



# Web Application Development

Ms Swapnil Shrivastava  
CDAC Bangalore

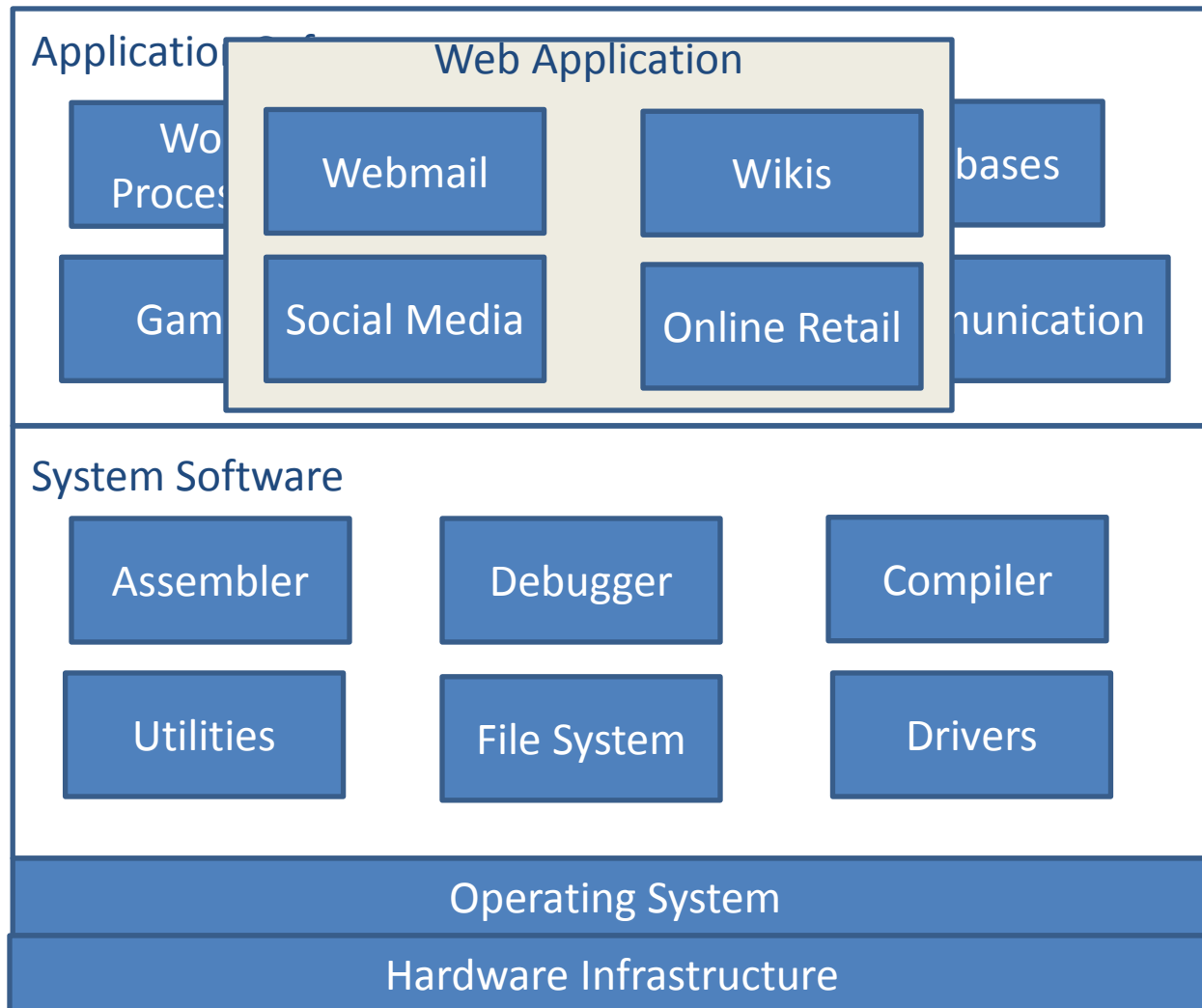
# Content

- Web Application: An Overview
- Web Application Architecture : The Building Blocks
- Scripting Languages
  - Client Side Scripting
  - Server Side Scripting
- HyperText Transfer Protocol
- Domain Name Service
- Web Server
- Summary

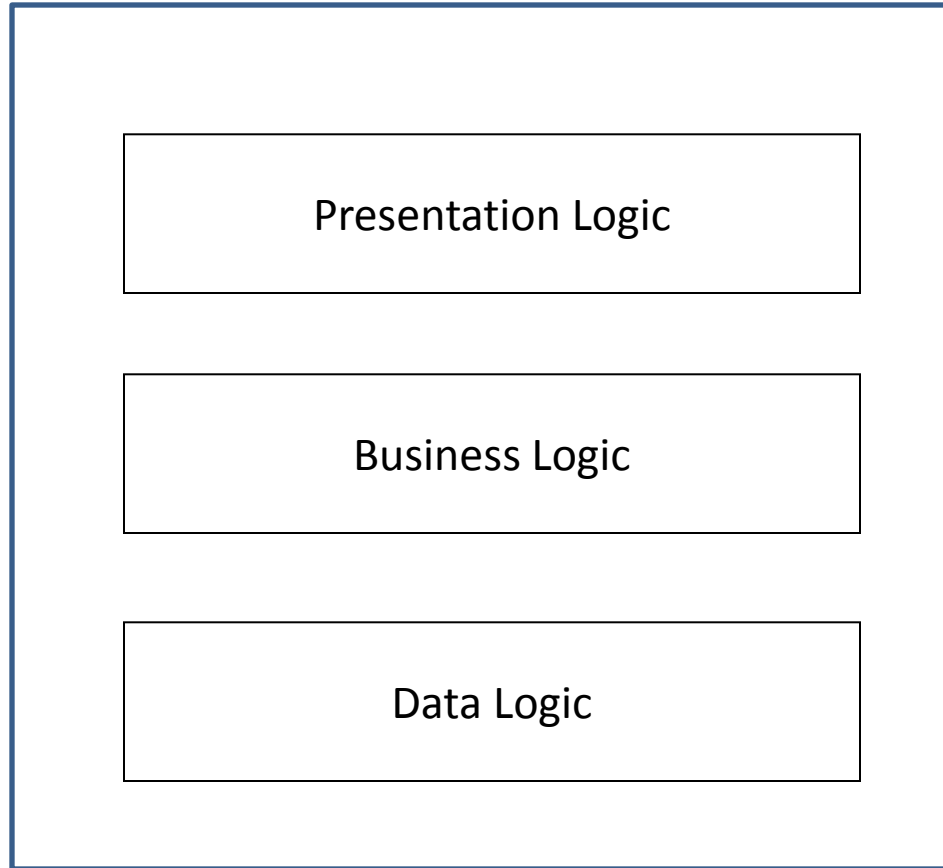
# Web Application

- A web application or web app is any software that is rendered in a web browser.
- It is created in a browser-supported programming language (such as the combination of JavaScript, HTML and CSS).
- Common web applications include webmail, online retail sales, online auctions, wikis and many other functions.

