# Programowanie aplikacji WWW
# Web application programming

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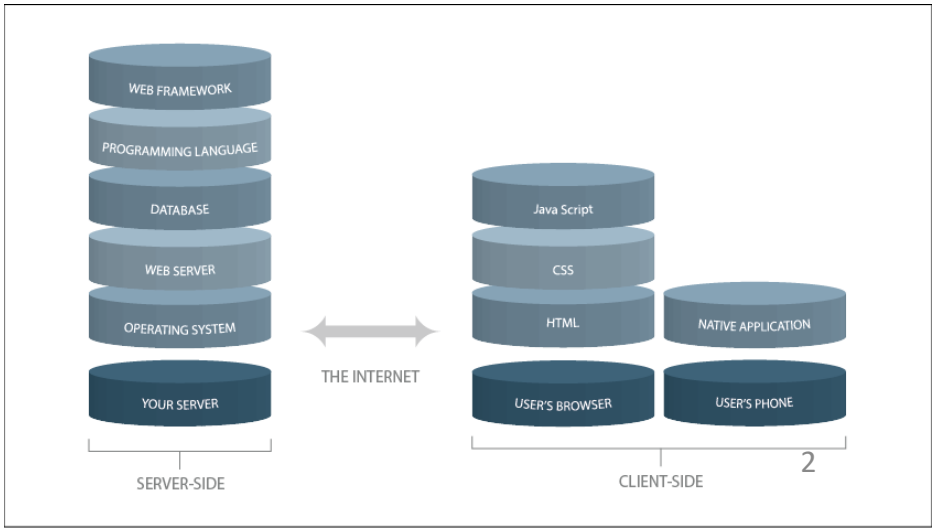
# Introduction

- Browser-side programming:
  - HTML
  - CSS and JavaScript, DHTML
  - XML/XSD/XLST – formal standards
  - AJAX, JSON, jQuery
- Server-side programming:
  - Basics of HTTP programming and web server-interaction
  - JSP and JavaServlets
  - Python Django
- Web application testing
- Model-View-Controller in web application



# Course Assessment

- 100 points total
  - graded laboratories 45-90 min. to solve a task – 30 points total
    1:HTML+CSS+JS – 20 points
    2:XML – 10 points
  - an **web application** – 70 points, developed during 3 laboratories + final presentation

  - allowed : lecture slides, own lecture and tutorial notes, previous laboratory solutions
  - any attempt to communicate, share or to copy someone else's work during graded labs will result in a score of 0 points

- Max 3 absences in the semester
- Own computer use is allowed during laboratories

- To pass the laboratories you need:
  – at least 51 points total
  – and at least 50% from each graded lab and the application task

- Final grade depends on total of the points :
  – 51-60 => 3.0
  – 61-70 => 3.5
  – 71-80 => 4.0
  – 81-90 => 4.5
  – 91-100 => 5.0

Your recent projects
– individual assesment; max. 4,5
The first 3 weeks – until 18.10

https://pages.mini.pw.edu.pl/~ostrekg/WAP24Z/

# Pointed tasks

- The following pointed tasks are planned:

– HTML and CSS + JS – 20 points (~4-11-2024)

– XML, (DTD or XSD), XSLT – 10 points(~16-12-2024)

– web application – 70 points (pres. 16+23-01-2025)

Marcin Sulecki 2 lectures - TBA

Patrycja Garbacz– Lab PAW – IAD x 2 (Wednesday 16-20)

