independent data format
- It serves as an alternative to the use of the XML format

JSON Example

```
[
    {
        “Id”: 1111,
        “last_name”: “Smith”,
        “first_name”: ”John”,
        “address”: {
            “city”: “New York”,
            “street”: “21 2nd Street”,
            “postal_code”: 10021,
            “state”: “NY”
        }
    }
]
```

API

“**A**pplication **P**rogram **I**nterface”

DEMO

Postman