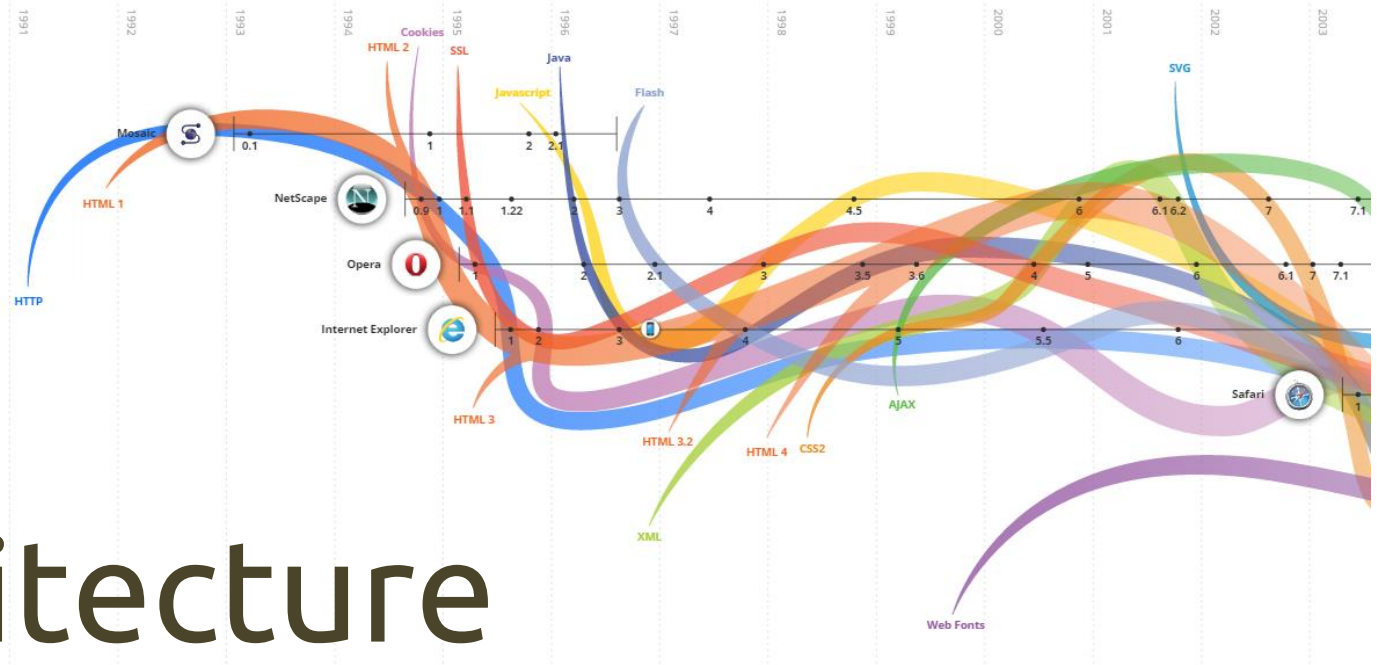


Web Architecture

AN INTRODUCTION

Quick overview to the Web architecture and technologies



POLITECNICO
DI TORINO



General Architecture



Typically, a web browser.

It may also be:

- mobile application
- desktop application
- other server application
- ...

Logical server

a process that runs on a host that relays information to a client upon requests

Physical server

a host computer on a network that holds information and respond to requests for those information

General Architecture

- What types of information do clients and servers exchange?
- How can these information be found?
- How are these information sent?

General Architecture

- What types of information do clients and servers exchange?
 - HTML (Hyper Text Markup Language) files
 - Multimedia files
 - CSS, JavaScript, ... files
- How can these information be found?
 - URL (Uniform Resource Locator)
- How are these information sent?
 - With HTTP (Hyper Text Transfer Protocol) requests and responses
 - TCP/IP is used for data transfer

Getting started with HTML...

The screenshot shows the MDN (Mozilla Developer Network) website. The top navigation bar includes the MDN logo, 'Sign in', and a search bar. Below the navigation bar, the main heading is 'Learn web development'. The breadcrumb trail reads 'MDN > Learn web development > HTML > Introduction to HTML'. The page title is 'Introduction to HTML'. On the left, there is a 'SEE ALSO' section with a list of related topics. The main content area contains a paragraph about HTML, a 'Prerequisites' section, and a 'Note' box. On the right, there is an 'IN THIS ARTICLE' section with links to 'Prerequisites', 'Guides', 'Assessments', and 'See also'.

