

<http://www.halvorsen.blog>

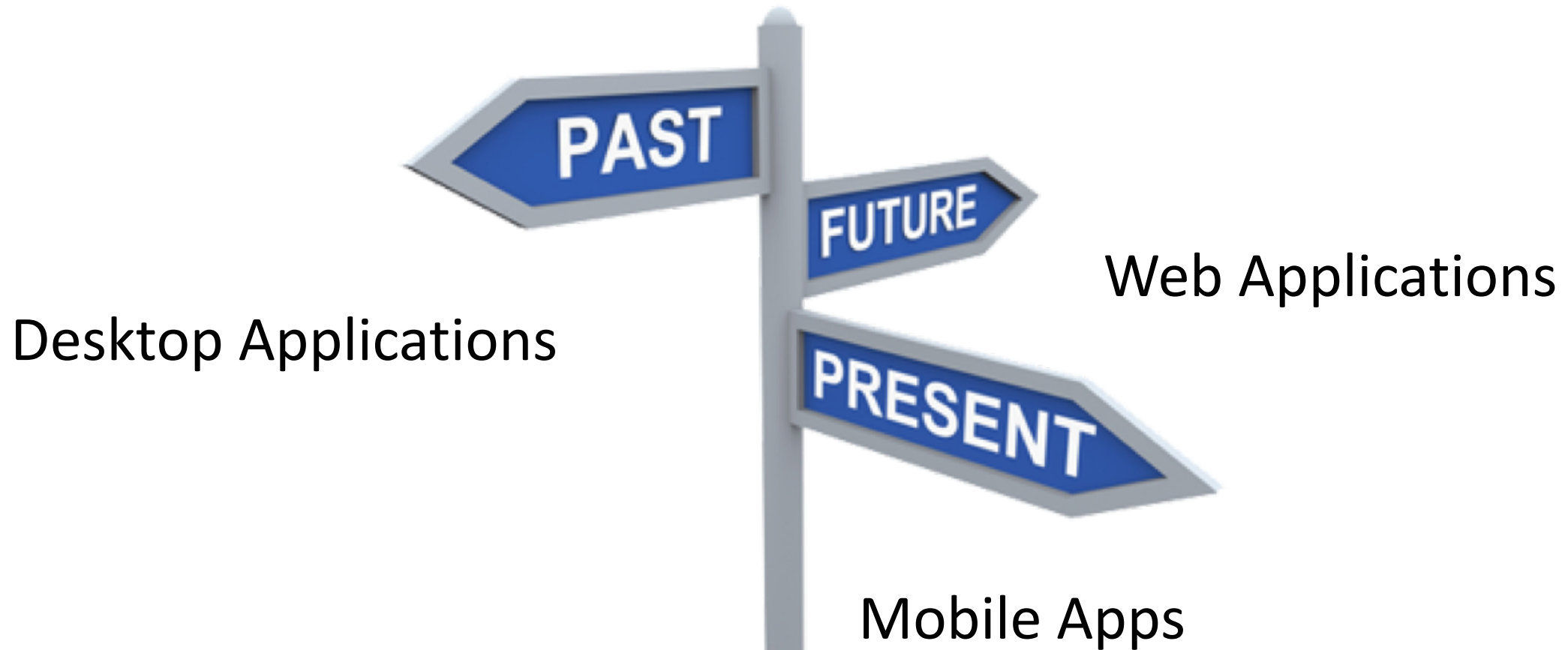


# Web Programming

Hans-Petter Halvorsen

# Web is the Present and the Future

With HTML5 powerful Web Applications can be made

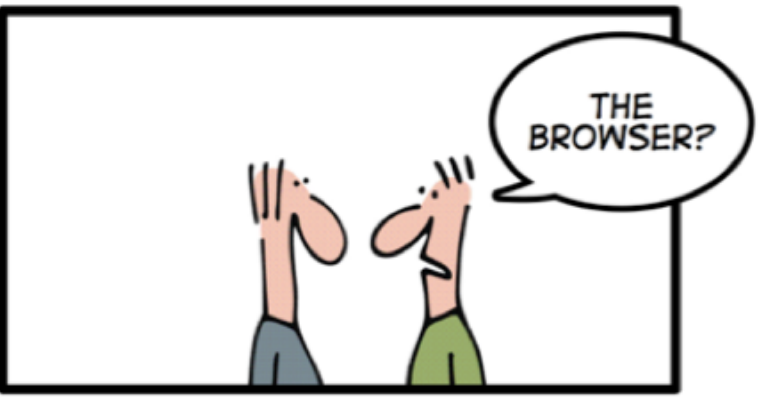
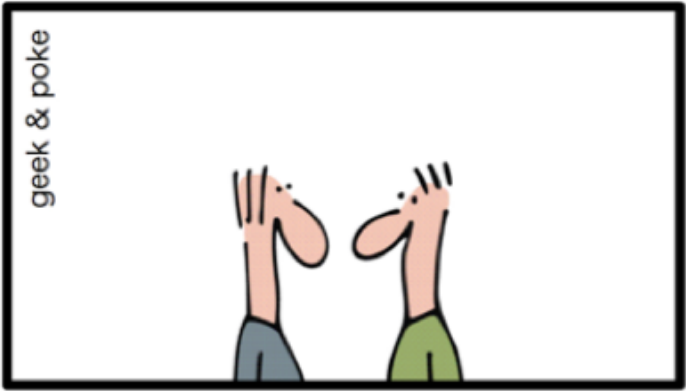
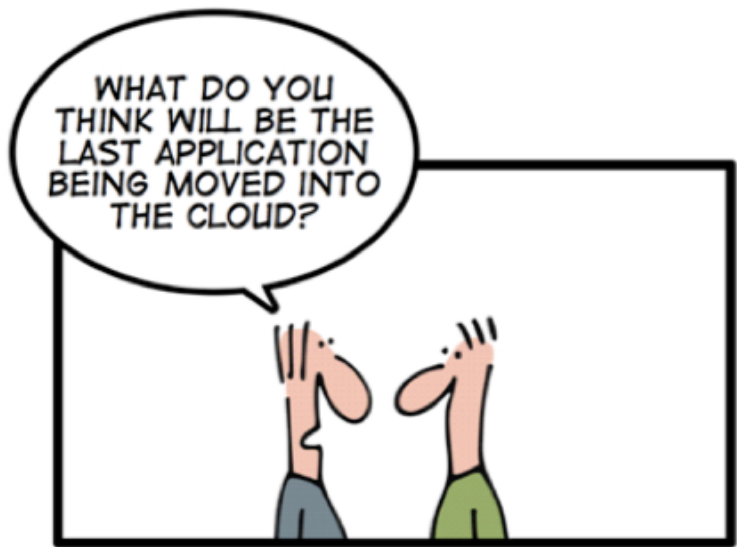


# History of the Web

- Internet (1960s)
- World Wide Web - WWW (1991)
- First Web Browser - Netscape, 1994
- Google, 1998
- Facebook, 2004
- Smartphones, 2007
- Tablets, 2010