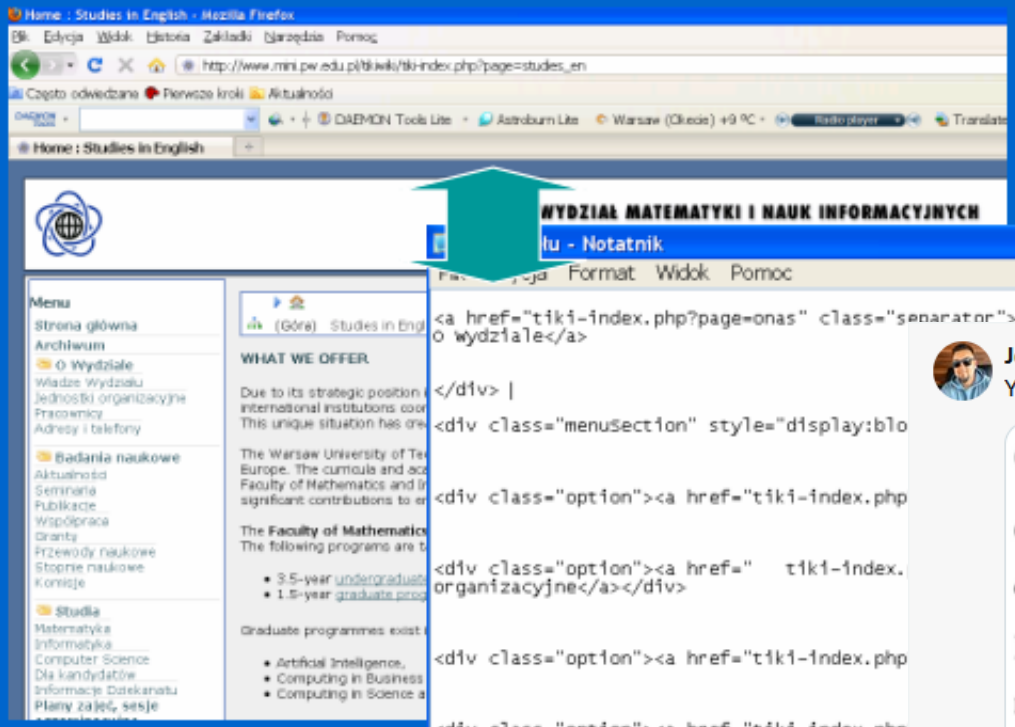
# Resources

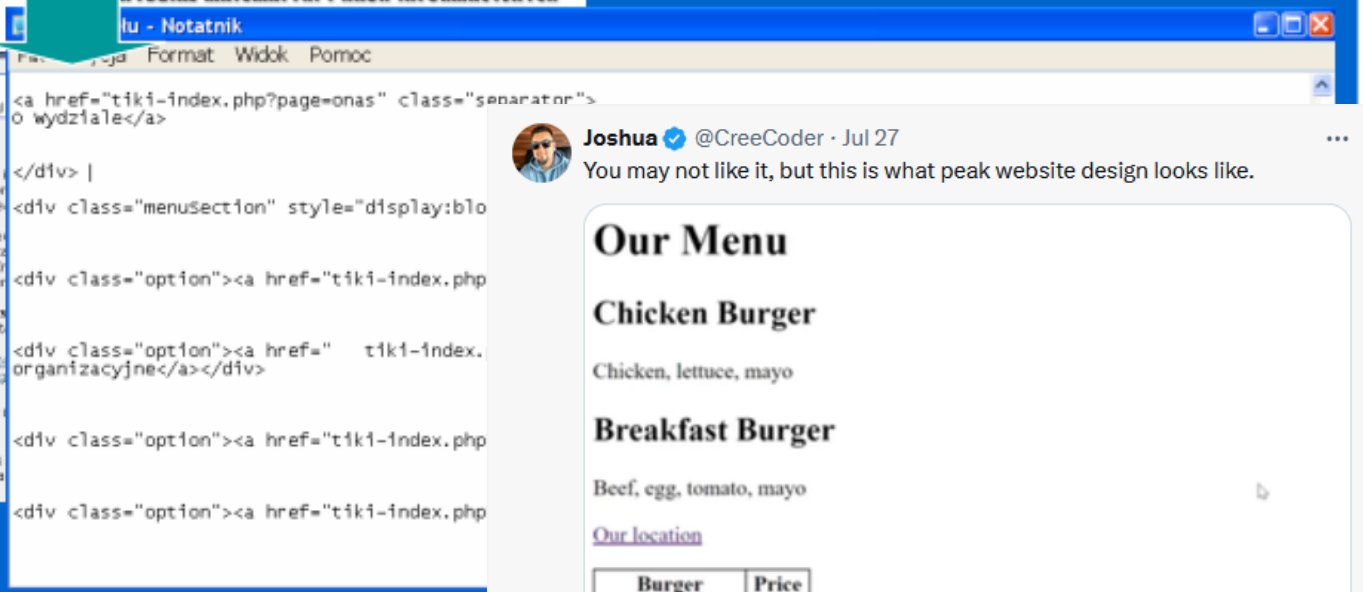

- Books:
  - Zeldman J., Marcotte E., Designing with Web Standards. Third Edition, Pearson Education, 2010
  - Deitel, P.J., JavaScript for Programmers, Pearson Education, 2010
  - Lemay L. and Colburn R. , Sams Teach Yourself Web Publishing with HTML & XHTML in 21 Days (4th Edition), 2003
  - Schafer S.M., HTML, XHTML, and CSS Bible, Wiley Publishing, 2010 (also: HTML,XHTML i CSS, Helion, 2011)
  - Schultz D., Cook C., Beginning HTML with CSS and XHTML: Modern Guide and Reference, Apress, 2007 (also: HTML, XHTML i CSS. Nowoczesne tworzenie stron WWW, Helion, 2008)
  - Head first Servlets & JSP : edycja polska Bryan Basham; Kathy Sierra; Bert Bates
  - Adrian Holovaty; Jacob Kaplan-Moss, The definitive guide to Django : Web development done right, 2009

- Web resources:
  - https://www.w3.org/ https://www.w3.org/standards/ https://www.w3.org/TR/
  - https://spec.whatwg.org
  - www.theserverside.com
  - https://tools.ietf.org/html/rfc7230 Internet Engineering Task Force (IETF)
  - https://www.oracle.com/java/technologies/java-ee-8.html
  - www.w3schools.com
  - https://jcp.org/en/jsr/detail?id=369
  - https://www.ntu.edu.sg/home/ehchua/programming/webprogramming/HTML_CSS_Basics.html
  - https://developer.mozilla.org/en-US/ https://www.youtube.com/channel/UCh5UlGiu9d6LegIeUCW4N1w
  - https://bitbucket.org/okulewicz/javascript-basic/src/master/
  - https://codepen.io/pen/

Consultation: Tuesday 14-15

# In practice



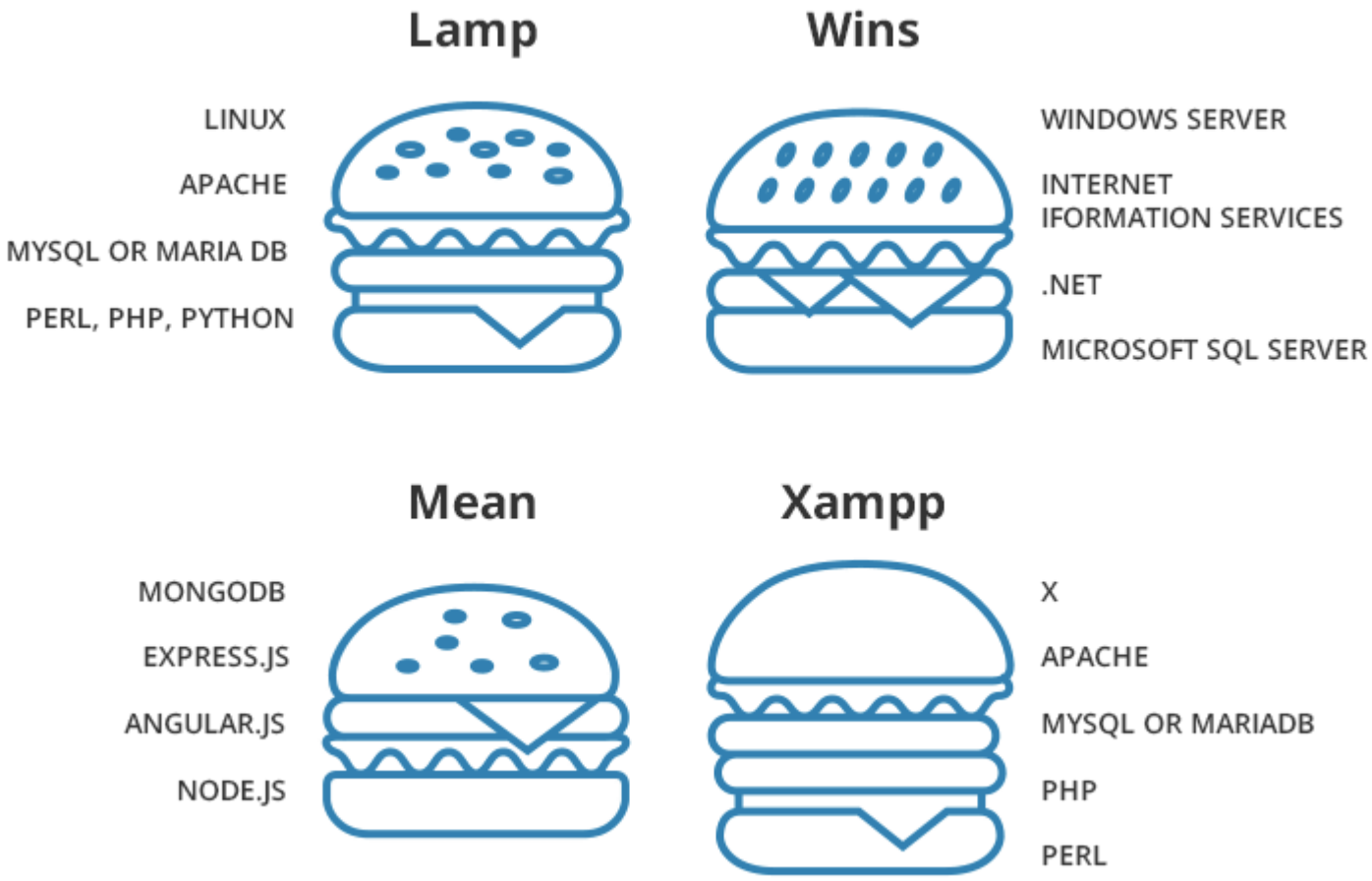







**Develop modern web applications using br**
**stack of technologies**

# Technology stack




https://ddi-dev.com/blog/programming/how-choose-technology-stack-web-application-development/