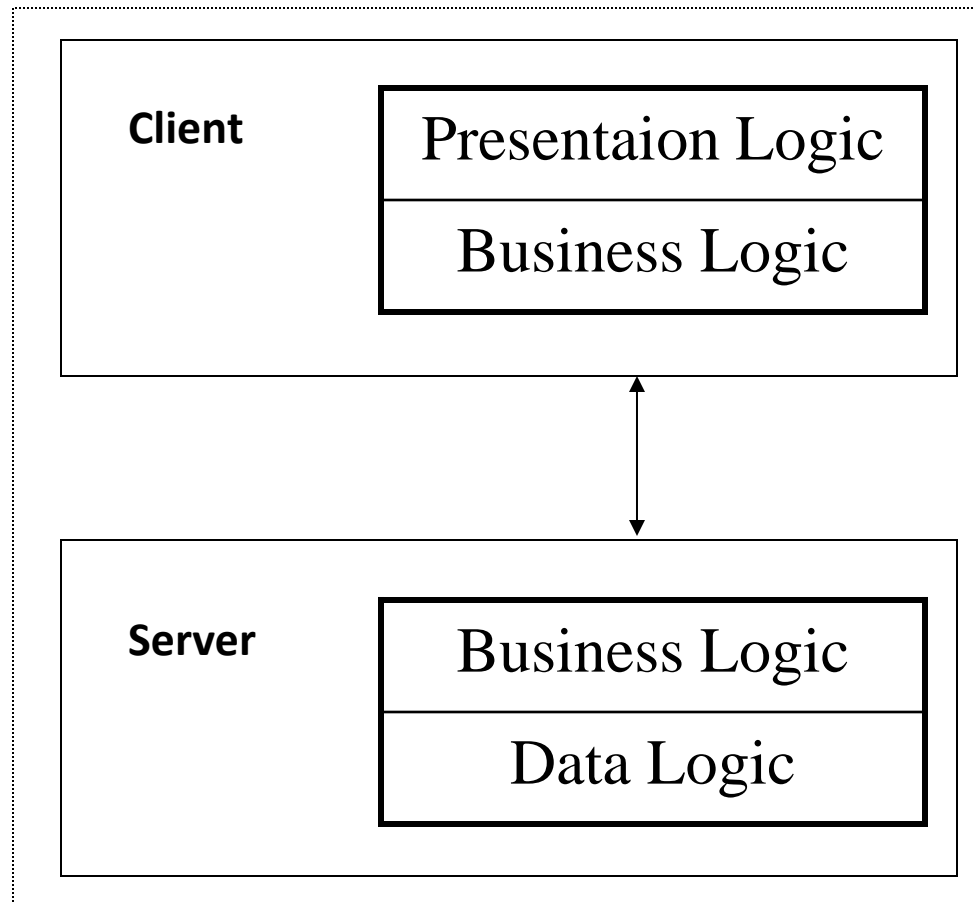
# Web Application ...contd



# What is an Application?

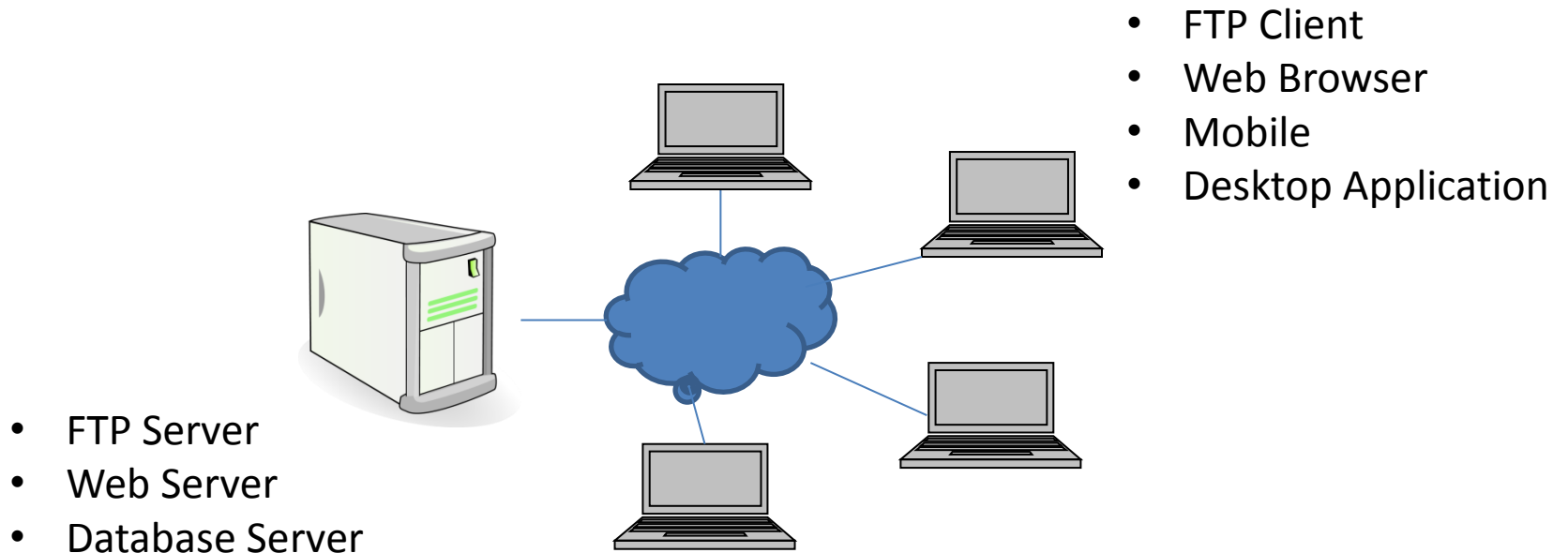


# Client Server Application

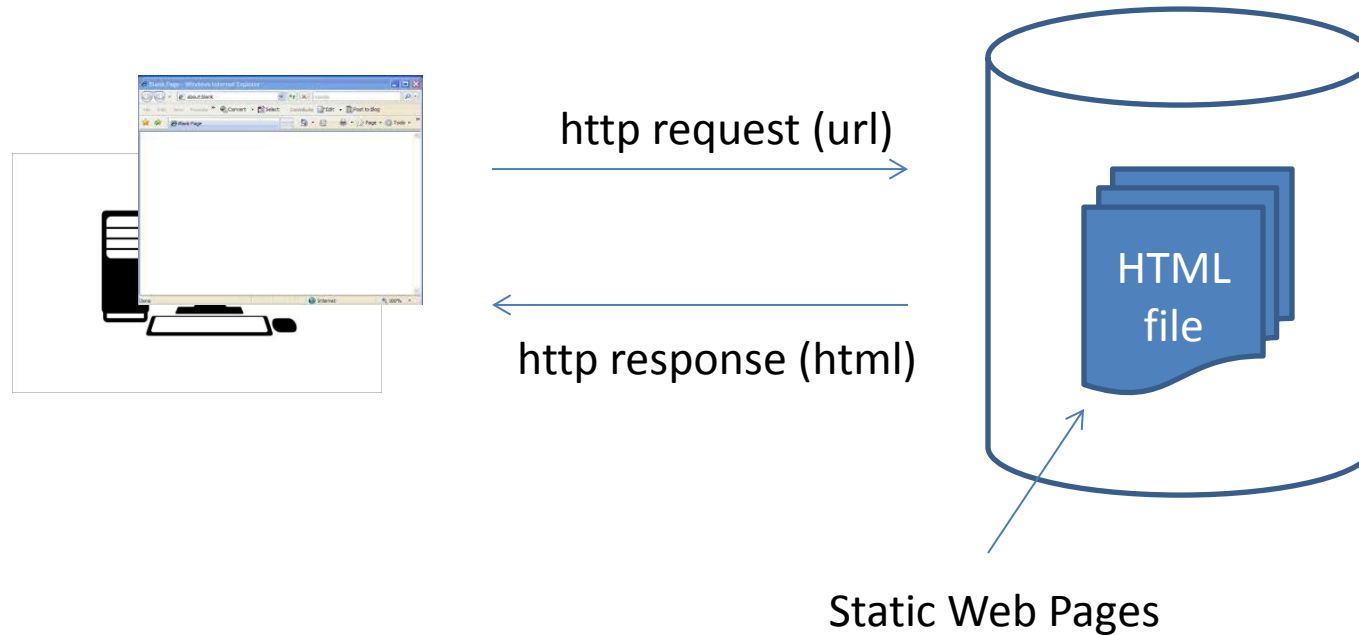


# Client Server Architecture

A computational architecture that separates an application into two processes.