# The Web Browser



O. Widder. (2013). geek&poke. Available: <http://geek-and-poke.com>



Edge



Chrome



Opera



Firefox



Safari

Microsoft Word Online - Work together on Word documents

NI myDAQ.docx - Microsoft Word Online

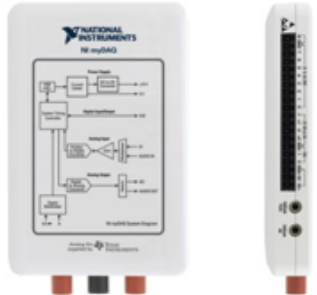
Word Online | OneDrive | myDAQ | NI myDAQ | Share | Hans-Petter Halvorsen | Sign out

FILE HOME INSERT PAGE LAYOUT REVIEW VIEW Tell me what you want to do OPEN IN WORD

Clipboard Font Paragraph Styles Editing

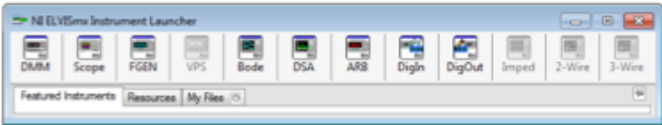
# 1. Introduction to myDAQ

NI myDAQ is a simple and intuitive DAQ device from National Instruments. NI myDAQ have Analog Inputs (AI), Analog Outputs (AO), Digital Inputs (DI) and Digital Outputs (DO).



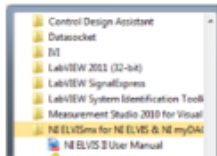
In addition to traditional I/O, the myDAQ have a built-in **Digital Multimeter**. The myDAQ can also be used as a **Power Supply**. Using the built-in software the myDAQ can also be used as an **Oscilloscope** and **Function Generator**.

When you plug in the device in the USB connection on your PC, the following will pop-up automatically (NI ELVISmx Instrument Launcher):



Note! You need to install the NI ELVISmx driver software first

If not, you find it in the National Instruments folder:



20 PAGES ABOUT 996 WORDS ENGLISH (U.S.) HELP IMPROVE OFFICE

# Web Pages Examples



store.apple.com

Apple Store | Store | Mac | iPhone | Watch | iPad | iPod | iTunes | Support

Kjøp Mac | Kjøp iPhone | Kjøp iPad | Kjøp iPod | Kjøp Apple TV | Kjøp tilbehør

## iPad Air 2

Forandring som fryder.

Fra kr 4 190

Gratis frakt på alle bestillinger over 1.038,-. Og gratis retur.

## Større. På absolutt alle måter.

Kjøp nå



# Web Development Environments

## Microsoft:

- Visual Studio (Windows, a scaled version is in beta for MacOS)
- Visual Studio Code (Cross-platform, open-source)

## Others:

- WebStorm (JavaScript IDE, client-side development and server-side development with Node.js, etc.)
- Eclipse
- Atom (free and open-source text and source code editor for macOS, Linux, and Windows)
- Sublime
- ...