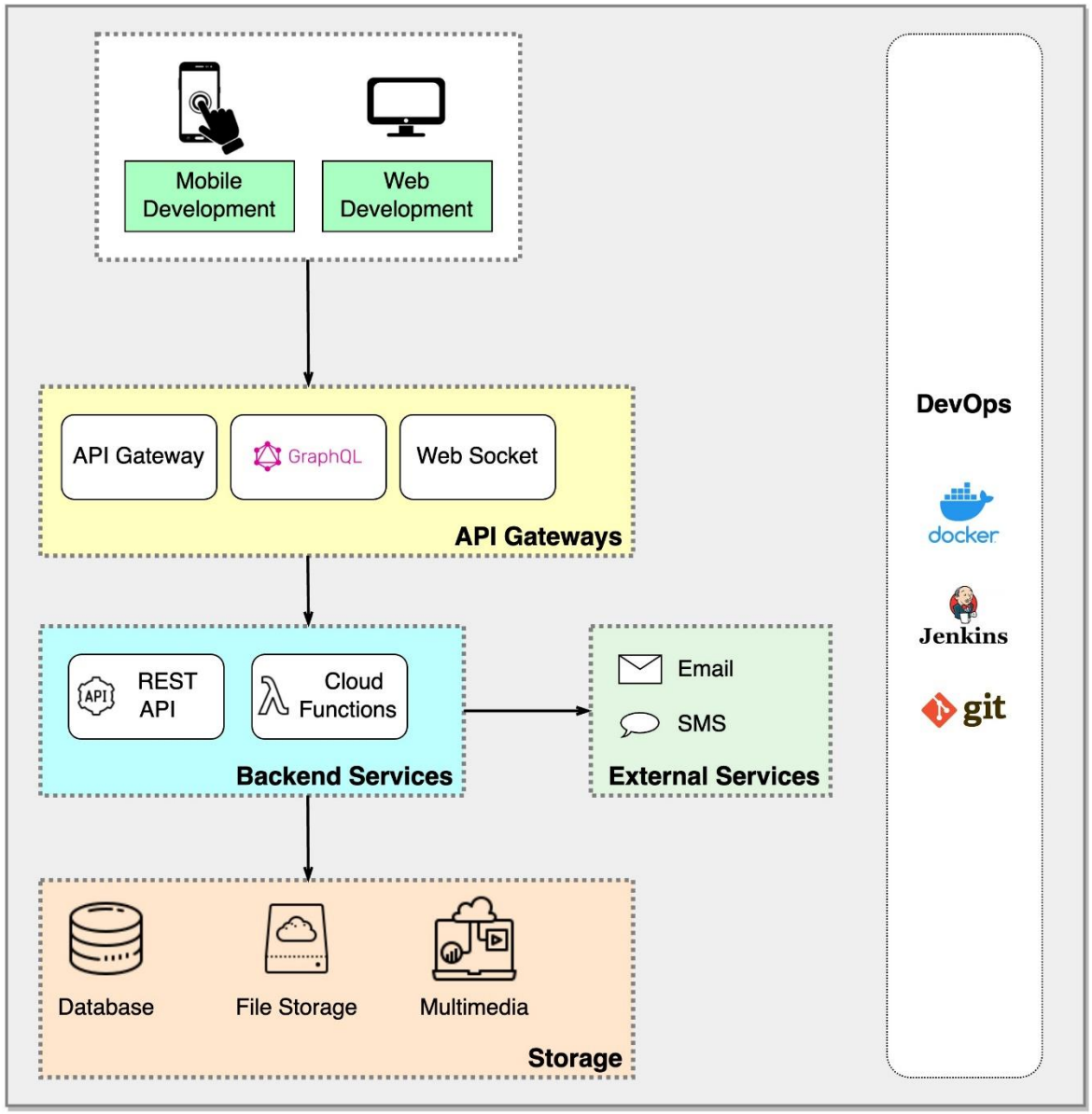
M.W. Lucas “The cloud is a fancy word for ‘other people’s computers.’