MDN > Learn web development > HTML > Introduction to HTML

Introduction to HTML

SEE ALSO

Complete beginners start here!

- ▶ Getting started with the Web

HTML — Structuring the Web

- ▼ Introduction to HTML
 - Introduction to HTML overview
 - Getting started with HTML
 - What's in the head? Metadata in HTML
 - HTML text fundamentals
 - Creating hyperlinks
 - Advanced text formatting
 - Document and website structure
 - Debugging HTML
 - Assessment: Marking up a letter
 - Assessment: Structuring a page of content
- ▶ Multimedia and embedding
- ▶ HTML tables

At its heart, HTML is a fairly simple language made up of elements, which can be applied to pieces of text to give them different meanings in a document (is it a paragraph? is it a bulleted list? is it part of a table?), structure a document into logical sections (does it have a header? three columns of content? a navigation menu?) and embed content such as images and videos into a page. This module will introduce the first two of these, and introduce fundamental concepts and syntax you need to know to understand HTML.

Prerequisites

Before starting this module, you don't need any previous HTML knowledge, but you should have at least basic familiarity with using computers, and using the Web passively (i.e. just looking at it, consuming the content.) You should have a basic work environment set up as detailed in [Installing basic software](#), and understand how to create and manage files, as detailed in [Dealing with files](#) — both are parts of our [Getting started with the web](#) complete beginner's module.

Note: If you are working on a computer/tablet/other device where you don't have the ability to create your own files, you could try out (most of) the code examples in an online coding program such as [JSBin](#) or [Thimble](#).

Guides

IN THIS ARTICLE

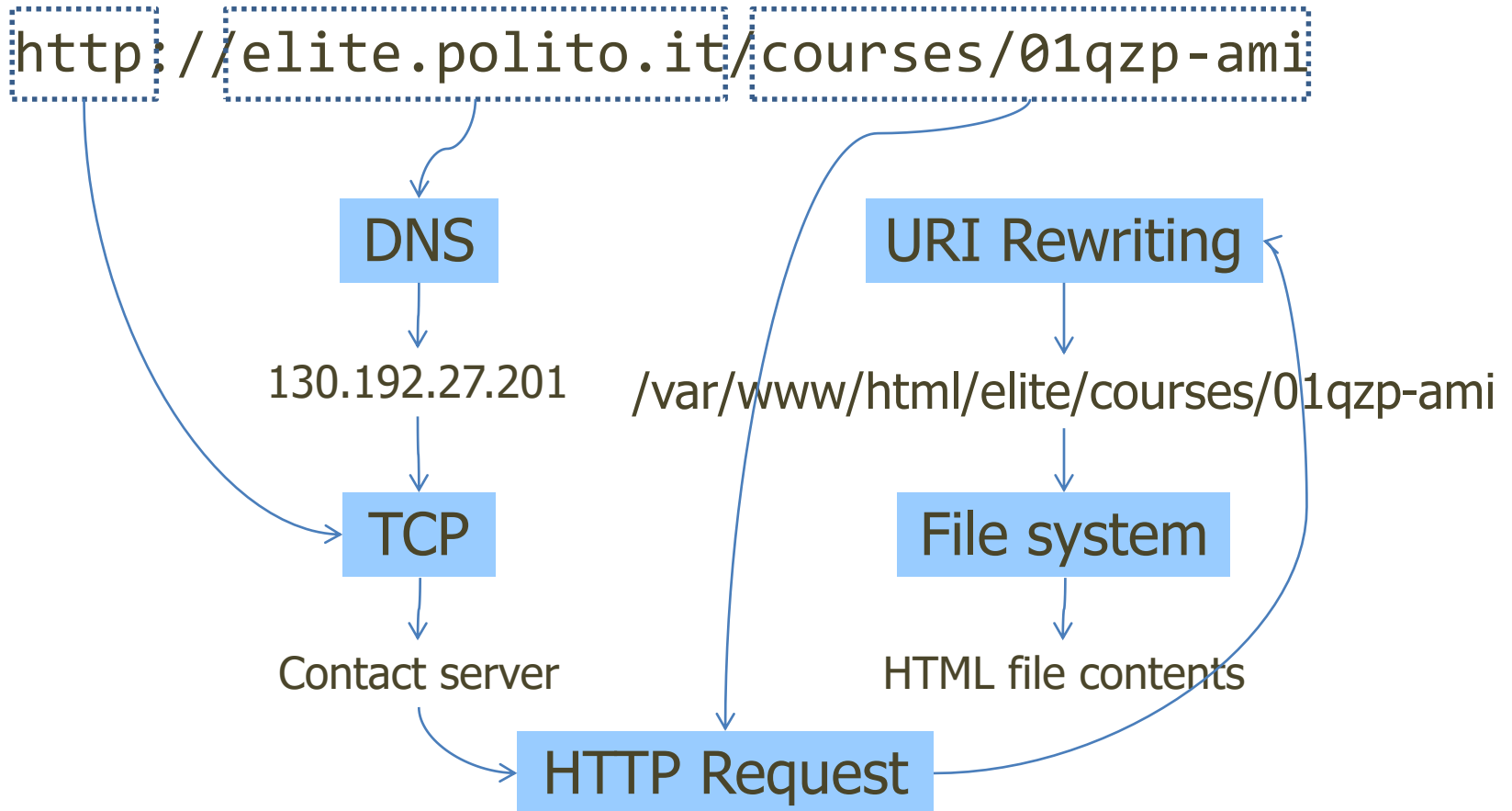
- Prerequisites
- Guides
- Assessments
- See also