# The Web Programming Triangle

**HTML**

Use **HTML** to define the content of web pages

**Web**

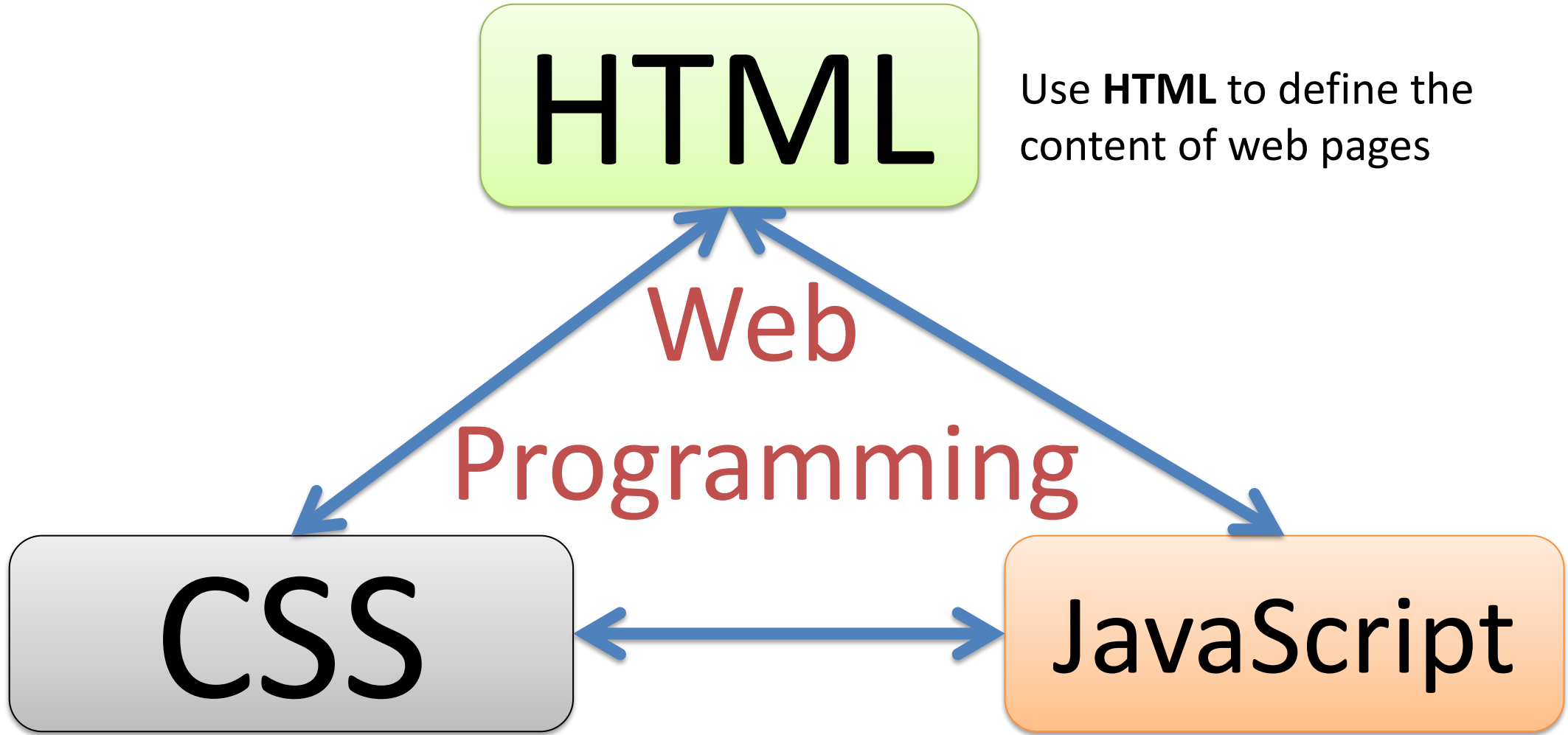
**Programming**

**CSS**

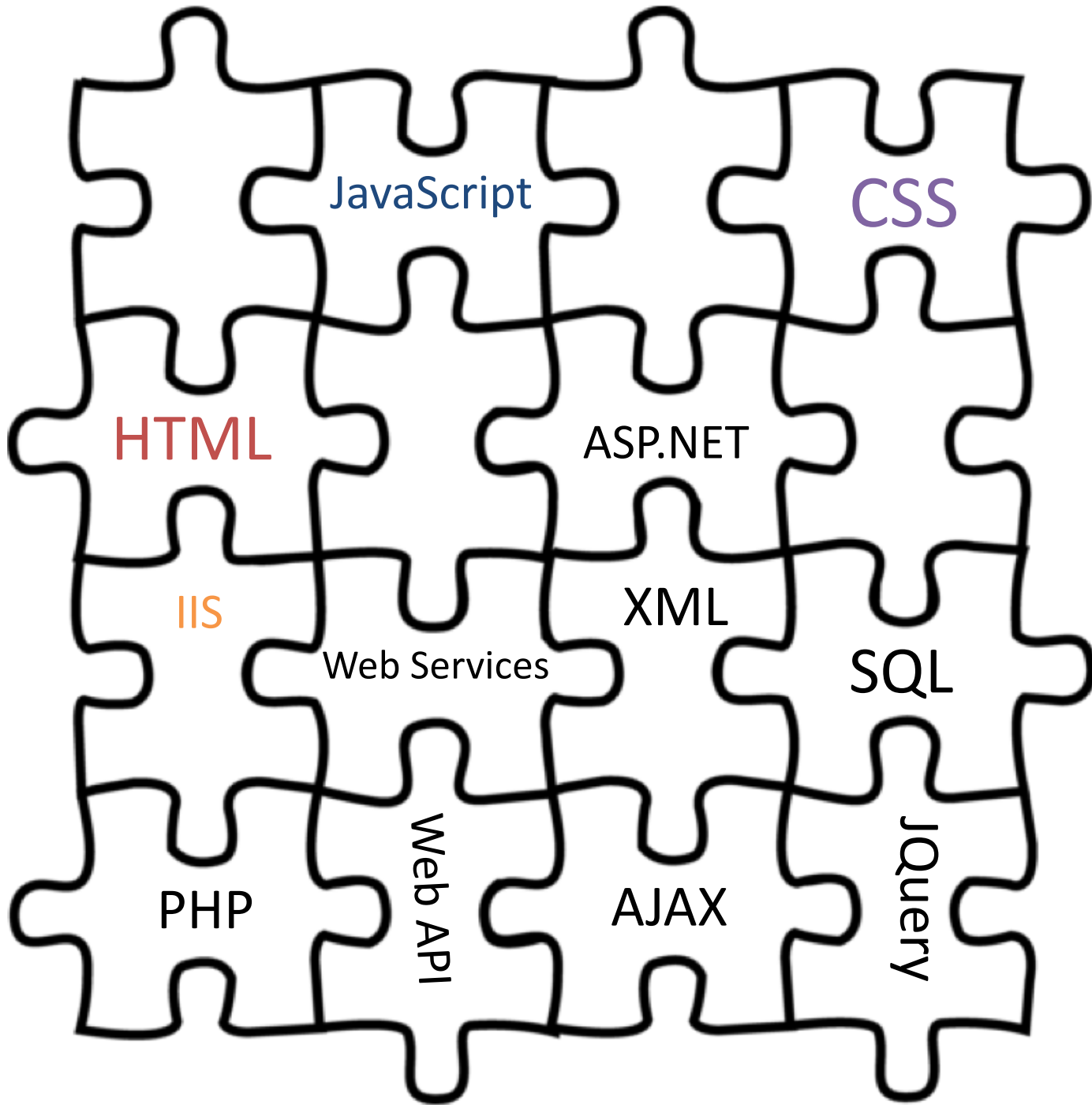
Use **CSS** to specify the layout of web pages

**JavaScript**

Use **JavaScript** to program the behavior of web pages



# Web Programming



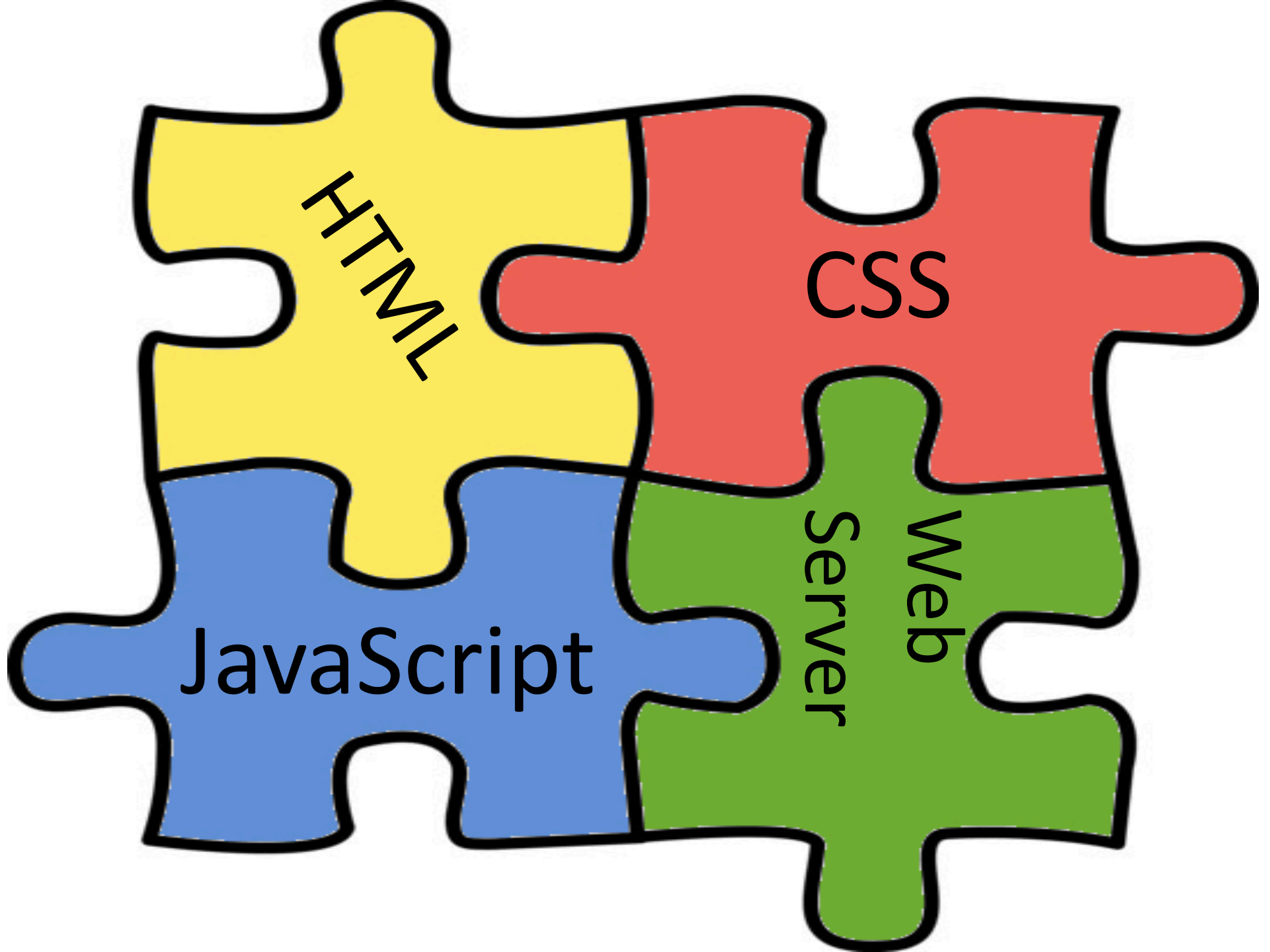


# Basic Web Programming

- HTML
- CSS
- JavaScript

For more Dynamic Web Programming we use e.g.,

- ASP.NET
- SQL
- AJAX
- PHP
- etc.