# Classic Web Application

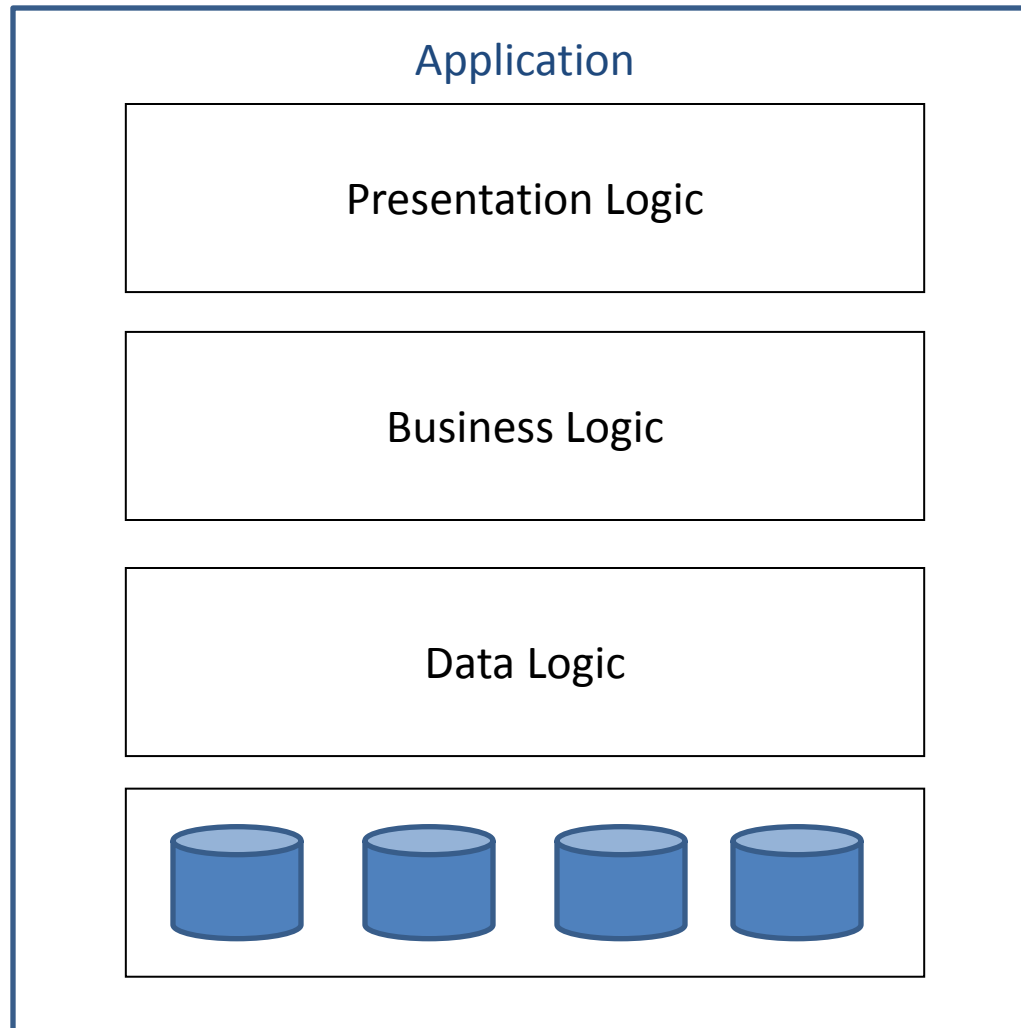




# Evolution

- 1987 - Perl
- Early 1990s – static Web documents
- 1995 – Javascript
- 1996 – Macromedia Flash
- 1999 – Servlet Specification, XML
- 2005 – Ajax
- 2011 – HTML5

# 3-tier Web Application Architecture



# 3-tier Web Application Architecture...contd

- Presentation Logic : Web Browser
  - HTML, CSS, JavaScript, VBScript
  - XHTML, DHTML, WML, AJAX
  - FLASH
- Business Logic : Web / Application Server
  - ASP, PHP, Perl, JSP
  - ASP.NET, Java
- Data Logic : Database Server
  - MySQL, SQL Server, Access

# What is HTML?

- HTML = HyperText Markup Language
- A set of markup tags for creation of web pages viewable in a browser.
- These html tags describes different document content.
  - `<html>` and `</html>` describes an HTML document
  - `<p>` and `</p>` describes a paragraph
- File extension : `.html,.htm`

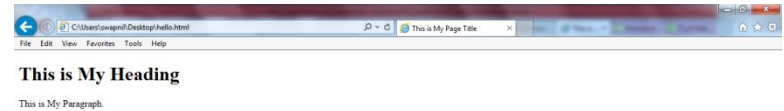
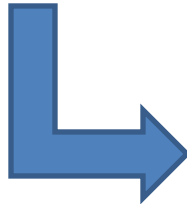
# HTML Example

hello.html

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is My Page Title</title>
  </head>

  <body>
    <h1>This is My Heading</h1>
    <p>This is My Paragraph.</p>
  </body>

</html>
```

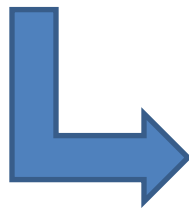


# CSS

- CSS=Cascading Style Sheets
- CSS is a way to style HTML.
  - Tag    Property    Value  
    p    { color:      red;}
- Three ways to apply CSS to HTML are :
  - inline,
  - internal / embedded and
  - External stored in .css file.

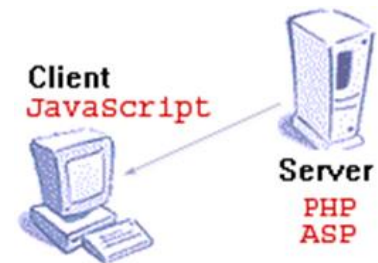
# HTML + CSS Example

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is My Page Title</title>
  </head>
  <body style="background-color:lightgrey">
    <h1 style="text-align:center;color:blue">This is My Heading</h1>
    <p style="font-family:courier">This is My Paragraph.</p>
  </body>
</html>
```



# Dynamic Web Pages

- The page that changes or is created when it is requested and contain up to date information.
- Scripting languages used for creating dynamic web pages.
- The programs written using scripts:
  - Client side
  - Server side
- JavaScript, VBScript, Perl, PHP, ASP