https://developer.mozilla.org/docs/Learn/HTML/Introduction_to_HTML

URL: Example

RFC 2396

<http://www.w3.org/Addressing/>



URL Basics

Scheme **Hostname** **Query**

- <http://www.sadev.co.za/users/1/contact>

Scheme **Hostname** **Query**

- <http://www.sadev.co.za?user=1&action=contact>

Scheme **Userinfo** **Hostname** **Port**

- <http://rob:pass@bbd.co.za:8044>

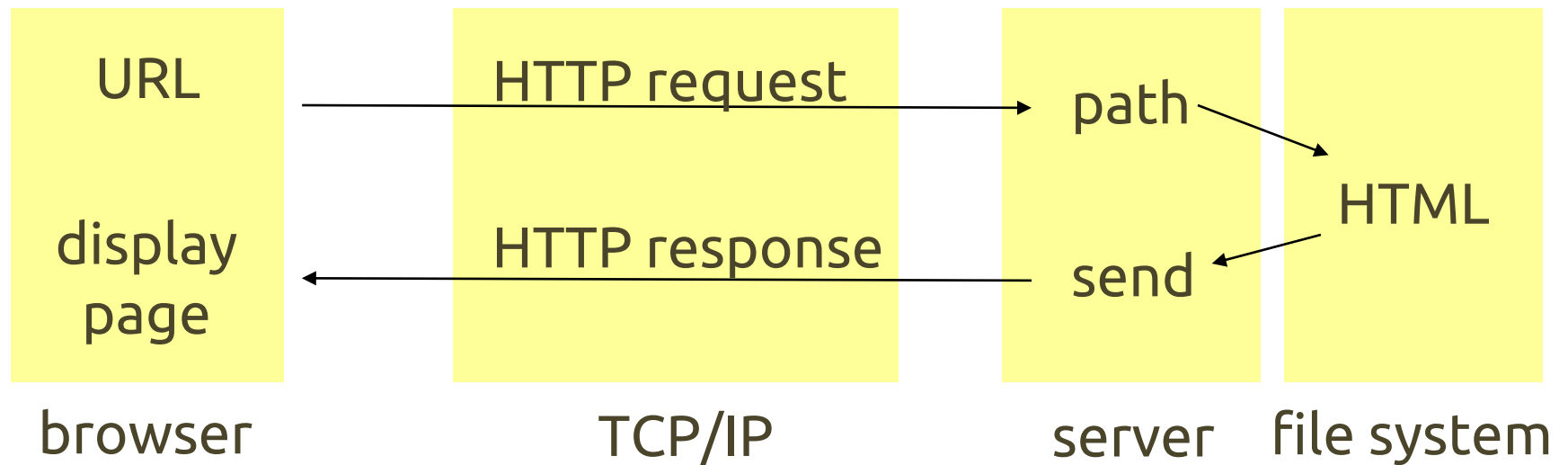
Scheme **Hostname** **Query** **Fragment**

- <https://bbd.co.za/index.html#about>

Web server (logical)

- Manages the HTTP protocol (handles requests and provides responses)
 - Receives client requests
 - Reads static pages/contents from the filesystem
 - Activates the application server for dynamic pages/content generation (server-side)
 - Provides an file (HTML, or other) back to the client
- One HTTP connection for each request
- Multi-process, Multi-threaded or Process pool