HTML

CSS

JavaScript

Server

Web

# Web Architecture



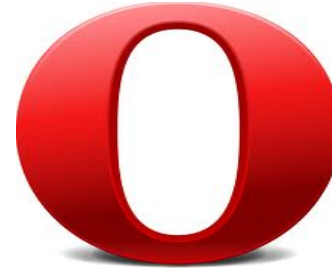
Internet Explorer



Chrome



Firefox



Opera



Safari

Client

Web Browser

HTML

CSS

JavaScript

Server-side

Web Server

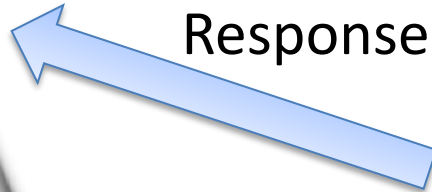
# Client-Server Example

**Client**

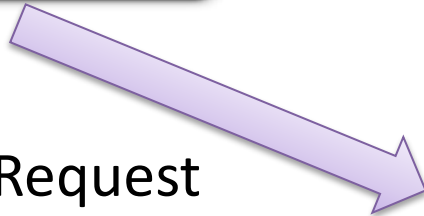


Web Browser

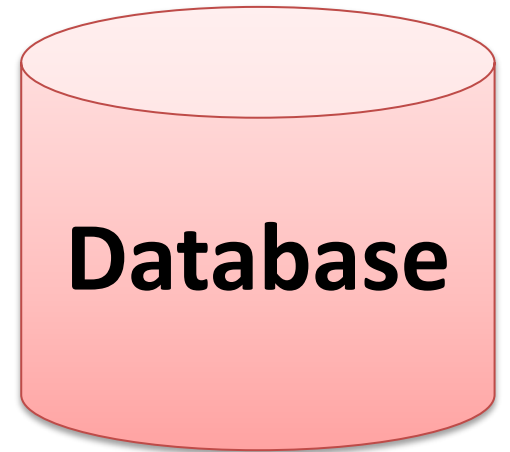
Response



Request



**Web Server**



**Database**

Internet Information Services (IIS), Apache, etc.

# Web Platform

The Web Browser creates the visual web page you see in the browser based on the

HTML code

```
<!DOCTYPE html>  
<html>  
<body>  
  
<h1>My First Heading</h1>  
  
<p>My first paragraph.</p>  
  
</body>  
</html>
```



**My First Heading**

My first paragraph.

HTML, CSS, JavaScript

Client-side

Web Browser

The code runs on the server and converted to HTML before sending to client (Web Browser)

Web Page (HTML)

Web Server

Server-side

ASP.NET, PHP, ...

Internet Information Services (IIS), Apache, etc.

# Server-side Development Framework

- ASP.NET (Programming Language: C#, IDE: Visual Studio)
- PHP
- Python Django (Programming Language: Python)
- Ruby on Rails (Programming Language: Ruby)
- Node.js (Programming Language: JavaScript)

# Client-side Development Framework

JavaScript is the de facto client-side programming language. Typically you want to use a JavaScript Framework.

Here are some popular JavaScript Frameworks:

- AngularJS, Angular2 (JavaScript Framework, Google)
- Bootstrap (JavaScript/HTML, CSS Framework), Open source framework
- JQuery
- TypeScript (Microsoft)



# Web Server



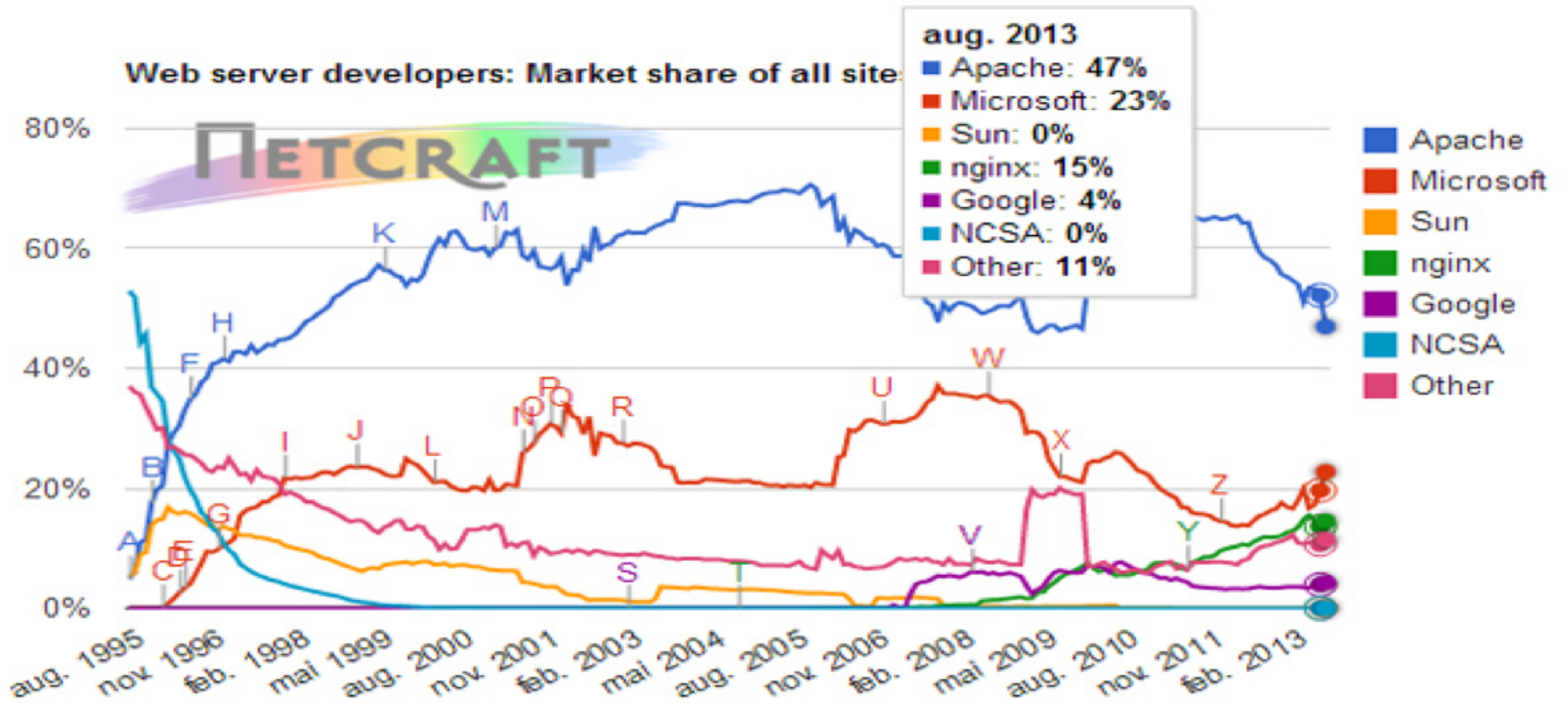
# Web Server

The term web server can refer to either the hardware (the computer) or the software (the computer application) that helps to deliver web content that can be accessed through the Internet.