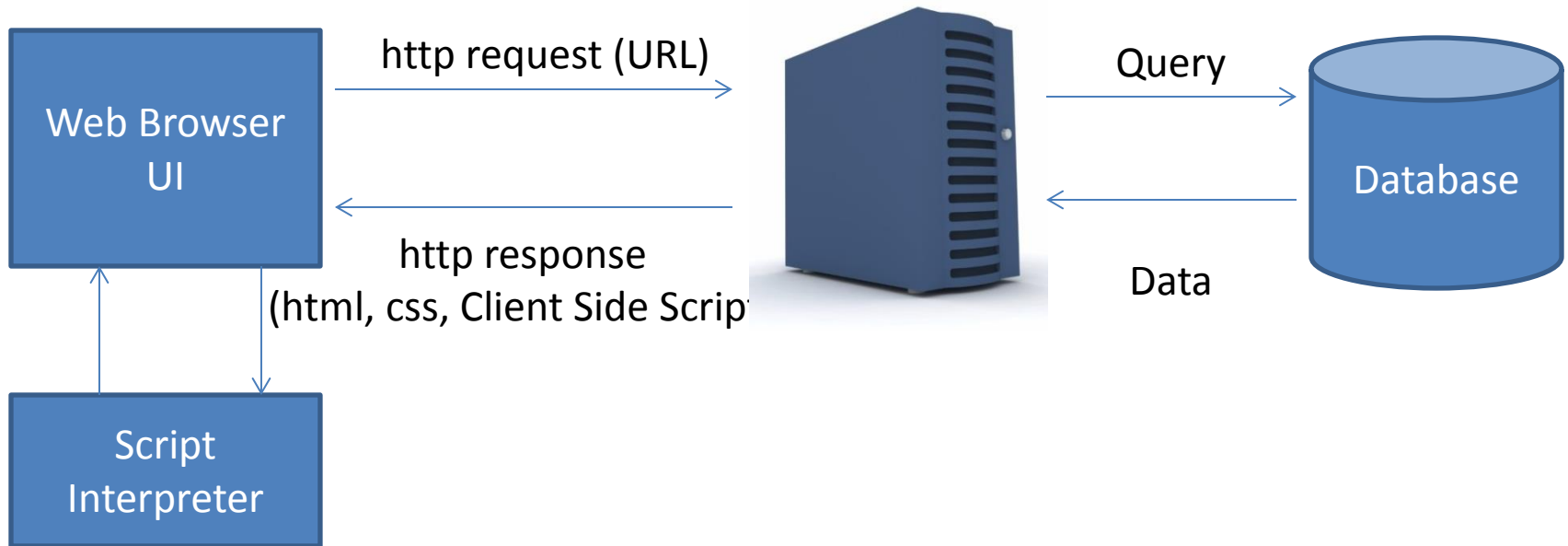




# Client Side Script

- Client scripting is mainly used for browser special effects and form validation.
- Runs in a Web browser (client-side).
- Embedded in HTML files and can manipulate the HTML itself.
- Microsoft's VBScript, Netscape's JavaScript

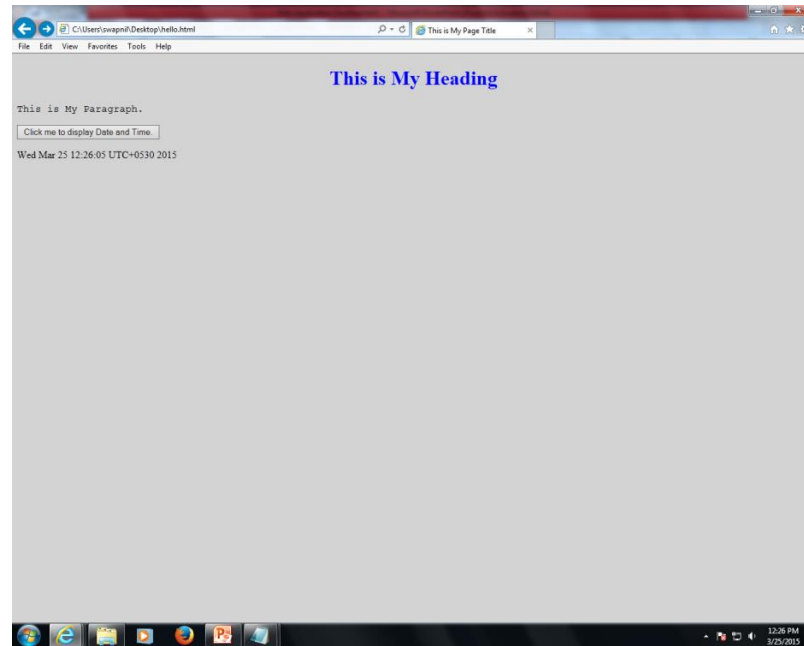
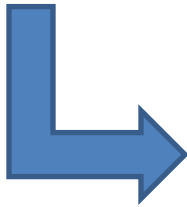
# Client Side Script



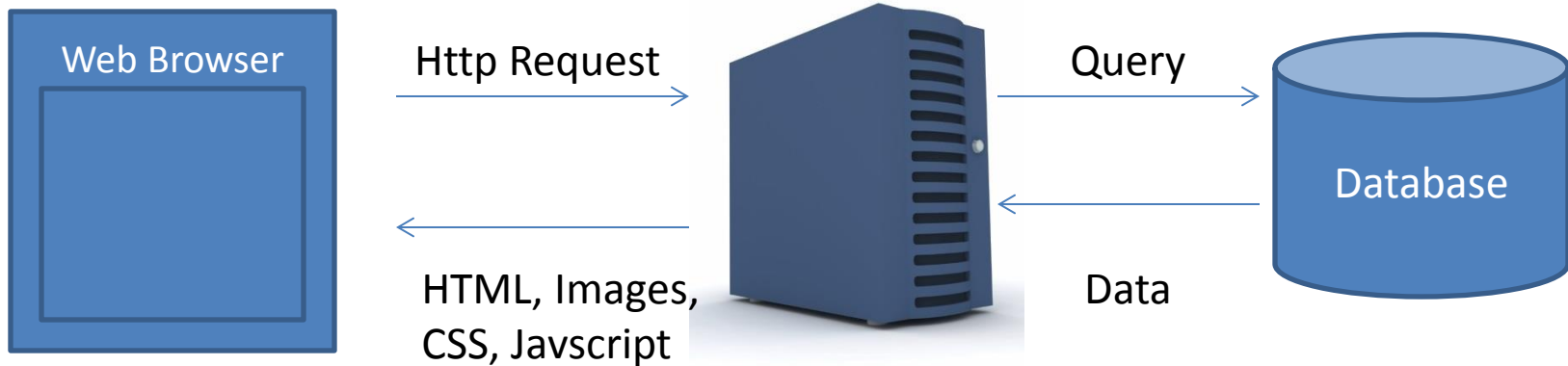
# HTML+CSS+JavaScript Example

```
<button type="button"  
    onclick="document.getElementById('demo').innerHTML = Date()">  
    Click me to display Date and Time.</button>
```

```
<p id="demo"></p>
```



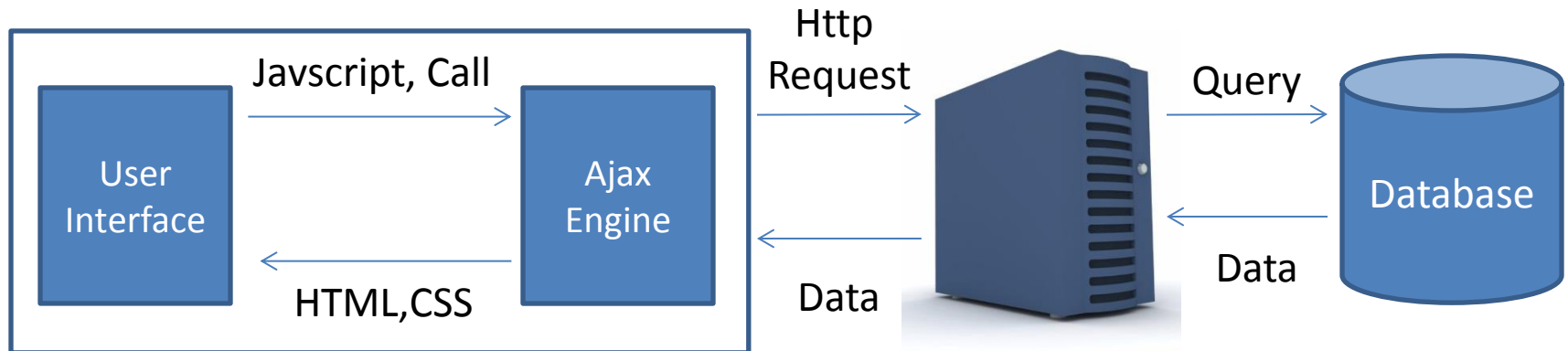
# Dynamic Web Pages



# Ajax

- AJAX = Asynchronous JavaScript and XML.
- A technique for creating better, faster, and more interactive web applications.
- AJAX is a browser technology independent of web server software.
- AJAX is a new way to use existing standards viz. JavaScript ,XML, HTML and CSS.
- It is about updating parts of a web page, without reloading the whole page.

