WEB

Development

What is the Internet?

- A global network of computers. Network of networks
- Researched by **DARPA** early 60s to survive **WWIII**
- **ARPANET**, a precursor, connected **military** and **academic** networks in **1980s**
- **Commercial** use expanded in **1990s** to what we have today

What is the Web?

- AKA The World Wide Web or **WWW** or just The Web
- A combination of technologies that **use the Internet** to **share formatted documents** connected to one another
- Invented by **Tim Berners-Lee** in '89 a physicist at **CERN**
- Documents are formatted in **HTML** (Hypertext Markup Language)

What is the Web?

- **Browsers** fetch HTML documents from **servers** connected by the internet
- Documents are found with **URLs** (Uniform Resource Locator)
- HTML documents format (hyper) text as **anchors** that refer or **link** to other documents

Some Milestones

1960s - The Internet

1970s - Client-server architecture

1980s - Personal computers

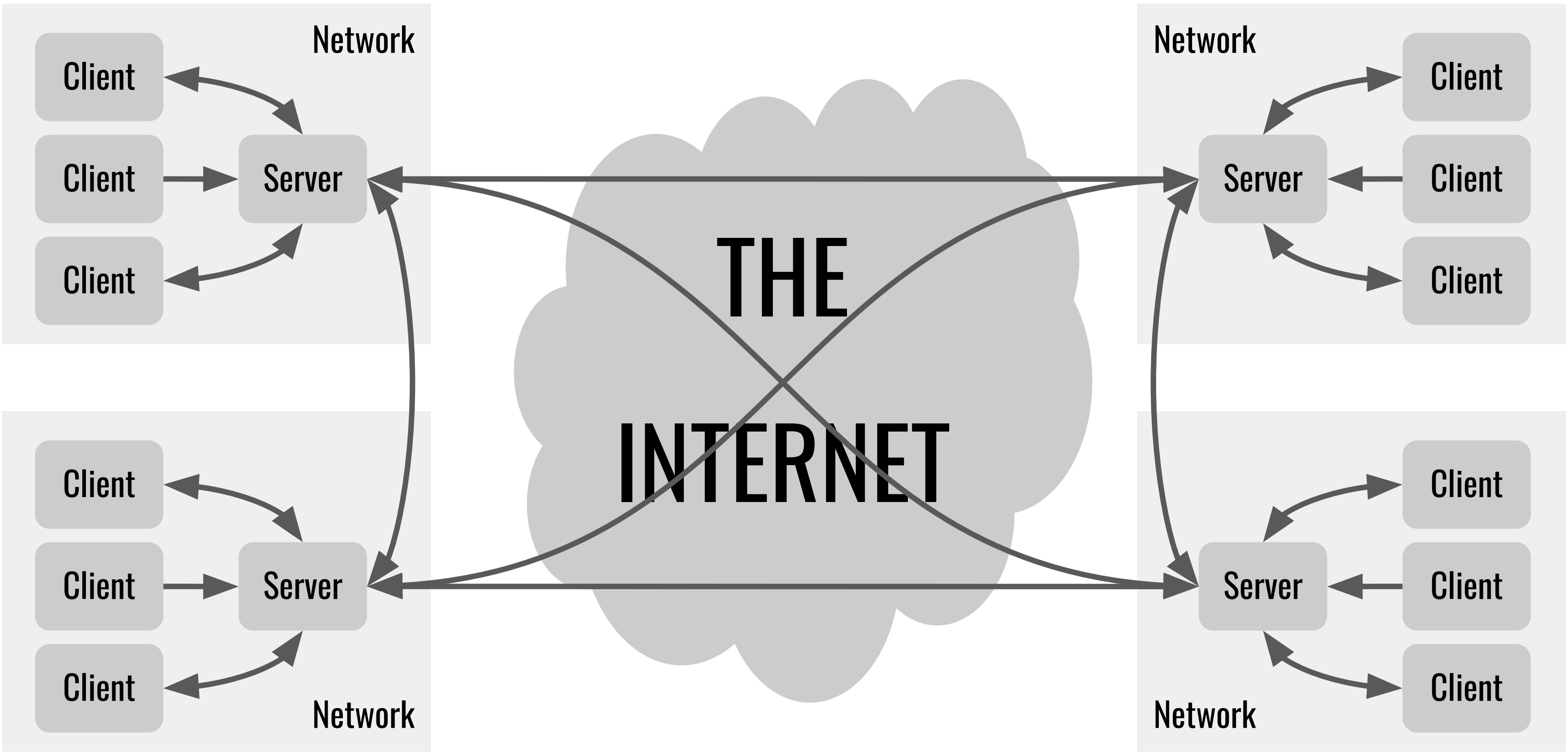
1990s - The World Wide Web

2000s - Web Applications

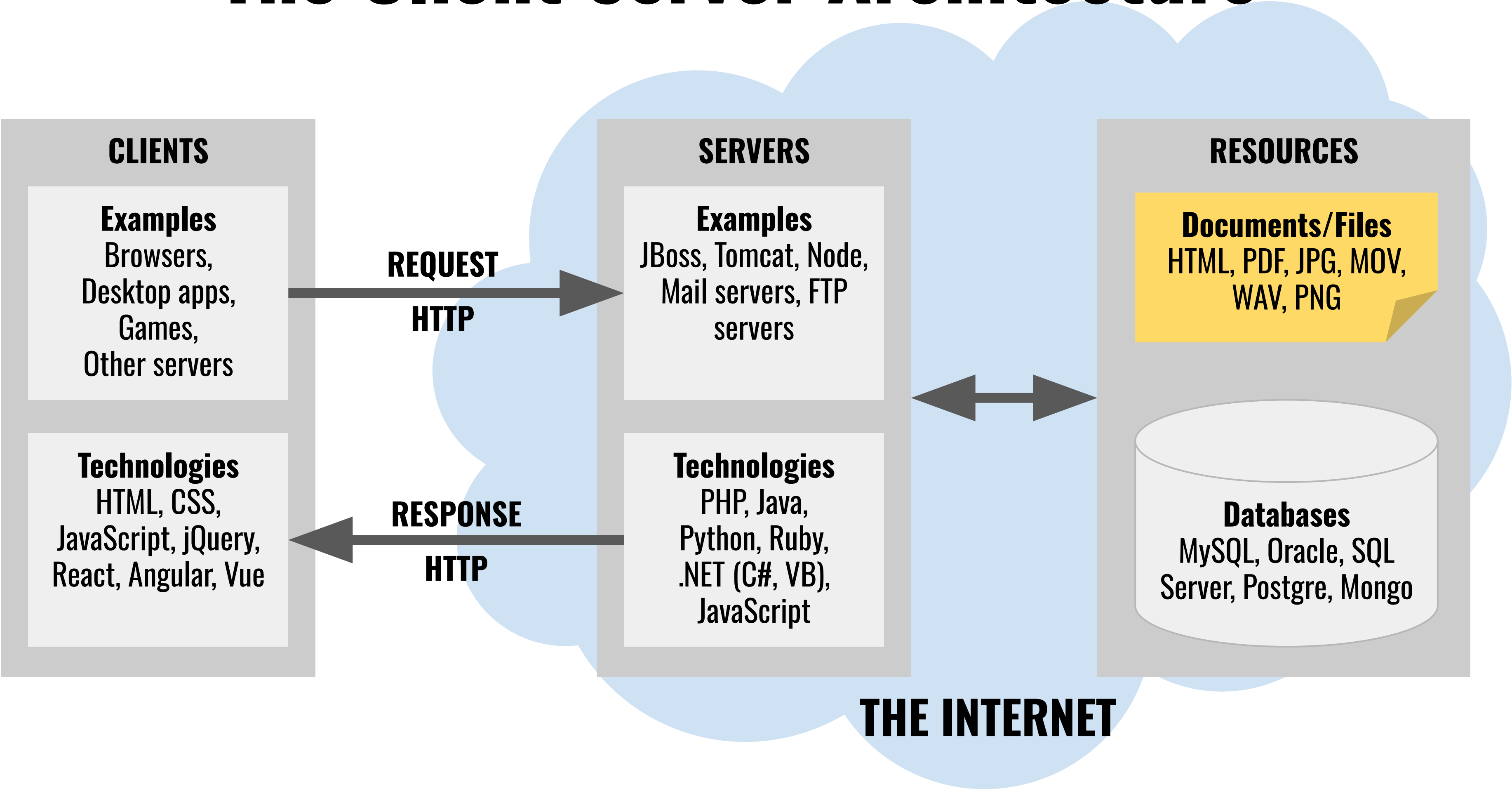
2010s - Mobile computing, big data

2020s - ?Neuralink/Starlink/TeslaBot/ChatGPT?