The most common use of web servers is to host websites, but there are other uses such as gaming, data storage or running enterprise applications.

- **IIS** - Internet Information Services
  - Microsoft Windows
- **Apache Web Server**
  - Open Source
  - Cross-platform: UNIX, Linux, OS X, Windows, ...
- **Nginx** (pronounced "engine x") - Has become very popular lately
- **GWS** (Google Web Server)
- ...

# Web Server Popularity



<http://www.digi.no/921119/under-halvparten-bruker-apache>



# HTML

# HTML

- **HyperText Markup Language (HTML)**
- The Visual appearance of a Web Site
- “Web Browser Language”: All Web Browser understand HTML
- HTML 5.x is the latest
- Maintained by W3C
  - World Wide Web Consortium

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>Title of the
document</title>
</head>

<body>
Content of the document.....
</body>

</html>
```

# The History of HTML

<b>Year</b>	<b>Version</b>
1989	Tim Berners-Lee invented www
1991	Tim Berners-Lee invented HTML
1993	Dave Raggett drafted HTML+
1995	HTML Working Group defined HTML 2.0
1997	W3C Recommendation: HTML 3.2
1999	W3C Recommendation: HTML 4.01
2000	W3C Recommendation: XHTML 1.0
2008	WHATWG HTML5 First Public Draft
2012	WHATWG HTML5 Living Standard
2014	W3C Recommendation: HTML5
2016	W3C Candidate Recommendation: HTML 5.1

[https://www.w3schools.com/html/html5\\_intro.asp](https://www.w3schools.com/html/html5_intro.asp)

# HTML5 is supported in all modern Browsers



Edge



Chrome



Opera



Firefox



Safari



# CSS

# CSS

- CSS – Cascading Style Sheets
- Styles define **how to display** HTML elements
- CSS is used to control the style and layout of multiple Web pages all at once

```
body {  
    background-color: #d0e4fe;  
}  
  
h1 {  
    color: orange;  
    text-align: center;  
}  
  
p {  
    font-family: "Times New Roman";  
    font-size: 20px;  
}
```



# Three Ways to Insert CSS

There are three ways of inserting a style sheet:

- **External style sheet** (Recommended!!)
  - An external style sheet is ideal when the style is applied to many pages. With an external style sheet, you can change the look of an entire Web site by changing just one file.
  - An external style sheet can be written in any text editor. The file should not contain any html tags.
  - The style sheet file must be saved with a .css extension
- **Internal style sheet**
  - An internal style sheet should be used when a single document has a unique style.
  - You define internal styles in the head section of an HTML page, inside the <style> tag
- **Inline style**
  - An inline style loses many of the advantages of a style sheet (by mixing content with presentation). Use this method sparingly!



# JavaScript

# JavaScript

- JavaScript is the programming language of the Web.
- All modern HTML pages are using JavaScript.
- JavaScript is the default scripting language in all modern browsers, and in HTML5.
- JavaScript is probably the most popular programming language in the world.
- It is the language for HTML, for the Web, for computers, servers, laptops, tablets, smart phones, and more.
- JavaScript can Change HTML Elements! – which makes it very powerful!

# Why JavaScript?

JavaScript is one of **3 languages** all web developers **must** learn:

1. **HTML** to define the content of web pages
2. **CSS** to specify the layout of web pages
3. **JavaScript** to program the behavior of web pages

# JavaScript vs. Java

- JavaScript and Java are different languages, both in concept and design.
- JavaScript was invented by Brendan Eich, to be used in Netscape (a no longer existing browser) in 1995, and was adopted by the ECMA standard association in 1997.

# JavaScript Example

```
<!DOCTYPE html>
<html>
<body>
<h1>My First JavaScript</h1>

<p>JavaScript can change the content of an HTML element:</p>

<button type="button" onclick="myFunction()">Click Me!</button>

<p id="demo">This is a demonstration.</p>

<script>
function myFunction() {
    document.getElementById("demo").innerHTML = "Hello JavaScript!";
}
</script>