https://www.nytimes.com/2022/01/03/business/wall-street-cloud-computing.html

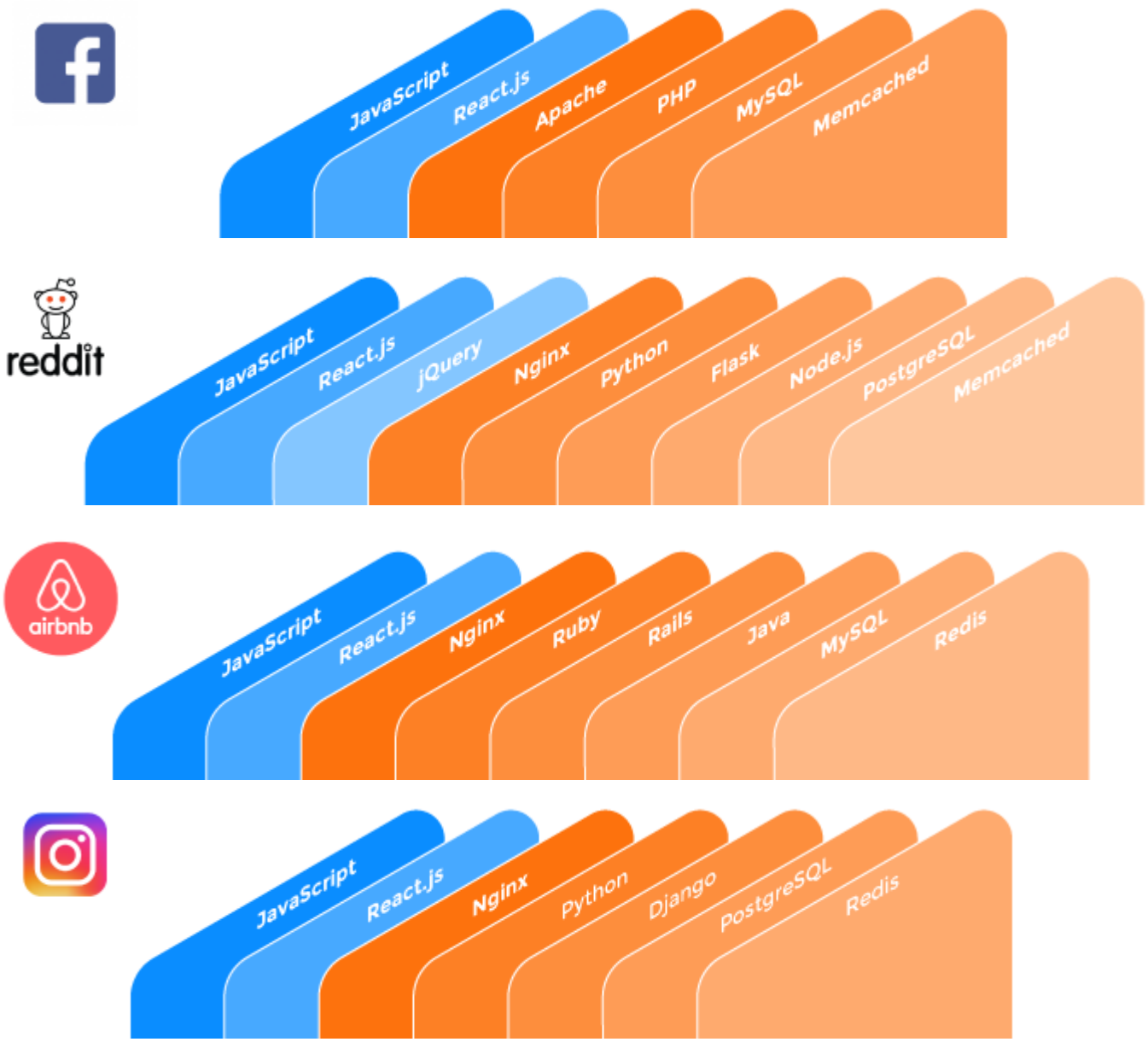
- Web developer
- Full stack developer, front-end, back-end, dev-ops,..