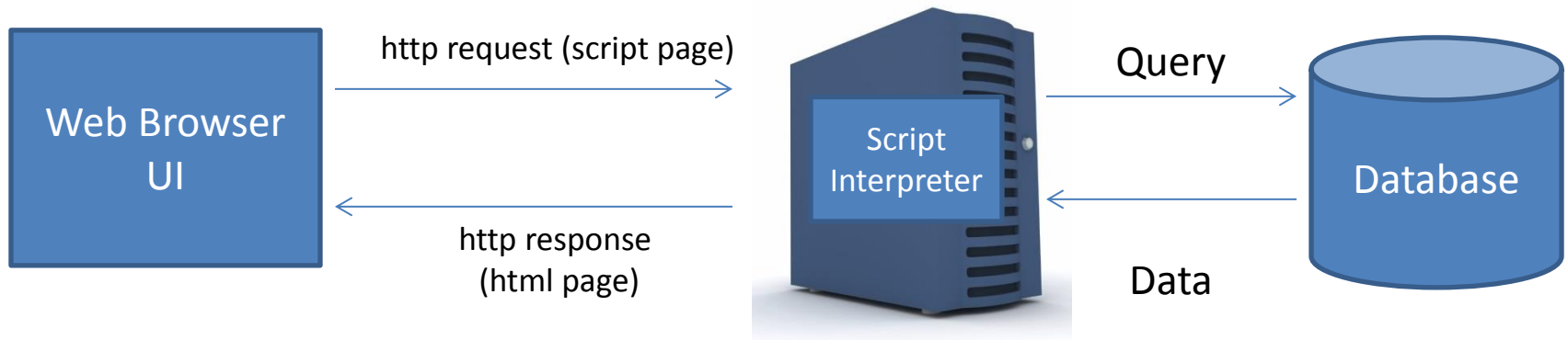
# Ajax Application Model



# Server Side Script

- They create Web pages on the fly on the Web server that are then sent to the browser.
- The server scripting is used for accessing databases on the backend.
- Hypertext Preprocessor (PHP), Microsoft's Active Server Pages

# Server Side Script





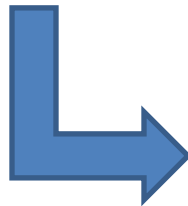
# PHP Example

hello.php

```
<!DOCTYPE html>
<html>
  <body>

    <?php
      echo "My first PHP script!";
    ?>

  </body>
</html>
```



My first PHP script!

# XML

- XML = Extensible Markup Language.
- It was designed to describe data.
- XML tags are not predefined. You must define your own tags.
- XML uses a Document Type Definition (DTD) or an XML Schema to describe the data.
- XML is a W3C Recommendation.

# JSON

- JSON is a lightweight, text-based, language-independent data interchange format.
- It is built on two structures:
  - A collection of name/value pairs.
  - An ordered list of values.
- JSON support six data types viz null, boolean, numeric, string, array and object.

# XML vs HTML

- XML is about describing information

```
<?xml version="1.0"
  encoding="ISO-8859-1" ?>
<note>
  <to>Tove</to>
  <from>Jani</from>
  <header>Reminder</header>
  <body>Don't forget me this
    weekend!</body>
</note>
```

- Data exchange

- HTML is about displaying information

```
<html>
<head>
  <title> Title of page </title>
</head>
<body>
  This is my first homepage.
  <b> This text is bold </b>
</body>
</html>
```

- describe content

# XML vs JSON

- Extended Markup Language
- Heavyweight
- JavaScript Object Notation
- Lightweight

```
<employee>
<name> Ameeta Sharma </name>
<salary> 50000 </salary>
<age> 32 </age>
</employee>
```

```
{
    name : "Ameeta Sharma",
    salary : 50000,
    age : 32
}
```

# Other Web Technologies

- JQuery
  - fast, small, and feature-rich JavaScript library.
  - easy-to-use API
- Web Service
  - interoperable machine-to-machine interaction over a network.
  - REST, SOAP protocol
- Content Management System
  - publishing, editing and modifying content, organizing, deleting as well as maintenance from a central interface.
  - Joomla, Drupal

# Web Application Framework

- To enable rapid web application development.
- Provide following common functionalities:
  - Data Persistence
  - Session Management and Authentication
  - Security
  - Caching
  - Administrative Interface
  - Templating
- Django, Drupal, Ruby on Rails, Symphony

# Benefits

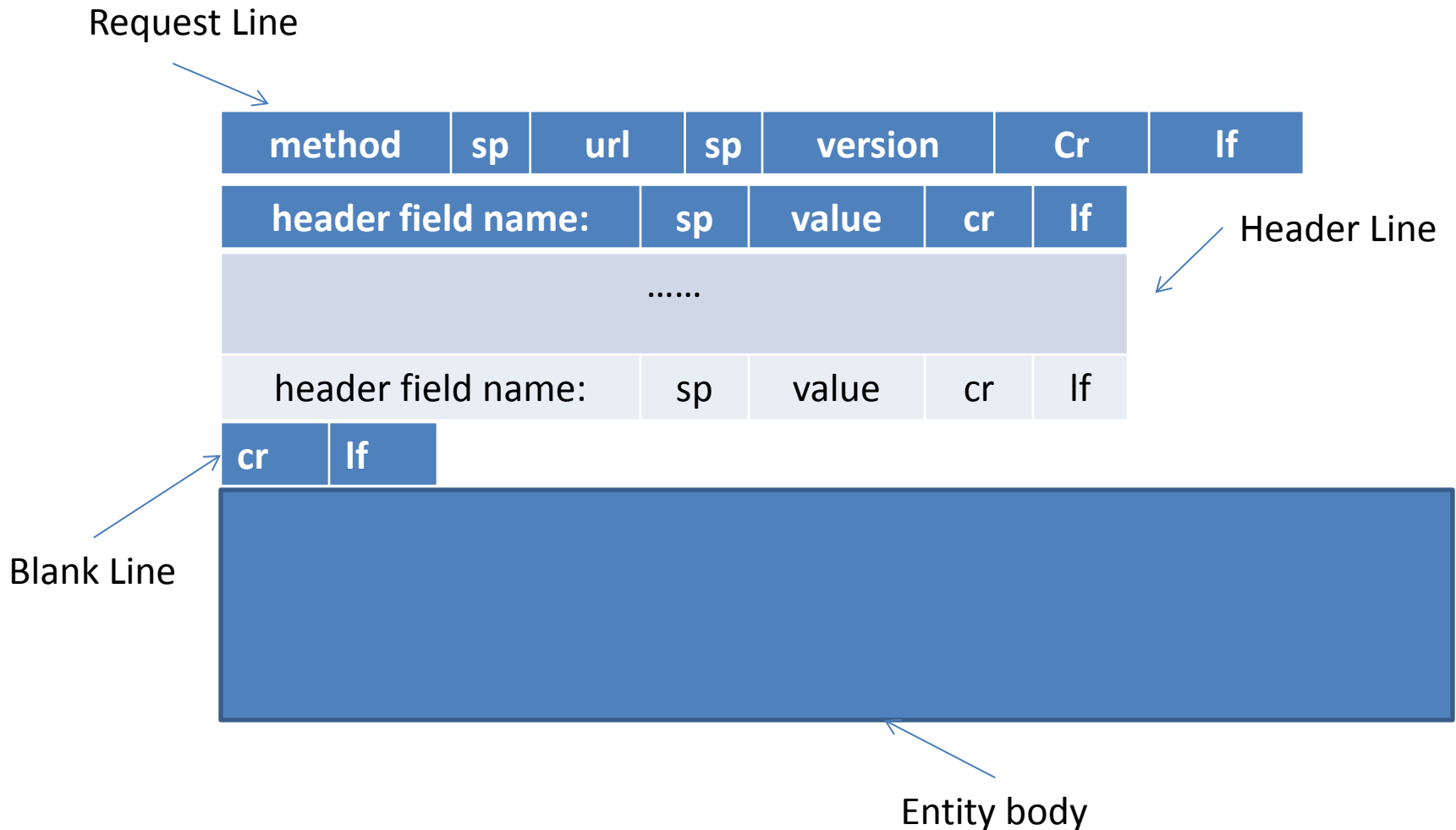
- A web browser required for roll out.
- Require little or no space on the client.
- No upgrade required.
- Interactive and improved usability
- Easier introduction of new devices.