</body>
</html>
```

## **My First JavaScript**

JavaScript can change the content of an HTML element:

Click Me!

**Hello JavaScript!**

# JavaScript Frameworks

JavaScript is the de facto client-side programming language. Typically you want to use a JavaScript Framework.

Here are some popular JavaScript Frameworks:

- AngularJS, Angular2 (JavaScript Framework, Google)
- Bootstrap (JavaScript/HTML, CSS Framework)
- JQuery
- TypeScript (Microsoft)



# AngularJS, Angular2

JavaScript Framework developed and maintained by Google

- <https://angularjs.org>
- <http://www.w3schools.com/angular/>



# Bootstrap



- Bootstrap is a popular HTML, CSS, and JavaScript framework for developing responsive, mobile first projects on the web
- Bootstrap is a free and open-source front-end web framework for designing websites and web applications.
- It contains HTML- and CSS-based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions.
- Unlike many web frameworks, it concerns itself with client-side/front-end development only.
- <http://getbootstrap.com>
- <http://www.w3schools.com/bootstrap/>

# JQuery



- <http://www.w3schools.com/jquery/>

# TypeScript



- TypeScript is a free and open-source programming language developed and maintained by Microsoft.
- It is a superset of JavaScript that compiles to JavaScript

<http://www.typescriptlang.org>



# ASP.NET

# ASP.NET

- ASP.NET is a Web Framework for creating Web Pages created and maintained by Microsoft
- ASP.NET is built on top of the .NET Framework
- You use Visual Studio and C#
- ASP.NET Web Forms are very similar to standard Win Forms that you are already familiar with.
- If you know ordinary Win Forms, you also know ASP.NET Web Forms!

# Web & ASP.NET

Client

Web Browser

**HTML**

JavaScript

CSS

Server-side

Web Server

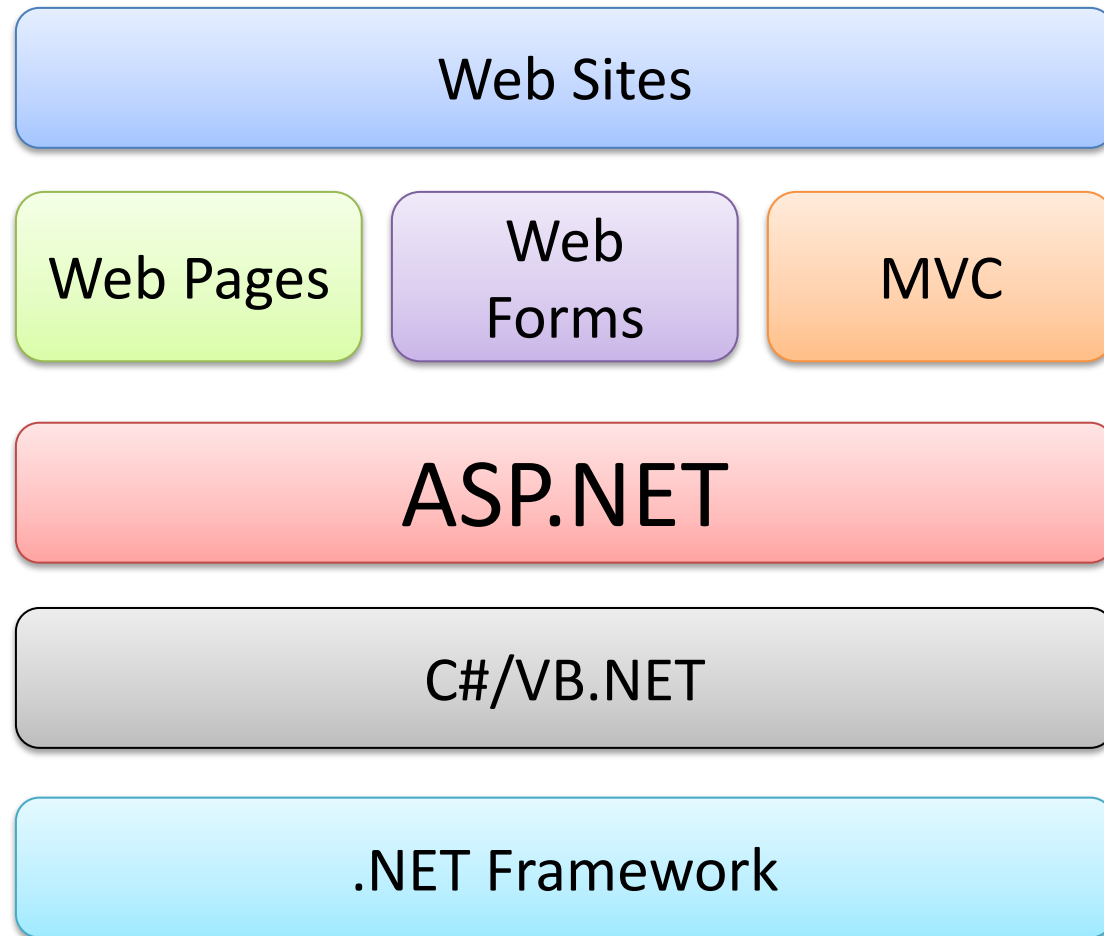
**ASP.NET**

C#/VB.NET

.NET Framework



# ASP.NET – 3 different Development Models



# ASP.NET

ASP.NET supports three different development models:

## Web Pages Single Pages Model

Simplest ASP.NET model.

Similar to PHP and classic ASP.

Built-in templates and helpers for database, video, graphics, social media and more.

Very similar to PHP  