# What Full Stack Development Requires?

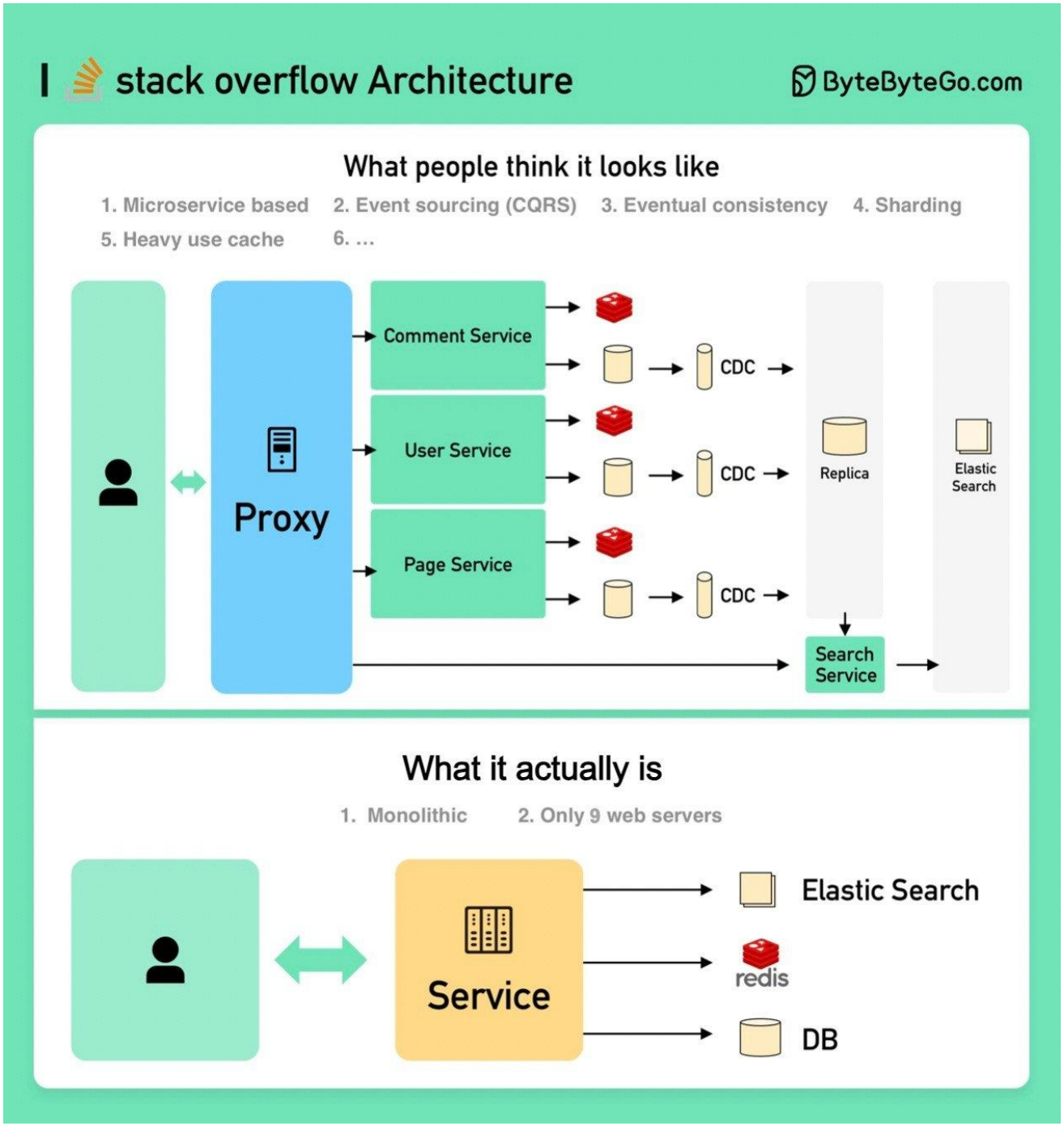
blog.bytebytego.com

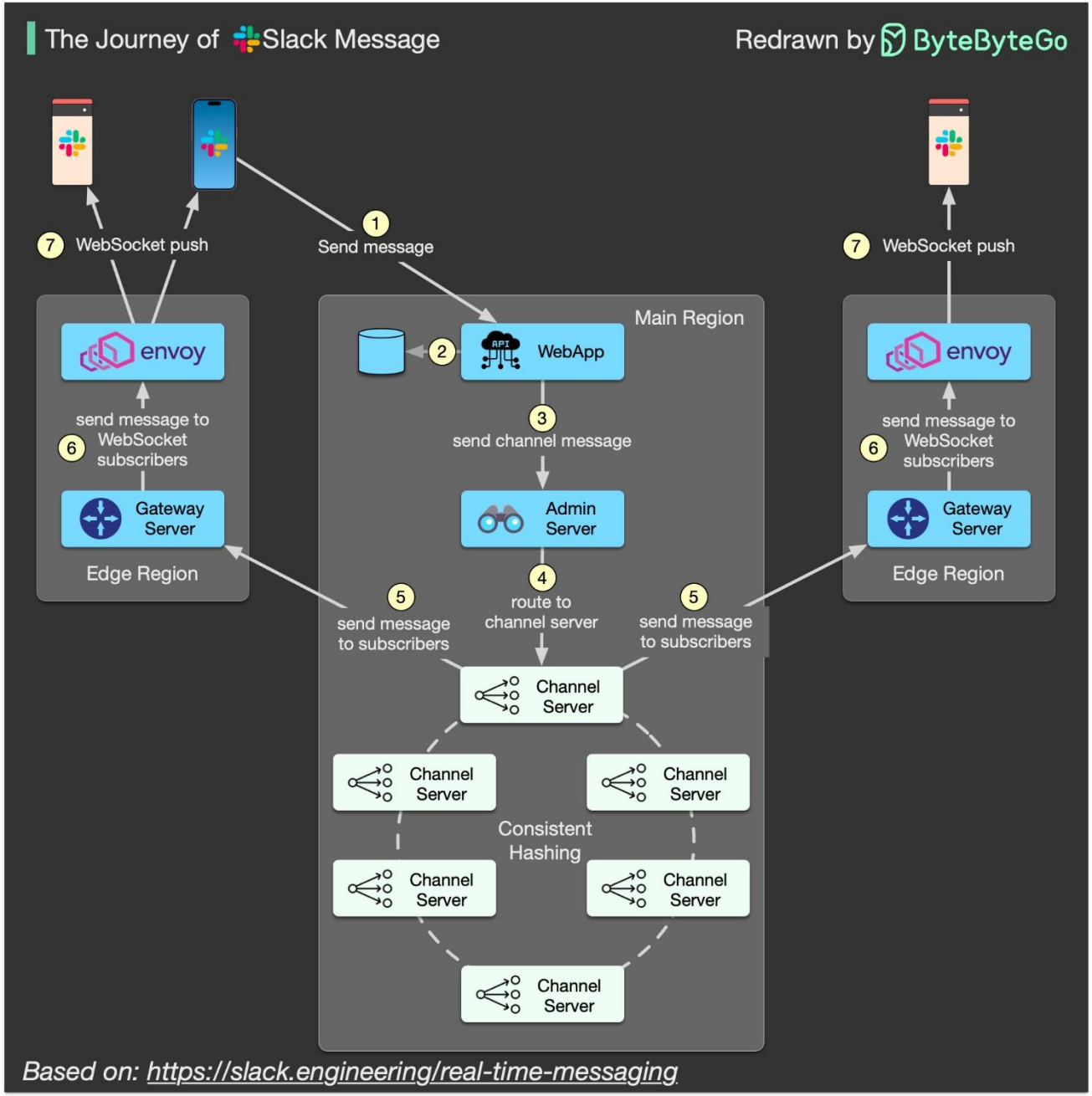


# Technology stack

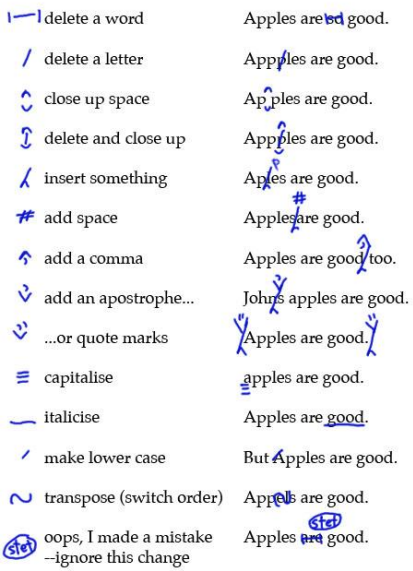



https://www.inception.education/technology-stack-for-web-application-development/

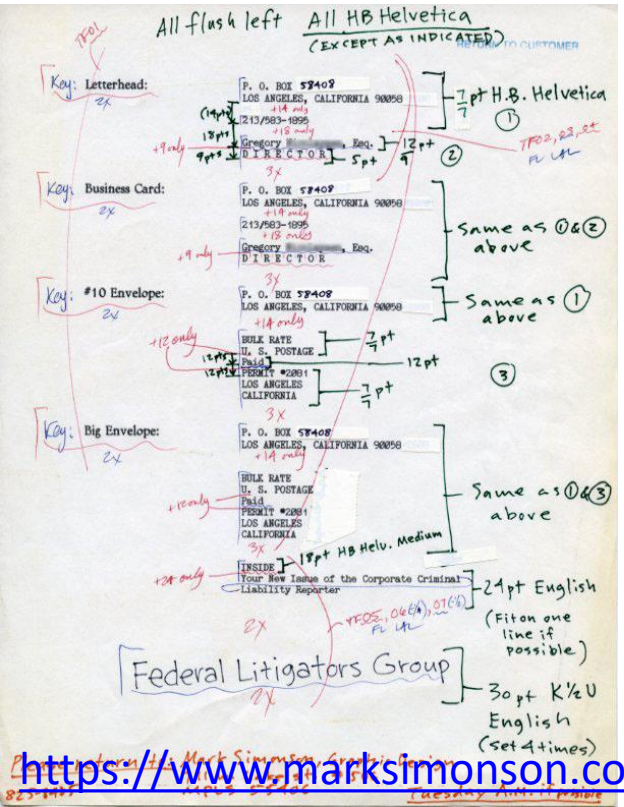

stack overflow Architecture
ByteByteGo.com
What people think it looks like
1. Microservice based
2. Event sourcing (CQRS)
3. Eventual consistency
4. Sharding
5. Heavy use cache
6. ...
Proxy
Comment Service
User Service
Page Service
CDC
CDC
CDC
Replica
Elastic Search
Search Service
What it actually is
1. Monolithic
2. Only 9 web servers
Service
Elastic Search
redis
DB


The Journey of Slack Message
Redrawn by ByteByteGo
1 Send message
7 WebSocket push
7 WebSocket push
envoy
envoy
send message to WebSocket subscribers
6
send message to WebSocket subscribers
6
Gateway Server
Gateway Server
Edge Region
Edge Region
Main Region
2
API
WebApp
3
send channel message
Admin Server
4
route to channel server
5
send message to subscribers
5
send message to subscribers
Channel Server
Channel Server
Channel Server
Consistent Hashing
Channel Server
Channel Server
Channel Server
Based on: https://slack.engineering/real-time-messaging