# HTTP

- It is an application-level protocol for distributed, collaborative, hypermedia information systems.
- Foundation for data communication for the World Wide Web (i.e. internet) since 1990.
- Basic features
  - Connectionless
  - Media independent
  - Stateless

# HTTP Header Format



# Example : HTTP Request

GET /hello.htm HTTP/1.1

User-Agent: Mozilla/4.0 (compatible; MSIE5.01;  
Windows NT)

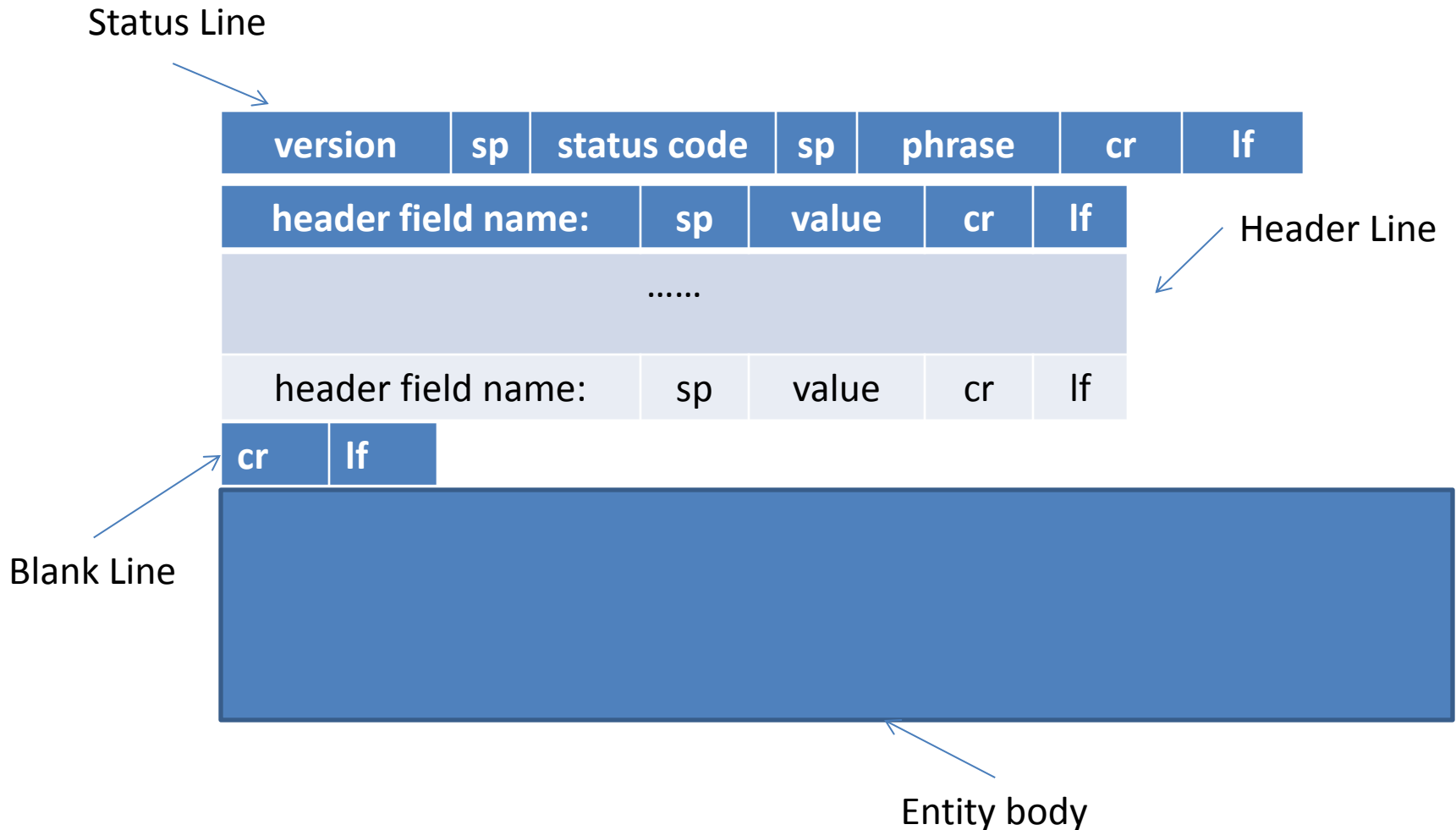
Host: www.tutorialspoint.com

Accept-Language: en-us

Accept-Encoding: gzip,deflate

Connection: Keep-Alive

# HTTP Header Format



# Example : HTTP Response

HTTP/1.1 200 OK

Date: Mon, 27 Jul 2009 12:28:53 GMT

Server: Apache/2.2.14 (Win32)

Last-Modified: Wed, 22 Jul 2009 19:15:56 GMT

Content-Length: 88

Content-Type: text/html

Connection: Closed

<html>

<body>

<h1>Hello, World!</h1>

</body>

</html>

# Request Methods

Method	Description
GET	Request to read a Web page
HEAD	Request to Read a Web page's header
PUT	Request to store a Web page
POST	Append to a named resource (e.g. a web page)
DELETE	Remove the Web page
TRACE	Echo the incoming request
CONNECT	Establish connection to the server
OPTIONS	Query certain options

# Status Code

Status Code	Allocated Meaning
1xx	Informational
2xx	Successful
3xx	Redirection
4xx	Bad Request
5xx	Internal Server Error

# Header Fields

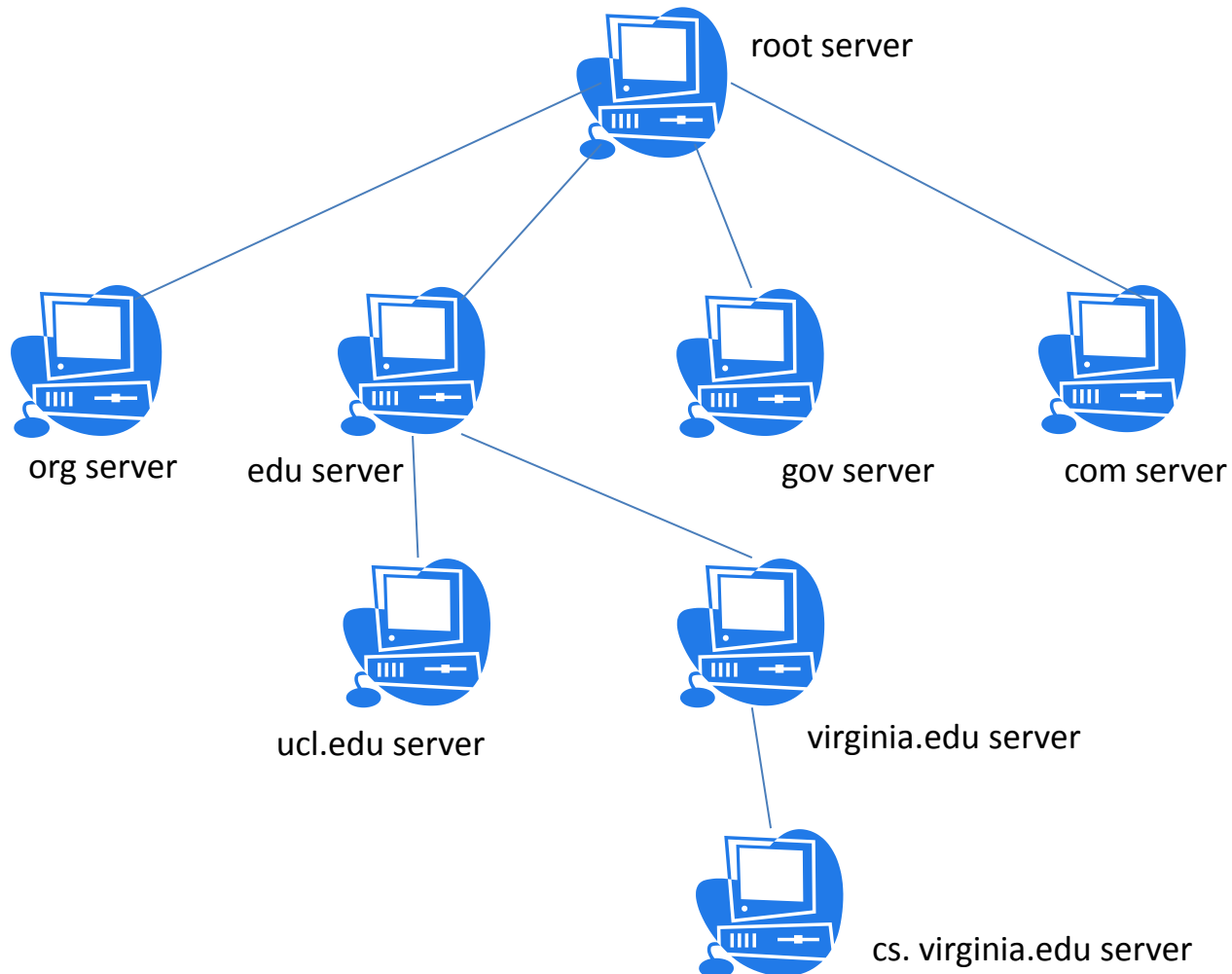
- General-header: These header fields have general applicability for both request and response messages.
- Client Request-header: These header fields are applicability only for request messages.
- Server Response-header: These header fields are applicability only for response messages.
- Entity-header: These header fields define meta information about the entity-body or, if no body is present.