GUI and Code mixed together  
If you are familiar with PHP this is a good starting point.

## MVC Model View Controller

MVC separates web applications into 3 different components:

Models for data  
Views for display  
Controllers for input

For more experienced  
Web Developers

## Web Forms Event Driven Model

The traditional ASP.NET event driven development model:

Web pages with added server controls, server events, and server code.

The Web version of classic WinForms  
GUI and Code is separated.  
If you are familiar with WinForms or WPF, this is a good choice

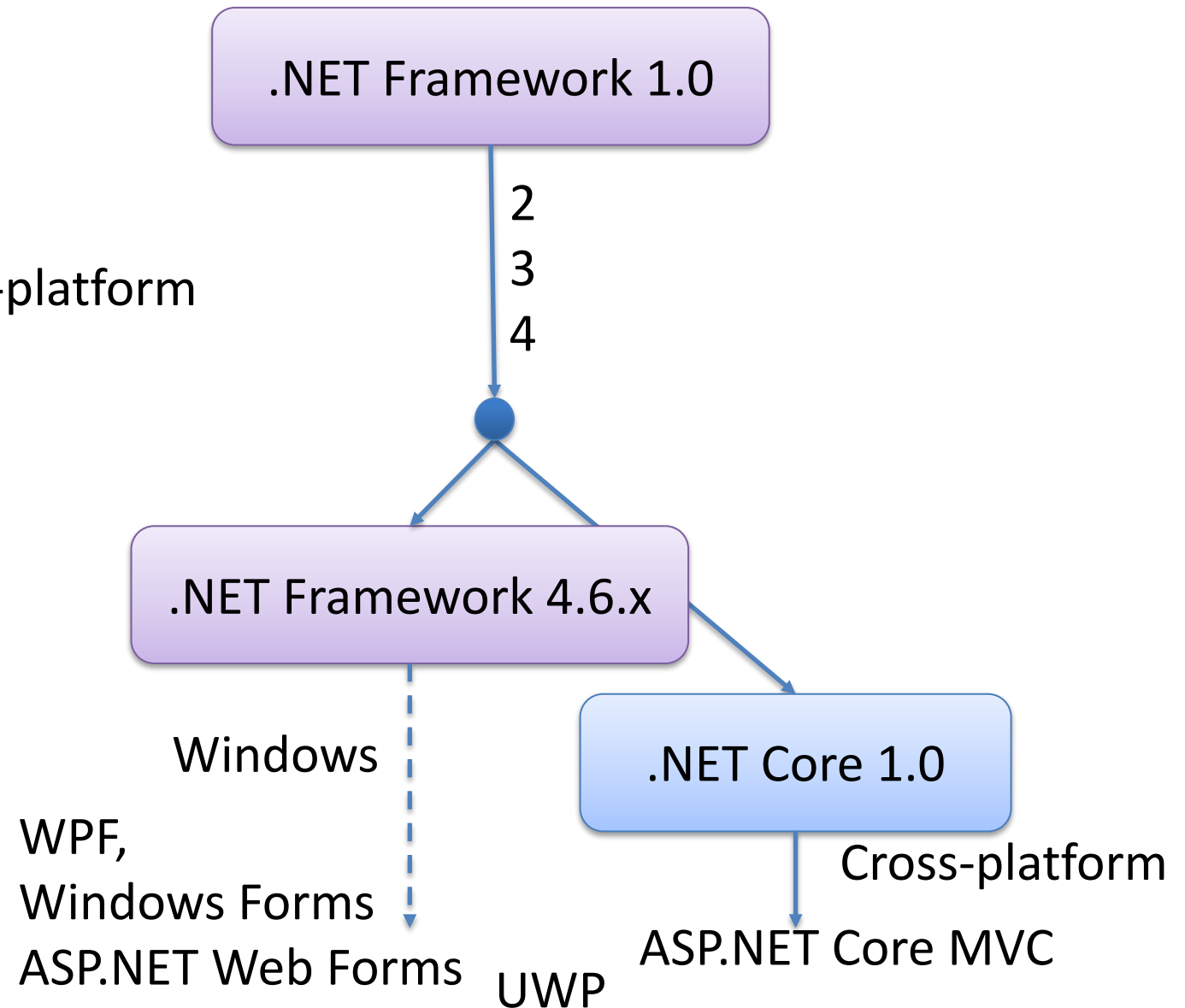




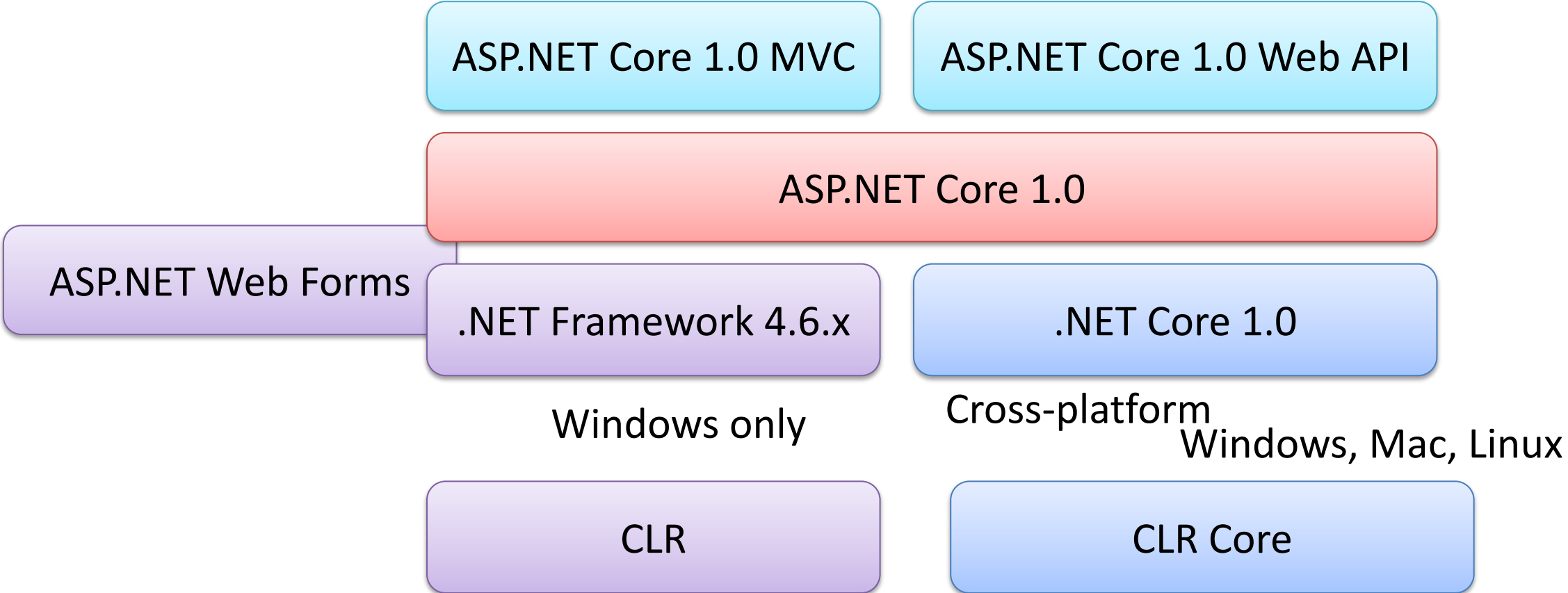
# ASP.NET Core

# ASP.NET – The Future

The new .NET Core is a lightweight cross-platform subset of the full .NET Framework



# ASP.NET Core



CLR – Common Language Runtime

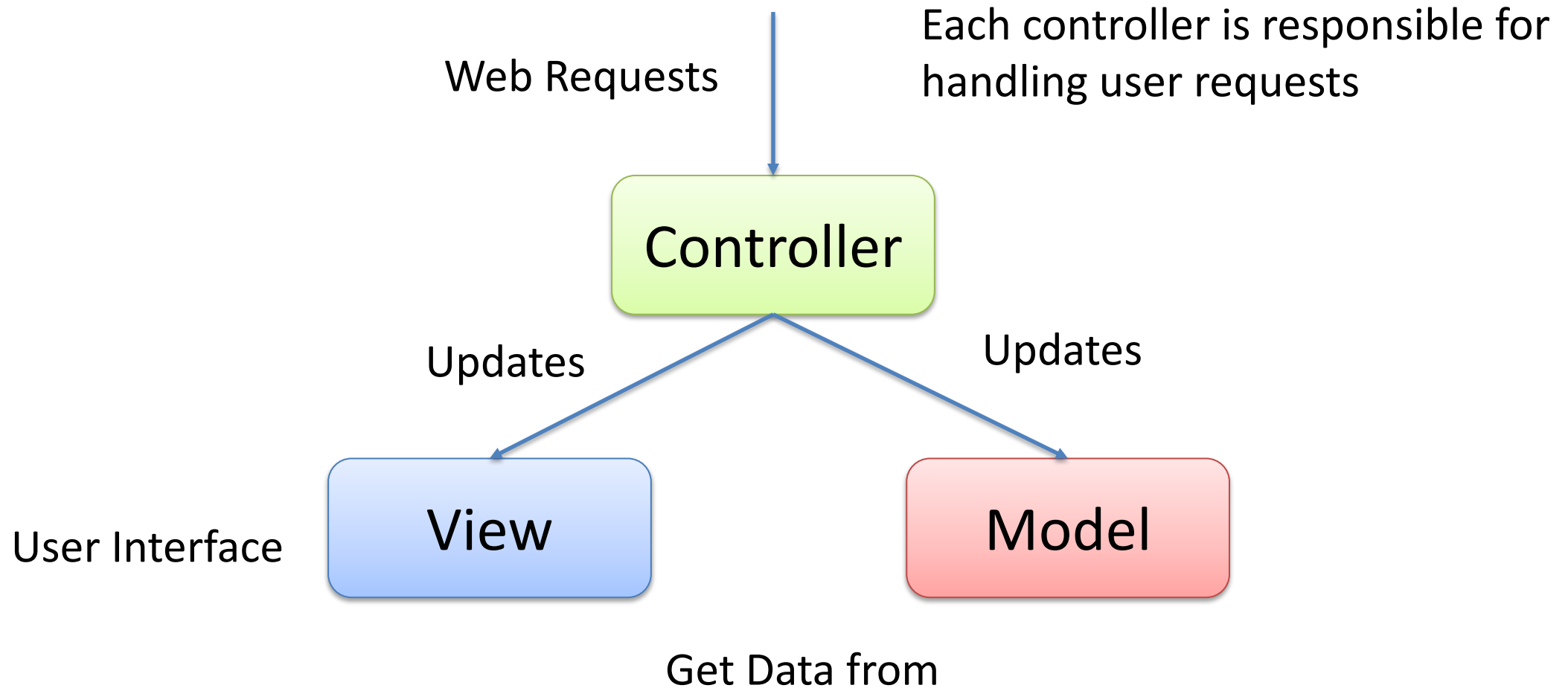
# Choosing the right .NET

- .NET Framework (latest release .NET 4.6)
  - Windows only
  - Mature
- .NET Core (latest release .NET Core 1.0)
  - Cross-platform (Windows, Mac, Linux)
  - Immature, partly unfinished
  - Open source
  - Modular (NuGet packages)

# ASP.NET Web Forms vs MVC

- Only MVC (ASP.NET Core MVC) will work with the new .NET Core Framework
  - .cshtml (mix of GUI and Code, so-called Razor files) + .cs files (pure C# code files)
  - No Visual Designer is available!
- ASP.NET Web Forms will continue to work with .NET Framework 4.6.x (but not part of .NET Core!)
  - .aspx (GUI) and .aspx.cs (Code behind) files + .cs (pure C# code files) files
  - Visual Designer is available

# MVC





# PHP

# PHP



The elePHPant, PHP mascot.

- **PHP** is a server-side scripting language for web development. It is used to make dynamic and interactive Web Pages
- Old and well-known Technology
- Very Popular and easy to learn
- Open Source/Free and Cross-platform
- PHP + MySQL is a powerful combination

<https://en.wikipedia.org/wiki/PHP>

<http://www.w3schools.com/php/>



# PHP

- PHP files can contain text, HTML, CSS, JavaScript, and PHP code
- PHP code are executed on the server, and the result is returned to the browser as plain HTML
- PHP files have extension ".php"

# PHP Example