Example



HTTP protocol

RFC 2616, RFC 2617
<http://www.w3.org/Protocols>

GET / HTTP/1.1

Host: elite.polito.it

User-Agent: Mozilla/5.0

Accept: text/html,application/javascript

Accept-Language: it-IT

Accept-Encoding: gzip

Cookie: __utma=1885

Connection: keep-alive

HTTP/1.0 200 OK

Cache-Control: no-store, no-cache, must-revalidate,

Connection: Keep-Alive

Content-Encoding: gzip

Content-Type: text/html; charset=utf-8

Date: Wed, 08 Apr 2016 13:36:24 GMT

Expires: Mon, 1 Jan 2020 00:00:00 GMT

Keep-Alive: timeout=15, max=100

Last-Modified: Wed, 08 Apr 2016 13:36:24 GMT

Pragma: no-cache

Server: Apache/2.4.6 (Linux/SUSE)

Transfer-Encoding: chunked

X-Powered-By: PHP/5.6.30

p3p: CP="NOI ADM DEV PSAi COM NAV OUR OTRo STP IND DEM«

<!DOCTYPE html>

<html>

<head>

.

Browser developer tools

The image displays two screenshots of a web browser showing the e-Lite website. The top screenshot shows the website's main page with a navigation menu (HOME, NEWS, PEOPLE, RESEARCH, TEACHING, THESIS) and three main content blocks: "SEMINARIO: INDICATORI QUANTITATIVI PER LA VALUTAZIONE DEI PROCESSI", "PUBLICATION: DESIGN RECOMMENDATIONS FOR SMART ENERGY MONITORING", and "PRESENTATIONS AT ACM CHI 2015".

The bottom screenshot shows the same website with the browser's developer tools open. The Network tab is active, showing a list of requests. The selected request is for the main page, and the Headers section is expanded, showing the following information:

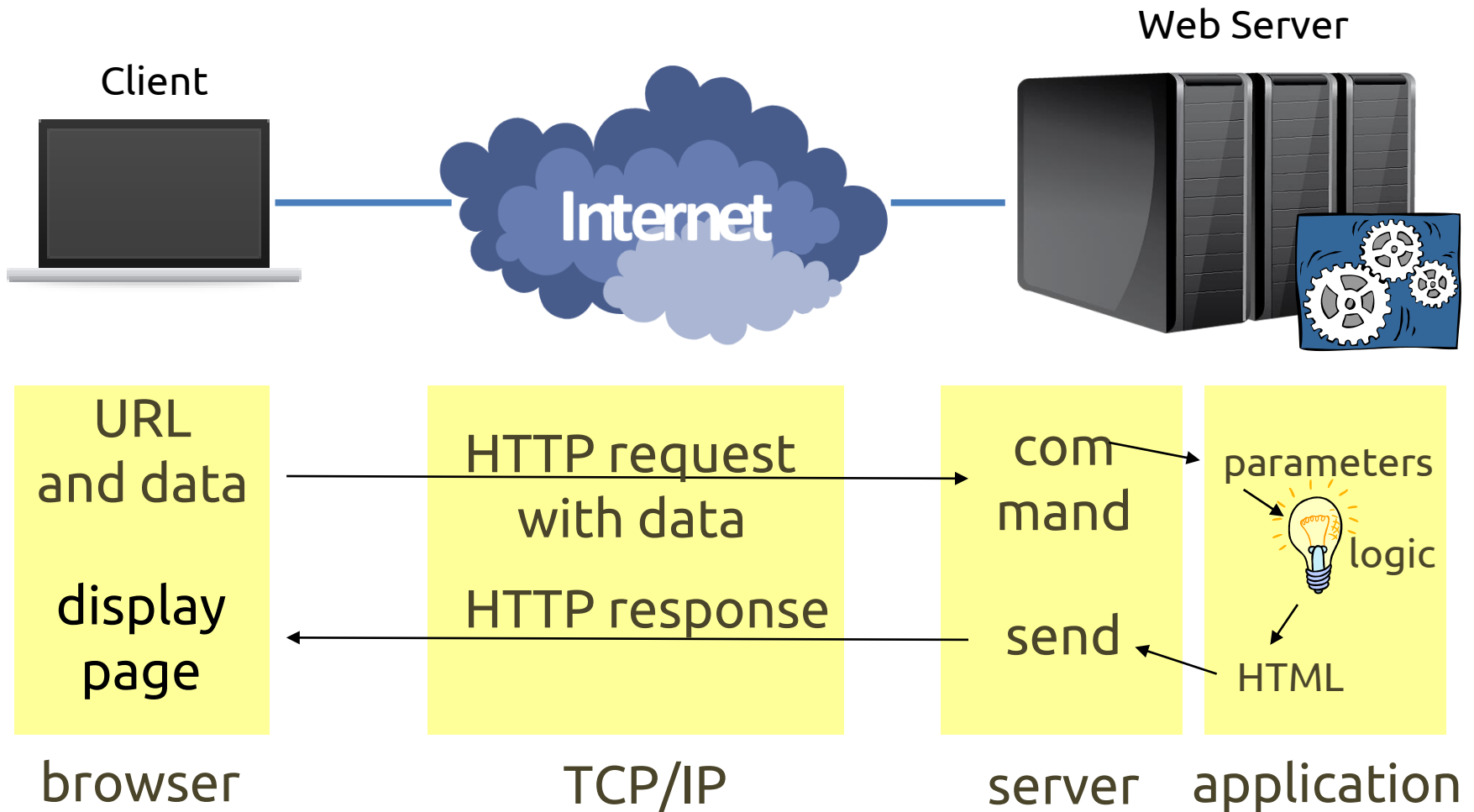
```
General
Remote Address: 130.192.5.26:80
Request URL: http://elite.polito.it/
Request Method: GET
Status Code: 200 OK

Response Headers
Cache-Control: no-store, no-cache, must-revalidate, post-check=0, pre-check=0
Connection: Keep-Alive
Content-Encoding: gzip
Content-Type: text/html; charset=utf-8
Date: Wed, 08 Apr 2015 13:47:35 GMT
Expires: Mon, 1 Jan 2001 00:00:00 GMT
Keep-Alive: timeout=15, max=100
Last-Modified: Wed, 08 Apr 2015 13:47:35 GMT
P3P: CP="NOI ADM DEV PSAI COM NAV OUR OTRR STP IND DEM"
Pragma: no-cache
Server: Apache/2.4.6 (Linux/SUSE)
Transfer-Encoding: chunked
X-Powered-By: PHP/5.4.20
```