The Internet - a network of networks



The Client Server Architecture



CLIENTS

Examples
Browsers,
Desktop apps,
Games,
Other servers

Technologies
HTML, CSS,
JavaScript, jQuery,
React, Angular, Vue

REQUEST

HTTP

RESPONSE

HTTP

SERVERS

Examples
JBoss, Tomcat, Node,
Mail servers, FTP
servers

Technologies
PHP, Java,
Python, Ruby,
.NET (C#, VB),
JavaScript

RESOURCES

Documents/Files
HTML, PDF, JPG, MOV,
WAV, PNG

Databases
MySQL, Oracle, SQL
Server, Postgre, Mongo

THE INTERNET

Server Frameworks

1993 - Common Gateway Interface (Perl, C++, …)

1995 - PHP (PHP)

1999 - Java 2 Enterprise Edition (J2EE)

2000 - .NET (ASPs, Visual Basic, C#, …)

2005 - Ruby on Rails (Ruby)

2005 - Django (Python)

2009 - Node.js (JavaScript)

2010 - Flask (Python)

Client Frameworks

1995 - JavaScript (Netscape)

1996 - Adobe Flash

2005 - Dojo

2006 - jQuery

2010 - Knockout

2010 - Angular (Google)

2010 - Backbone

2011 - Ember

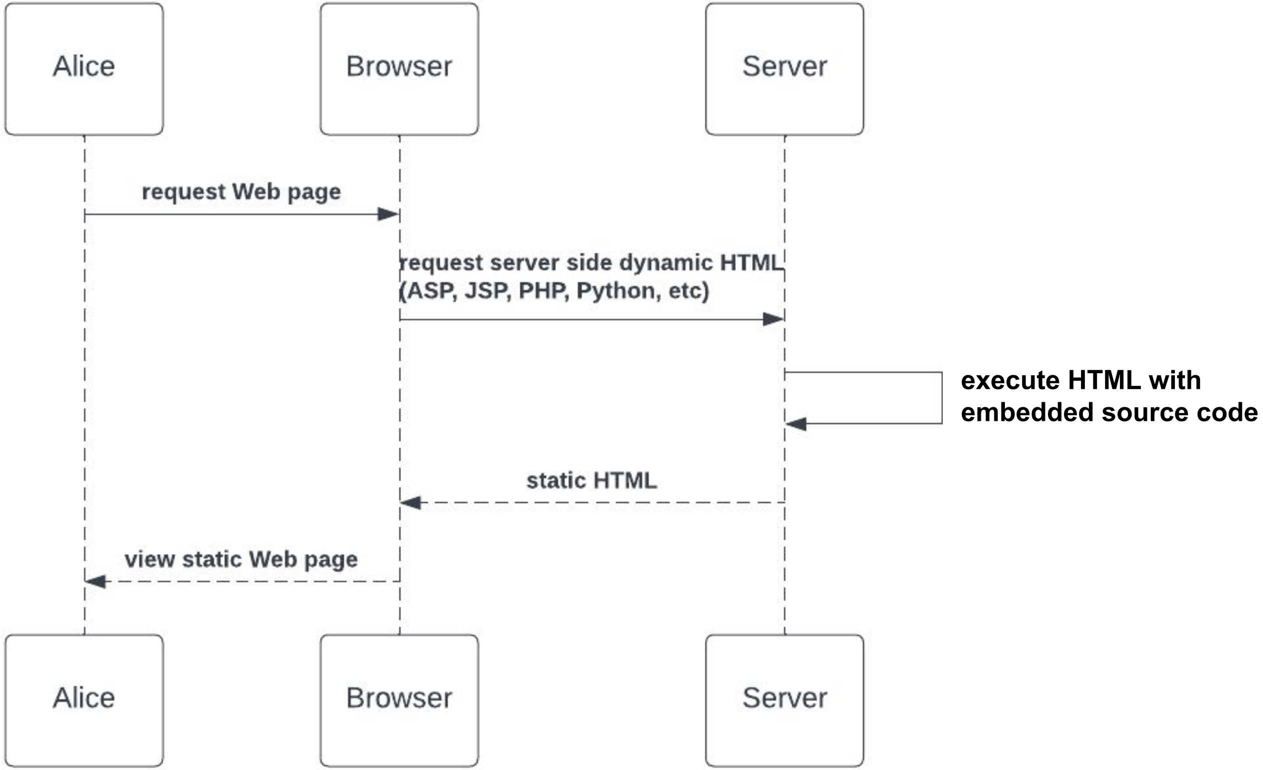
2012 - Sails

2012 - Meteor

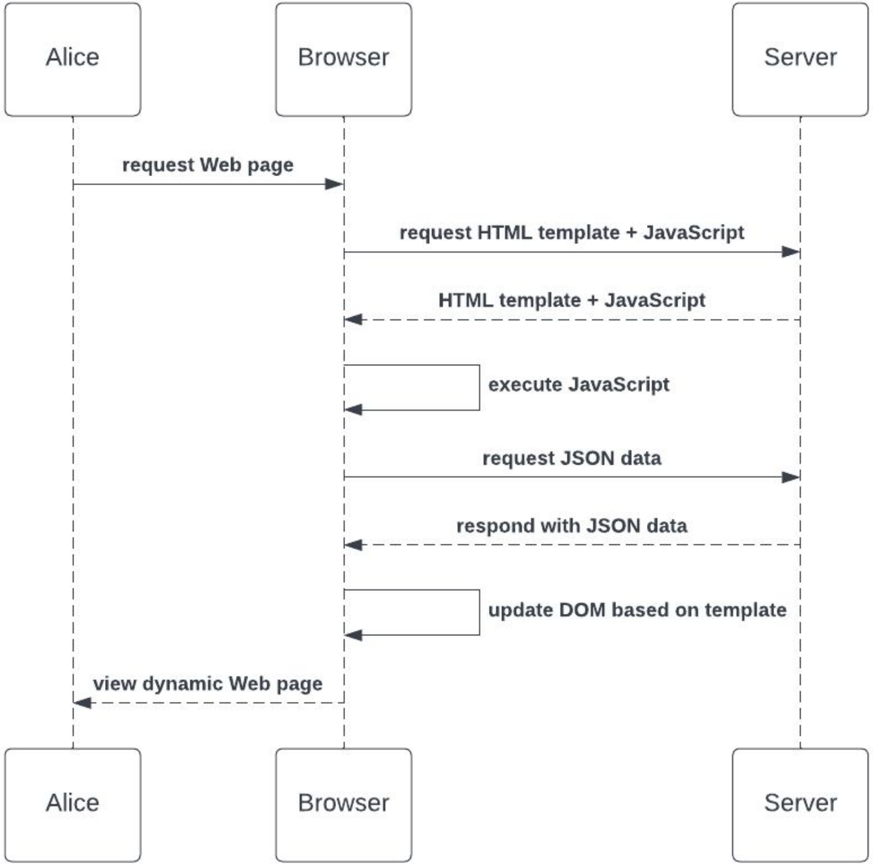
2013 - React (Facebook)

2014 - Vue

Server Side UI Rendering



Client Side UI Rendering



Web Application Development

Applying software engineering skills to build applications using the Web as a framework

- Requirements
- Data modeling
- Interprocess communication
- Data storage/retrieval
- User interface design

Working in Teams

The code belongs to the team

- Best practices
- Source control, pull requests, code review
- Naming conventions, understandability
- Application structure
- Planification, communication

Working in Large Projects

- Scalability
- Maintainability
- Software development methodologies
  - requirements, design, implementation, feedback, testing
  - incremental software development

Architecture

- Client-server architecture
- Multitier architecture
- Separation of concern (SoC)
  - Model View Controller (MVC)
  - Object-oriented programming
  - Aspect-oriented programming

Design Patterns

- Singleton
- Factory
- Service
- Model View Controller (MVC)
- Data access object (DAO)
- Inversion of control (IOC)