```
<!DOCTYPE html>  
<html>  
<body>  
  
<h1>My first PHP page</h1>  
  
<?php  
echo "Hello World!";  
?>  
  
</body>  
</html>
```



# AJAX

# AJAX

- The key technique in an AJAX web application is the partial refresh.
- With partial refreshes, the entire page doesn't need to be posted back and refreshed in the browser.
- Instead, when something happens, the web page asks the web server for more information.
- The request takes place in the background, so the web page remains responsive.
- When the web page receives the response, it updates just the changed portion of the page

# SIMPLY EXPLAINED

# AJAX

O. Widder. (2013). *geek&poke*. Available: <http://geek-and-poke.com>



NO AJAX

AJAX



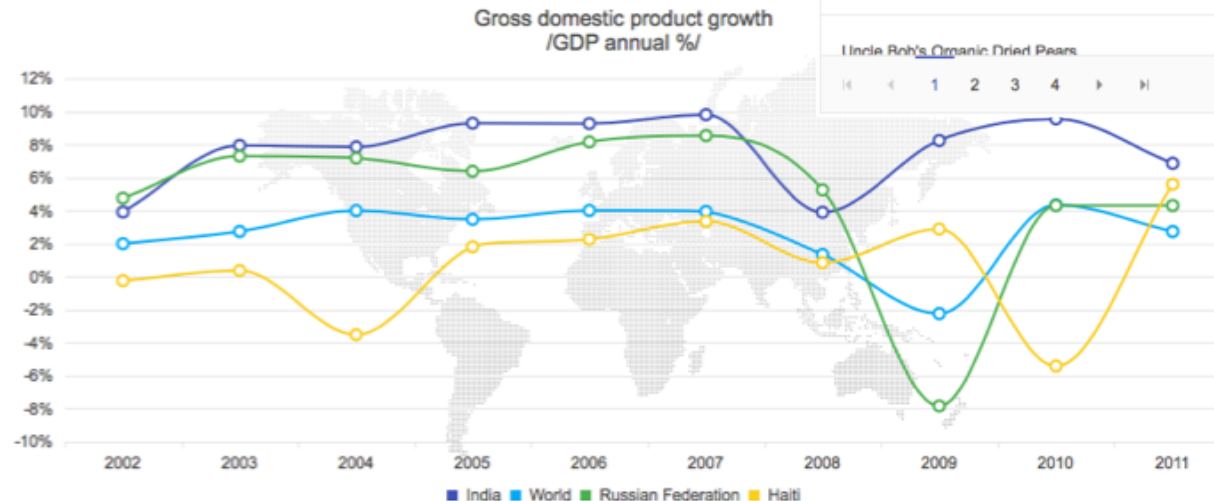
# 3.party Web Components

# Telerik

- Web Components for ASP.NET, ASP.NET Core, PHP, ...
- Components:
  - Grid
  - Charts
  - ...

+ ADD NEW RECORD				
ProductName	Unit Price	Units In Stock	Discontinued	
Chai	\$18.00	39	false	<a href="#">EDIT</a> <a href="#">DELETE</a>
Chang	\$19.00	17	false	<a href="#">EDIT</a> <a href="#">DELETE</a>
Aniseed Syrup	\$10.00	13	false	<a href="#">EDIT</a> <a href="#">DELETE</a>
Chef Anton's Cajun Seasoning	\$22.00	53	false	<a href="#">EDIT</a> <a href="#">DELETE</a>
Chef Anton's Gumbo Mix	\$21.35	0	true	<a href="#">EDIT</a> <a href="#">DELETE</a>
Grandma's Boysenberry Spread	\$25.00	120	false	<a href="#">EDIT</a> <a href="#">DELETE</a>
Uncle Bob's Organic Dried Pears	\$30.00	15	false	<a href="#">EDIT</a> <a href="#">DELETE</a>

1 - 20 of 77 items





### HTML/CSS

- » Learn HTML
- » Learn HTML5
- » Learn CSS
- » Learn CSS3
- » Learn Bootstrap

### JavaScript

- » Learn JavaScript
- » Learn jQuery
- » Learn jQueryMobile
- » Learn AngularJS
- » Learn AJAX
- » Learn JSON
- » Learn Google Maps

### Server Side

- » Learn SQL
- » Learn PHP
- » Learn ASP
- » Learn ASP.NET
- » Learn VBScript
- » Learn AppML

### XML Tutorials

- » Learn XML
- » Learn DTD
- » Learn Schema
- » Learn XML DOM
- » Learn XPath
- » Learn XSLT
- » Learn XQuery
- » Learn XSL-FO
- » Learn SVG
- » Learn RSS
- » Learn WSDL

### WEB Building

- » Web Building
- » Web Statistics
- » Web Validation
- » Web Certificates



## HTML

HTML Tutorial

HTML Tag Reference



## CSS

CSS Tutorial

CSS Reference



## JavaScript

JavaScript Tutorial

JavaScript Reference



## SQL

SQL Tutorial

SQL Reference



## PHP

PHP Tutorial

PHP Reference



## JQuery

JQuery Tutorial

JQuery Reference

## Learn Web Building

Learn how to create a website on your own computer  
Learn the basics of web building in less than a day  
Learn how to add a database to your website

Web Building Tutorial

Web Certificates

1000+ Examples



Color Picker

## References

- » HTML/HTML5 Tags
- » HTML Colors
- » HTML Characters
- » HTML Symbols
  
- » CSS 1,2,3
- » CSS3 Support
  
- » JavaScript
- » HTML DOM
- » jQuery
- » jQuery Mobile
- » Google Maps
  
- » PHP
- » SQL
- » ASP.NET
  
- » XML DOM
- » XSLT
- » XPath
- » SVG



# References



- Wikipedia
- I. Sommerville, *Software Engineering*: Pearson, 2015.
- Web Server: <http://www.digi.no/921119/under-halvparten-bruker-apache>
- O. Widder. (2013). *geek&poke*. Available: <http://geek-and-poke.com>
- <http://www.w3schools.com>

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Web: <http://www.halvorsen.blog>