Performance measures

- **Latency:** time required for providing a 0 byte http page. Includes the server activation time, the request decoding time, the file access time, the transmission time and the time for closing the connection.
 - Unit of measure: http/s or s/http
- **Throughput:** maximum speed at which infinite-sized pages can be sent.
 - Unit of measure: Bytes (Mbytes)/s
- **#Requests / s**

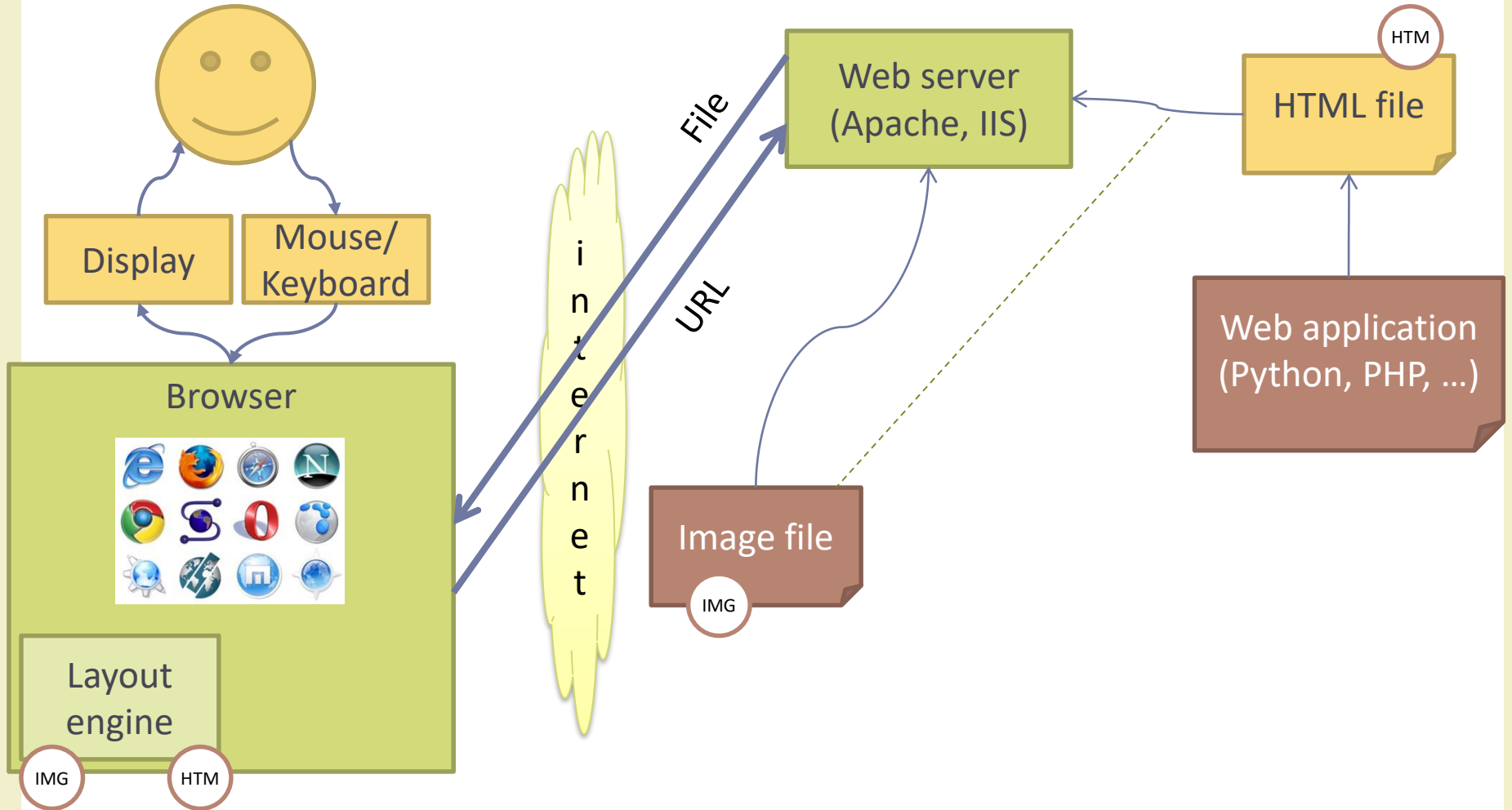
Dynamic Web Transaction



Application server

- Dynamic page generation and content generation
- Manages the site business logic
- It is the middle tier between the client browser and the data residing on a database
- Implements the session mechanisms
- Different technologies and architectures are available