# Mark-up/markup




Mark-up




Procedural markup:
- Rich Text Format

```
{\rtf1\ansi\ansicpg1250\deff0\deflang1045{\fonttbl{\f0\fnil\fcharset0 Calibri;}{\f1\fnil\fcharset238 Calibri;}}
{\*\generator Msftedit 5.41.21.2510;}\viewkind4\uc1\pard\sa200\sl276\slmult1\qr\lang1033\f0\fs22
Dyr. E.\lang1045\f1  \lang1033\f0
K.Tor, Przewodniczcy Zastpcy\line
Firma z\lang1045\f1  \lang1033\f0
o.o. w/m\par
\pard\sa200\sl276\slmult1 Henryk Potrykus\line
ul.Kr\'f3tka\lang1045\f1
\lang1033\f0 Puck\par
\par
Z\lang1045\f1  \lang1033\f0 przykroci zawiadamiam, \lang1045\f1\'bfe
Pa\'f1skie podanie zostalo...\par
\pard\sa200\sl276\slmult1\qr Z
powa\'bfaniem\par
\pard\sa200\sl276\slmult1\lang1033\f0\par
}
NUL
```

Generic Coding
- Tex macros

```
\documentclass{letter}
\usepackage{polski}
\address{Dyr. E.~K.~Tor,\\ Przewodniczcy Zastpcy\\
 Firma z~o.o.\\ w/m}
\signature{E.~.K.~Thor}
\begin{document}
 % pierwszy list
\begin{letter}{Henryk Potrykus\\ul.~Krótka\\Puck}
\opening{Szanowny Panie}
 Z~przykroci zawiadamiam, że Paskie podanie
 zostalo...
\closing{Z~powaaniem}
\cc{cc: Józef Wujke}
\end{letter}
```

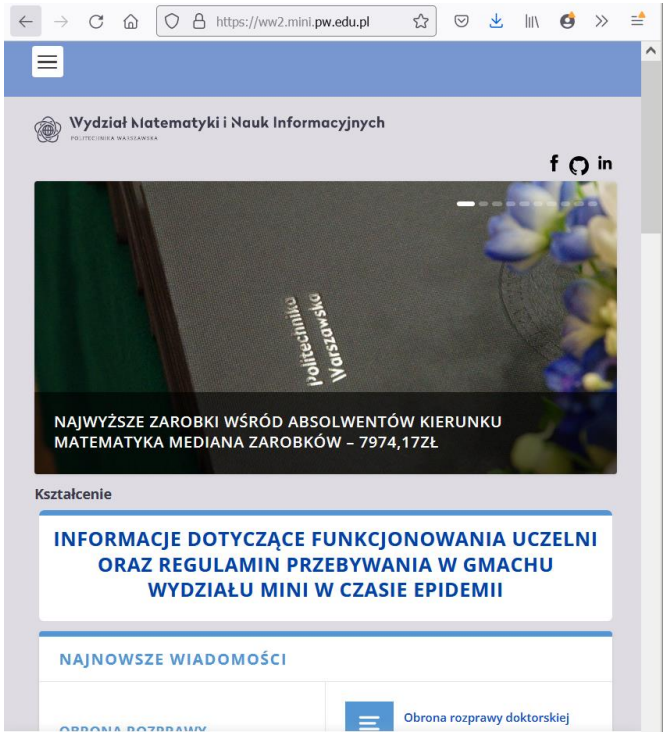
printers:
PostScript
PDF

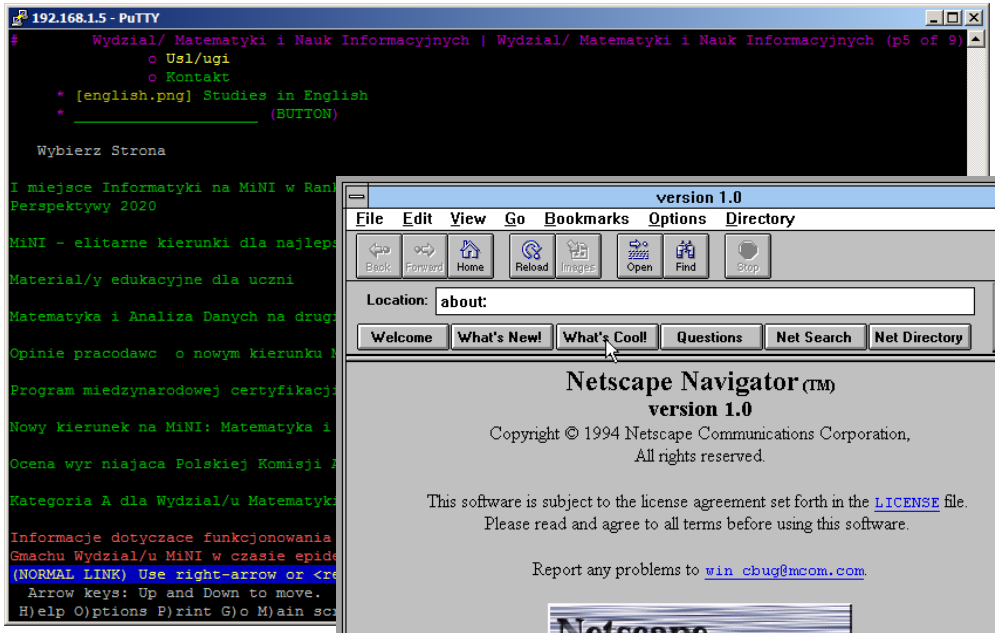
Standard Generalized Markup Language (SGML ISO 8879:1986) extends generic coding