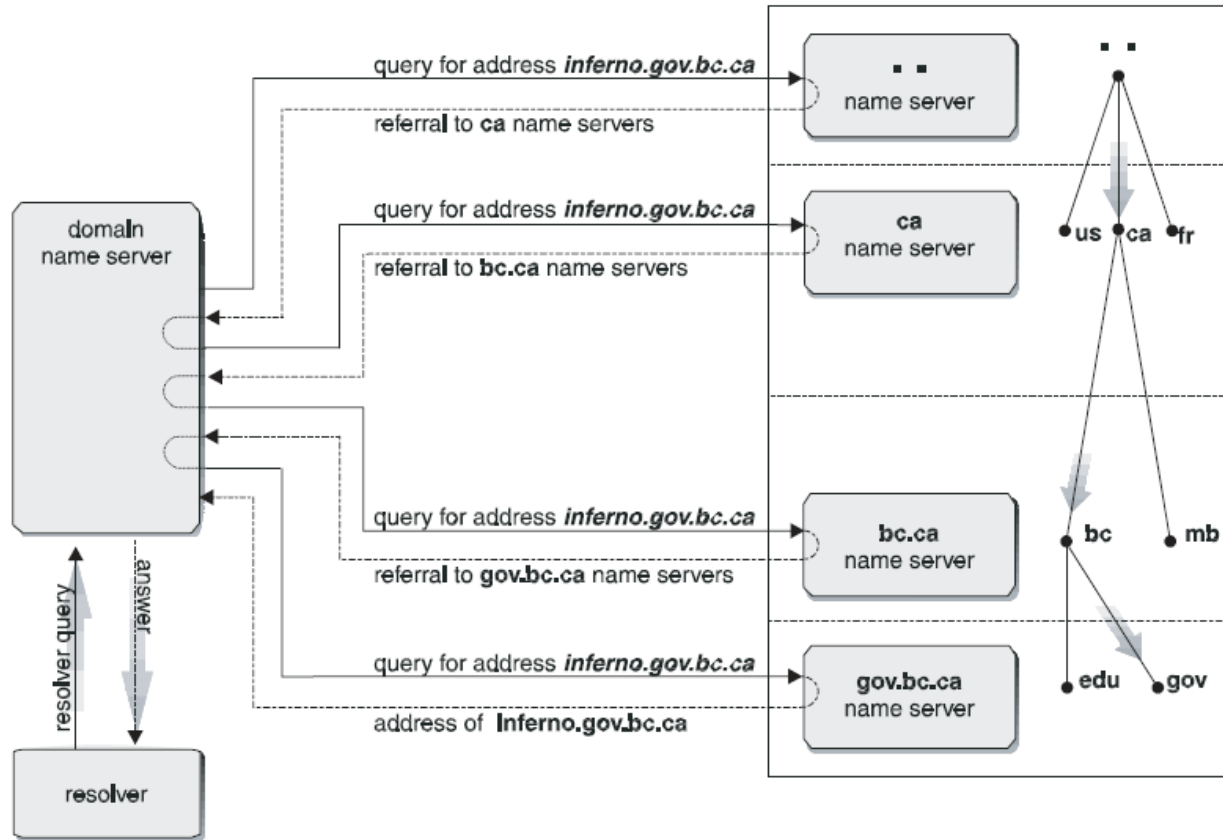
# Domain Name System

- It is used on the Internet to provide a standard naming convention for locating IP-based computers.
- A distributed database that translates between domain names and IP addresses
- This naming system allows for growth on the Internet and the creation of names that are unique throughout the Internet .

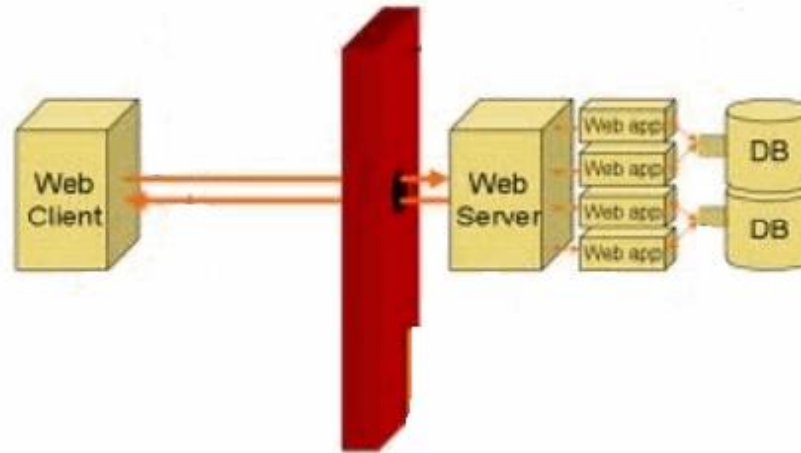
# Domain Name Servers



# Domain Name Resolution

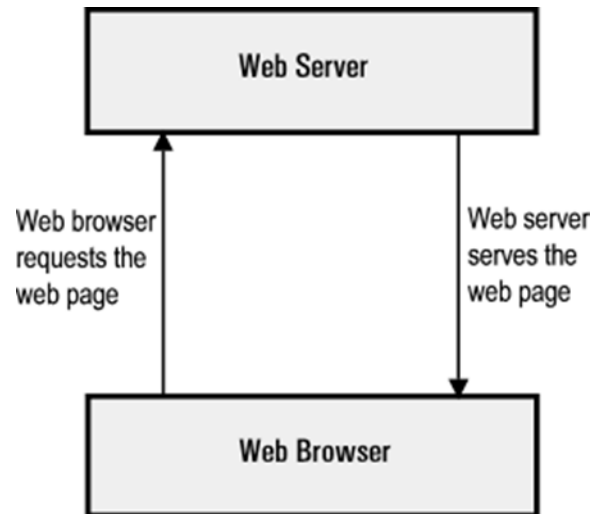


# Web Server



- A web server store, process and deliver web pages to clients.
- The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP).
- Web pages are HTML documents, which may include images, style sheets and scripts in addition to text content.