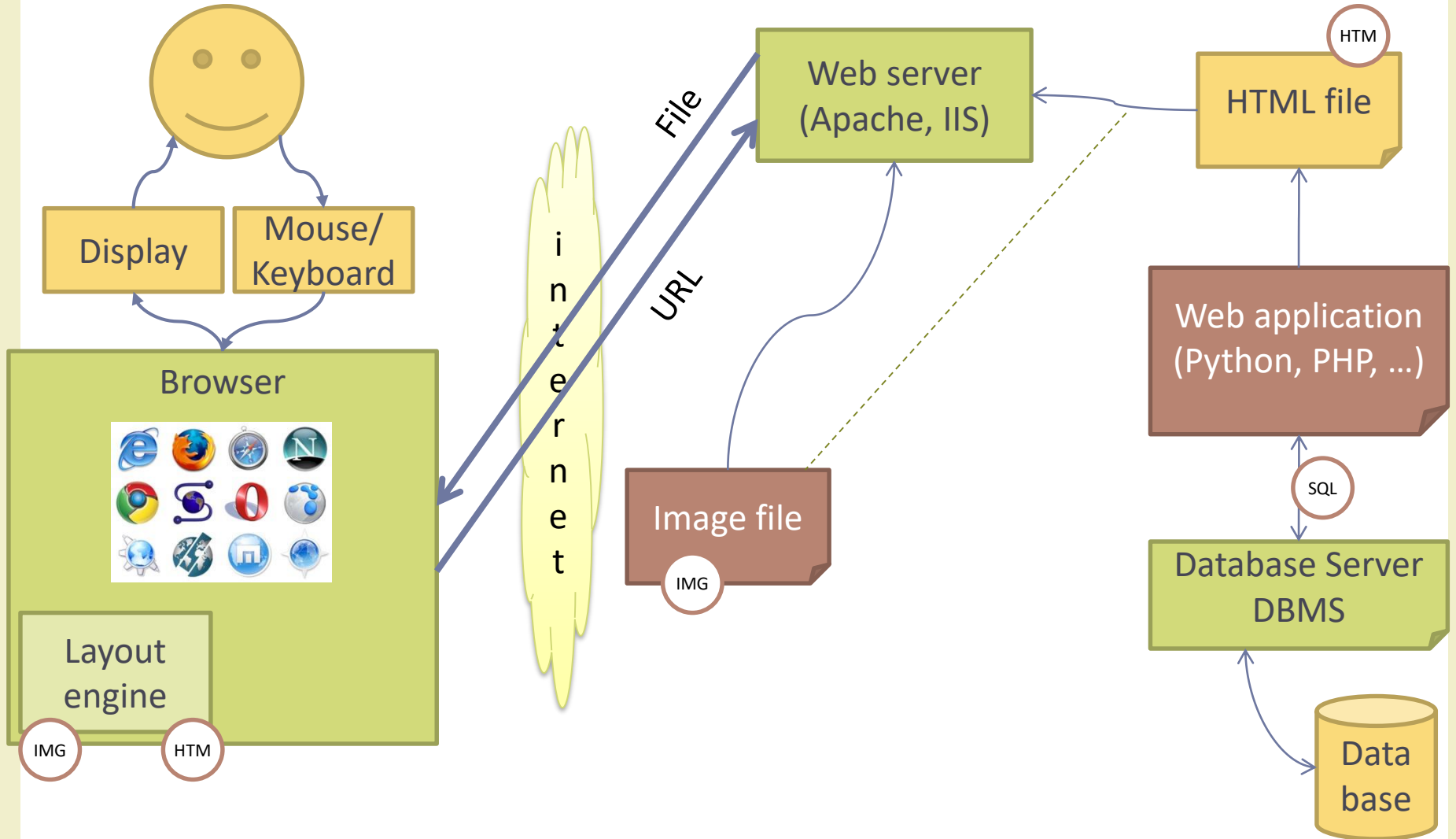
General Architecture



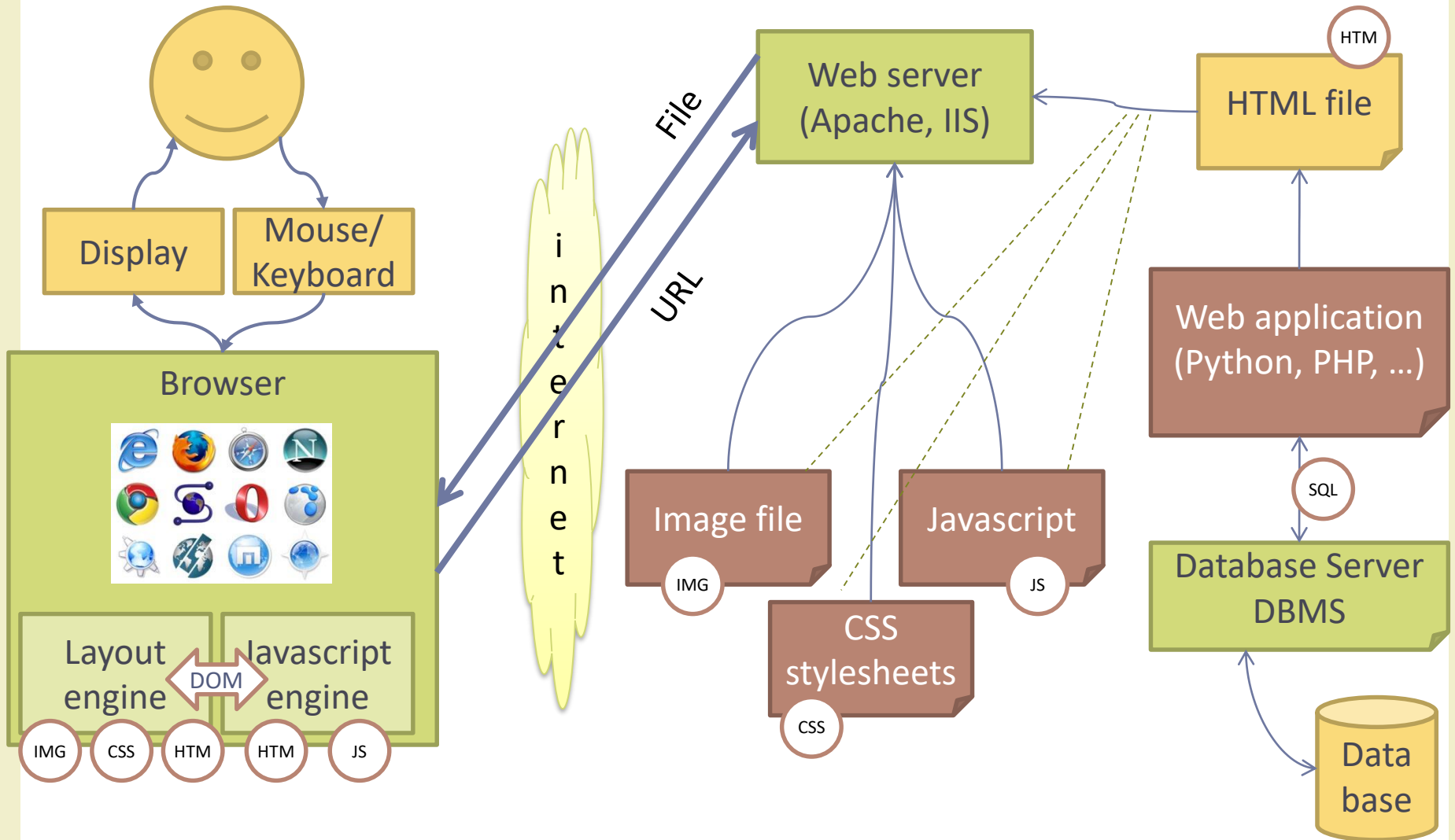
Database server

- Stores the data on which the application server works.
- Executes the queries issued by the application server:
 - Updates the stored data
 - Inserts new data