https://www.marksimonson.com/notebook/view/the-lost-art-of-type-specing

# HTML
# HyperText Markup Language

- Aim : document presentation
- How to render : ie. web browser




HTML is a set of tags that follows the rules of SGML

# HTML - network

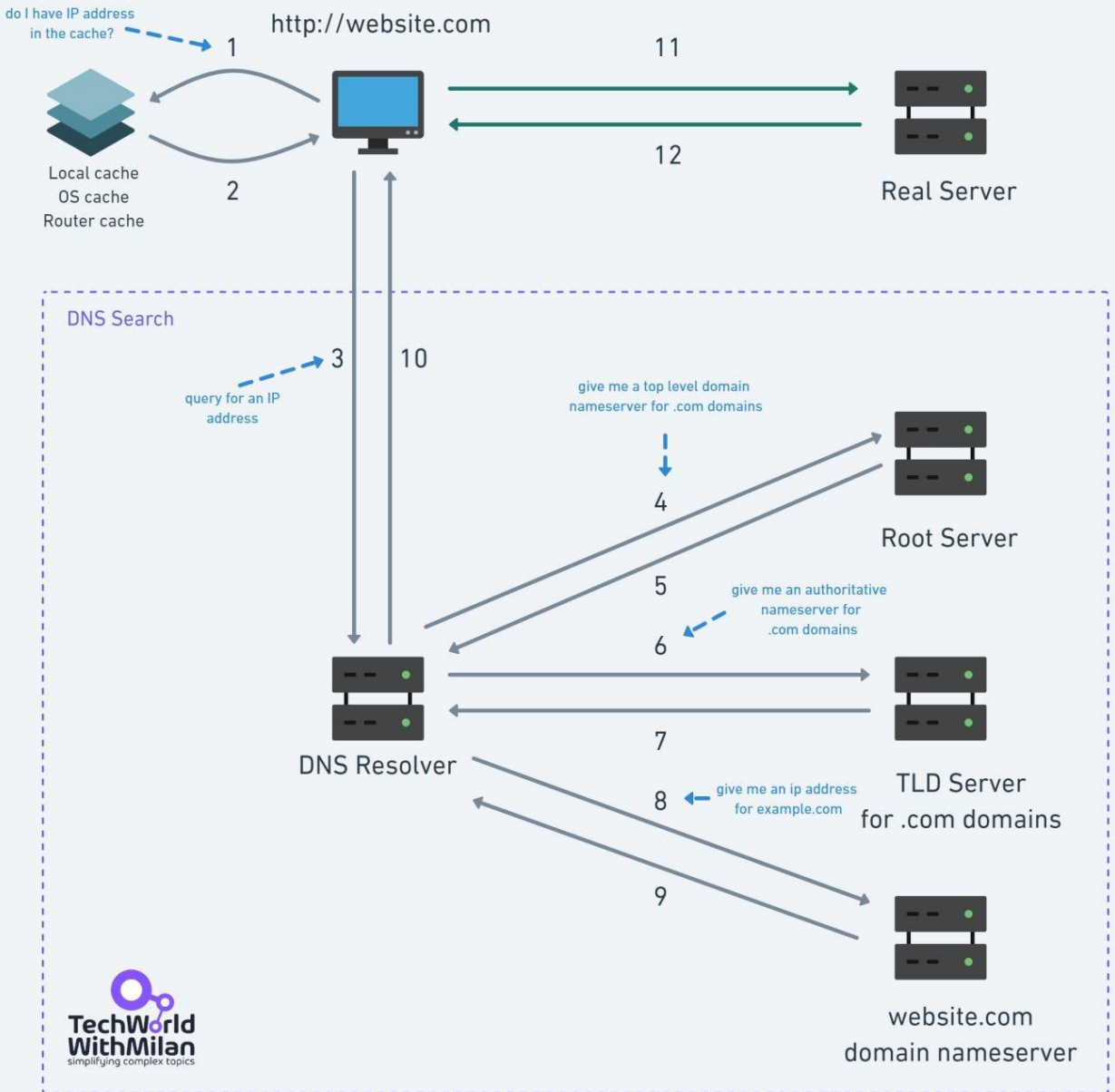
- CERN
  - HTML & WWW
- DNS
  - Domain name registrar
  - ccTLD .pl – NASK/dns.pl
- Hosting
- Reverse proxy
  - Load balancing
- Cloud services

DNS types:
-Authoritative
-Caching
-Forwarding (Recursive)

BIND (caching + forwarding)
Unbound – caching
NSD - authoritative

DNSSEC
HTTPS Certificate
(https://certbot.eff.org/)

# How DNS Works



# Web Browsers - engines

| Engine | Status | Steward | ECMA | License | Embedded in |
|---|---|---|---|---|---|
| WebKit | Active | Apple | JavaScriptCore (KJS) | GNU LGPL, BSD-style | **Safari** browser, plus all browsers hosted on the iOS App Store |
| Blink | Active | Google | V8 | GNU LGPL, BSD-style | **Google Chrome** and all other Chromium-based browsers such as **Microsoft Edge, Brave, Vivaldi and Opera** |
| Gecko | Active | Mozilla | SpiderMonkey | Mozilla Public | **Firefox** browser and Thunderbird email client, plus forks such as SeaMonkey and Waterfox |
| Servo | Active | Mozilla | SpiderMonkey | Mozilla Public | experimental browser, Firefox Quantum |
| Goanna | Active | M. C. Straver[4] | SpiderMonkey | Mozilla Public | Pale Moon and Basilisk browsers |
| NetSurf | Active | hobbyists[5] | | GNU GPLv2 | NetSurf browser[6] |
| KHTML | Active | KDE | KJS | GNU LGPL | |
| EdgeHTML | Maintenance only | Microsoft Proprietary | | | Universal Windows Platform apps; formerly in the Edge browser |
| Trident | Discontinued | Microsoft Proprietary | JScript / Chakra | | Internet Explorer browser and Microsoft Outlook email client |
| Presto | Discontinued | Opera Software | Linear B / Futhark / Carakan | Proprietary | formerly in the Opera browser |

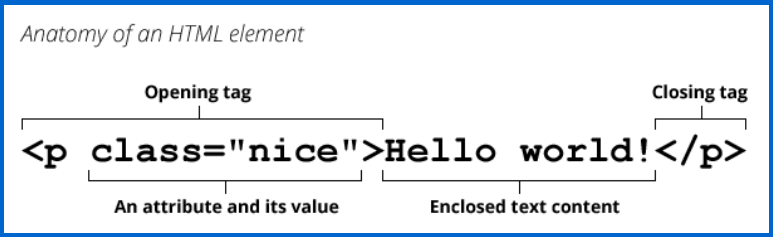
Mosaic 1.0 – first graphical, no tables support

KHTML->Webkit->Blink

https://en.wikipedia.org/wiki/Comparison_of_browser_engines

# HTML – a simple example

```
<HTML>
<HEAD>
  <TITLE> Internet Programming - first
     HTML file
  </TITLE>
</HEAD>
<BODY>
  Body text of the document.
</BODY>
</HTML>
```




**This document is not formally valid. A tendency to more strictly follow standards is observed. In particular, elements and attributes deprecated in HTML 4.0 should no longer be placed in documents.**

# HTML – a formal example

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
   "http://www.w3.org/TR/html4/strict.dtd">
<html lang="en">
   <head>
      <meta http-equiv="Content-Type"
      content="text/html; charset=ISO-8859-1">

      <title>
            HTML 4 Document
      </title>
</head>
<body>
<p> Body text of the document </p>
</body>
</html>
```

**Whether an HTML document fully matches the requirements defined in the HTML standard, can be checked at http://validator.w3.org. Source code of the validator, and other validators (standalone, browser plug-ins etc.) are available, as well.**

# Basic facts about HTML

- Each document is a pure text document
- All multimedia content is placed in separate files
- Each document is a mixture of text and tags
- Each tag has the following syntax