# HTTP Request



- Web servers are able to map the path component of a Uniform Resource Locator (URL) into:
  - A local file system resource (for static requests)
  - An internal or external program name (for dynamic requests)

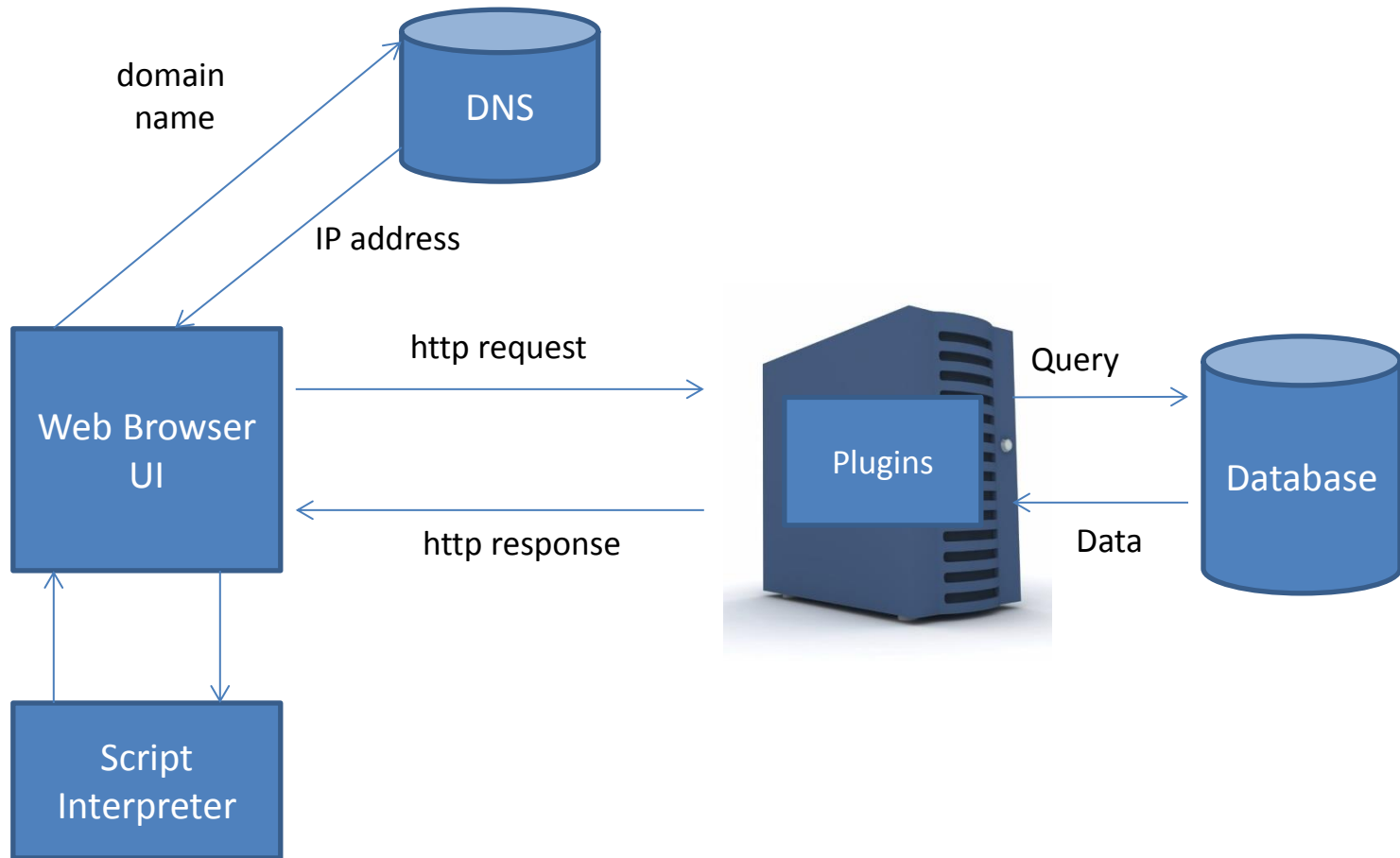
# Web Servers

- Apache HTTP Server
  - Most popular open source web server.
  - Available for a range of operating system.
- Microsoft Internet Information System
  - Second most popular web server
  - Part of Windows Operating System
- Sun Java System Web Server
  - Available for most operating system
  - for medium to large business applications.

# Web Application Security

- deals specifically with security of websites, web applications and web services.
  - Personal Information Leakage
  - File and Path Name based Attacks
  - DNS Spoofing
  - Location header and spoofing
  - Authentication Credentials
  - Proxies and Caching

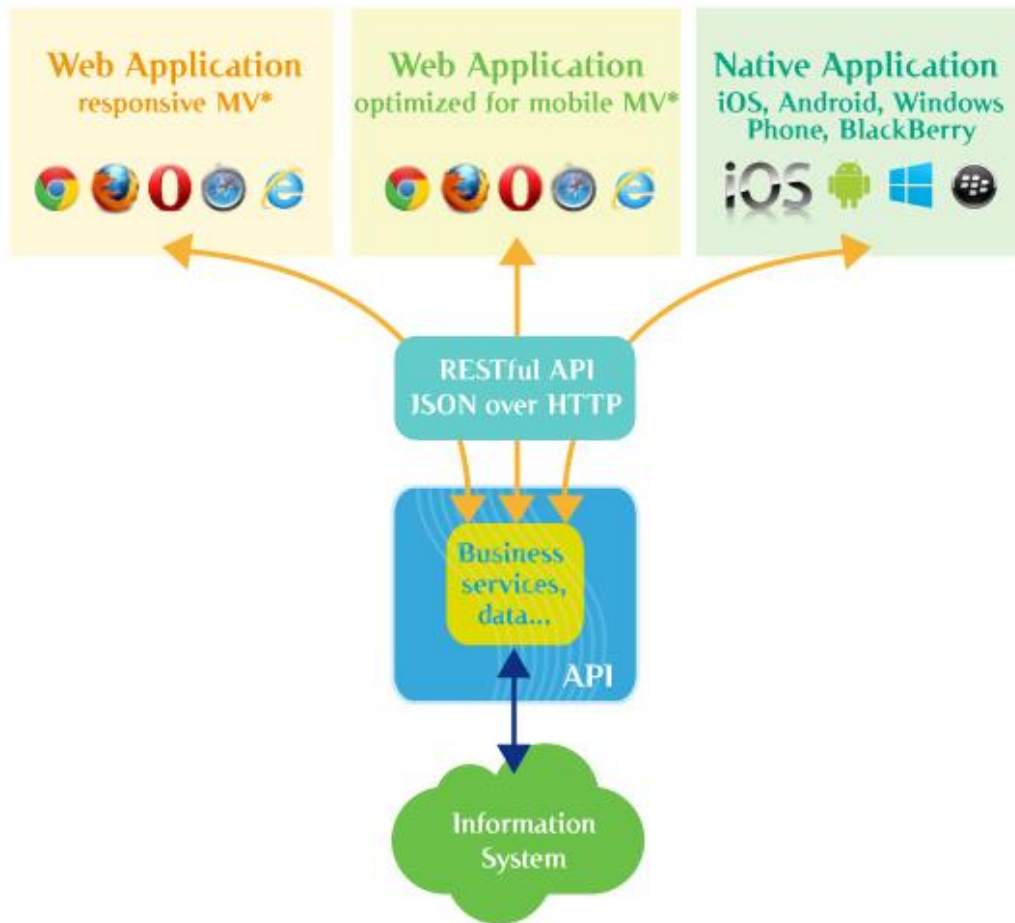
# Web Page Rendering





# Summary

- Most Web pages are a combination of those technologies
  - Raw content, placed inside...
  - HTML tags, formatted with...
  - CSS rules, interactivity produced by...
  - JavaScript scripts on Clients sides and...
  - PHP scripts on server sides
- Newer technologies like DHTML, XHTML, and AJAX are based on combination of these.



*Thank  
You*