 - Provides back query results
- The most frequent/complex queries can be implemented internally as stored procedures (pre-compiled queries with parameters)

General Architecture



General Architecture



Why is it so "complex"?

- The Web is continuously evolving
 - it incorporates (= adds) different technologies and tools
- To solve problems and issues that arise among time



<http://www.evolutionoftheweb.com/>

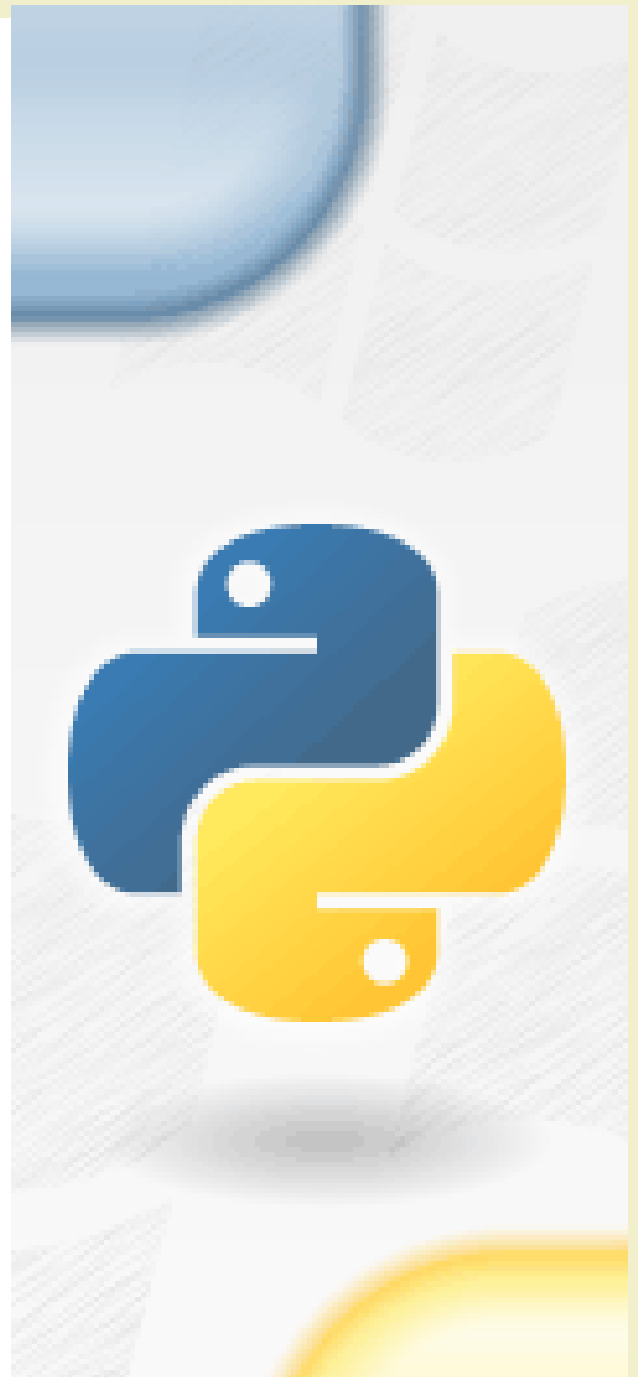
Questions?

01QZP AMBIENT INTELLIGENCE




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