```
<TAG_NAME [Attribute1="value1"
           Attribute2="value2" …]>
   …
</TAG_NAME>
```

# Basic facts about HTML – part II

- The text is formatted by a browser – line endings in your source document are ignored unless you use tags (BR or P)
- Each document can be displayed in a different way in different browsers – this is not an error!
- To preserve portability, the browser must be able to decide about final display – there can be different screen resolutions, window sizes, number of available colours …

# Sample tags

| Tag name | Meaning | Example |
|---|---|---|
| HTML | Encloses whole document content | <HTML><br>….<br></HTML> |
| HEAD | Encloses the header section i.e. the section containing settings affecting the whole document like character encoding | |
| BODY | Encloses the actual content of a document i.e. the information to be displayed | |
| A | Defines hypertext link i.e. creates the web out of individual documents | <a href="http://www.pw.edu.pl">University</a> |
| P | Encloses the text of a paragraph | <P>introduction</P> |

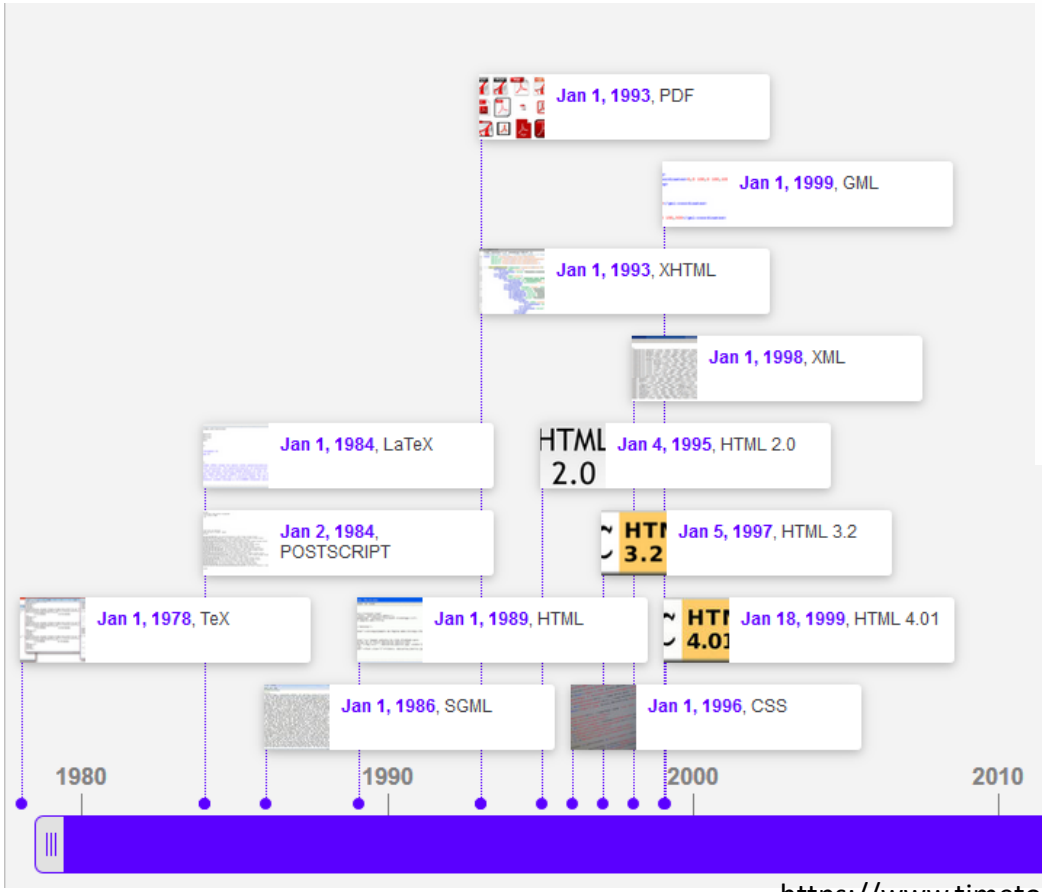
# Sample tags – part II

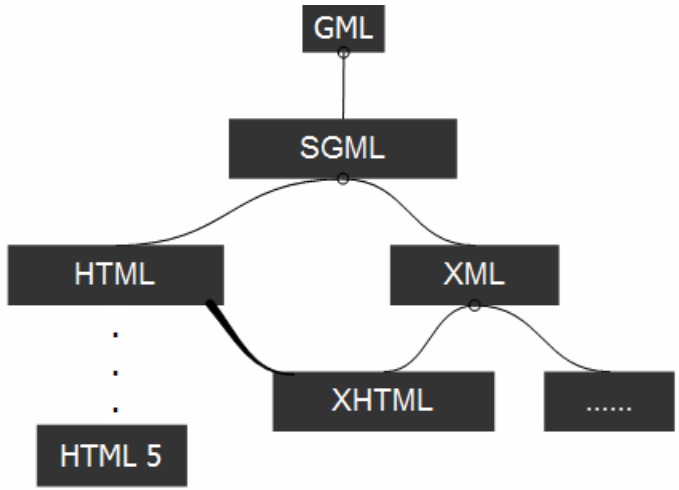
| Tag name | Meaning | Example |
|---|---|---|
| BR | Ends the line of the text | Text<BR /><br>The next line |
| H1-H6 | Headers of different size | <H1>Chapter 1</H1><br><H2>Section 1.1</H2> |
| PRE | Preformatted text – useful for displaying code listings (text identation is preserved) | <PRE><br>1 2 3<br>4 5 6<br></PRE> |
| UL and LI | Stand for unordered list and list item respectively. OL is used for order list. | <UL><br><LI>first item<br><LI>second item<br></UL> |

# Sample tags – part III

| Tag name | Meaning | Example |
|---|---|---|
| OL and LI | Stand for ordered list and list item respectively. | <OL><br><LI>first item<br><LI>second item<br></OL> |
| HR | Horizontal line | <hr /> |
| EM | Emphasised | The text |
| STRONG | Strong text | The text |
| BLOCKQUOTE | Citation | <blockquote address="www.sun.com">…</blockquote> |
| CITE, Q, INS, DEL, SUP, SUB,… | Other tags: citation, inserted and deleted text, superscript, subscript | … |

# Markup specifications




https://www.timetoast.com/timelines/markup-languages-evolution

HTML 4.0 oraz XHTML 1.0 Transitional (pośredni)
HTML 4.0 i XHTML 1.0 Frameset (układ ramek)
HTML 4.0 i XHTML 1.0 Strict (ścisły)