WEB SYSTEM AND TECHNOLOGIES

Chapter 1
Introduction
Internet & Web

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Introduction

- The Internet is a vast, international network, made up of computers and the physical connections (wires, routers, etc.) allowing them to communicate.
- It is the largest network in the world that connects hundreds of thousands of individual networks all over the world.
- The popular term for the Internet is the “information highway”.
- Rather than moving through geographical space, it moves your ideas and information through cyberspace – the space of electronic movement of ideas and information.

How to access the Internet?

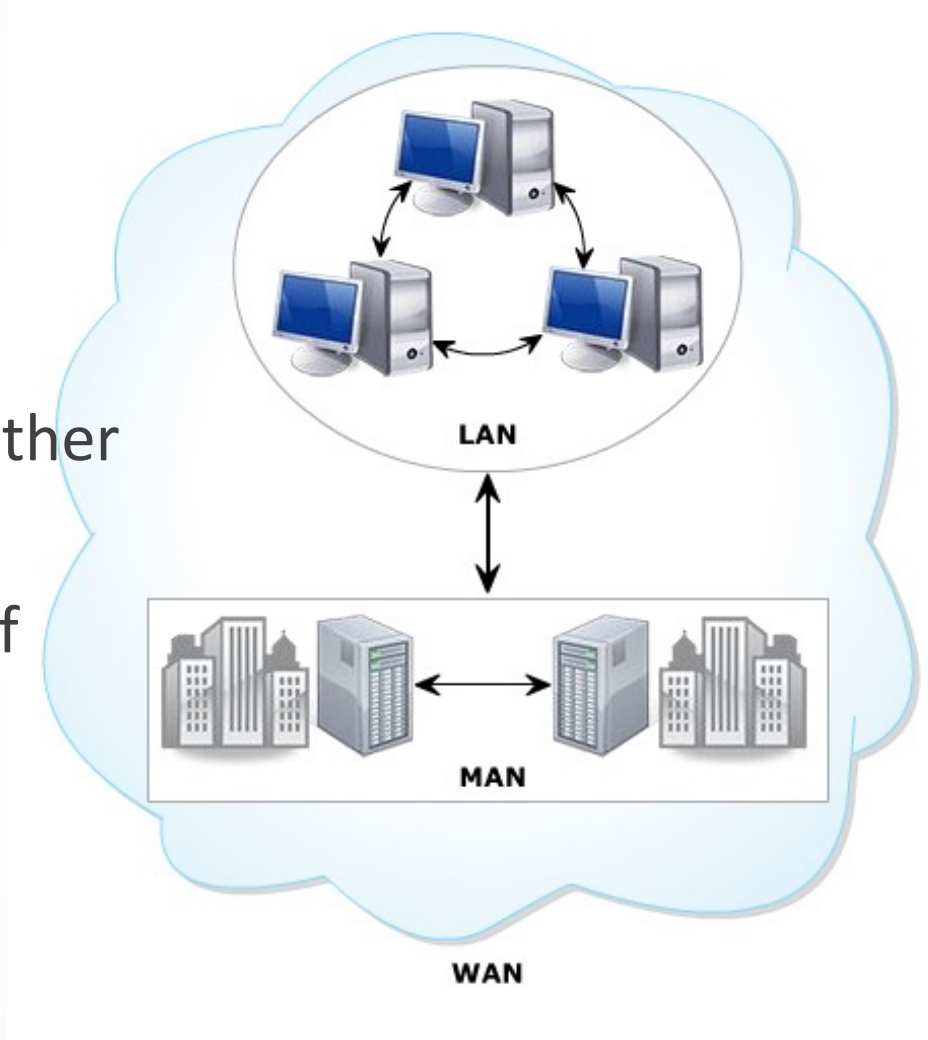
- Many schools and businesses have direct access to the Internet using special high-speed communication lines and equipment. Students and employees can access through the organization's local area networks (LAN) or through their own personal computers.
- Another way to access the Internet is through Internet Service Provider (ISP).
- To access the Internet, an existing network need to pay a small registration fee and agree to certain standards based on the TCP/IP (Transmission Control Protocol/Internet Protocol) reference model.
- Internet Service Provider (ISP) : A commercial organization with permanent connection to the Internet that sells temporary connections to subscribers.

What is Web?

- The World Wide Web (WWW or just the Web) is a collection of software that spans the Internet and enables the interlinking of documents and resources.
- The **Web** consists of information organized into Web pages containing text and graphic images.
- It contains hypertext links, or highlighted keywords and images that lead to related information.
- **Links**: A connection between one web page and another.
- A collection of linked **Web pages** that has a common theme or focus is called a **Web site**.
- The main page that all of the pages on a particular Web site are organized around and link back to is called the site's **home page**.

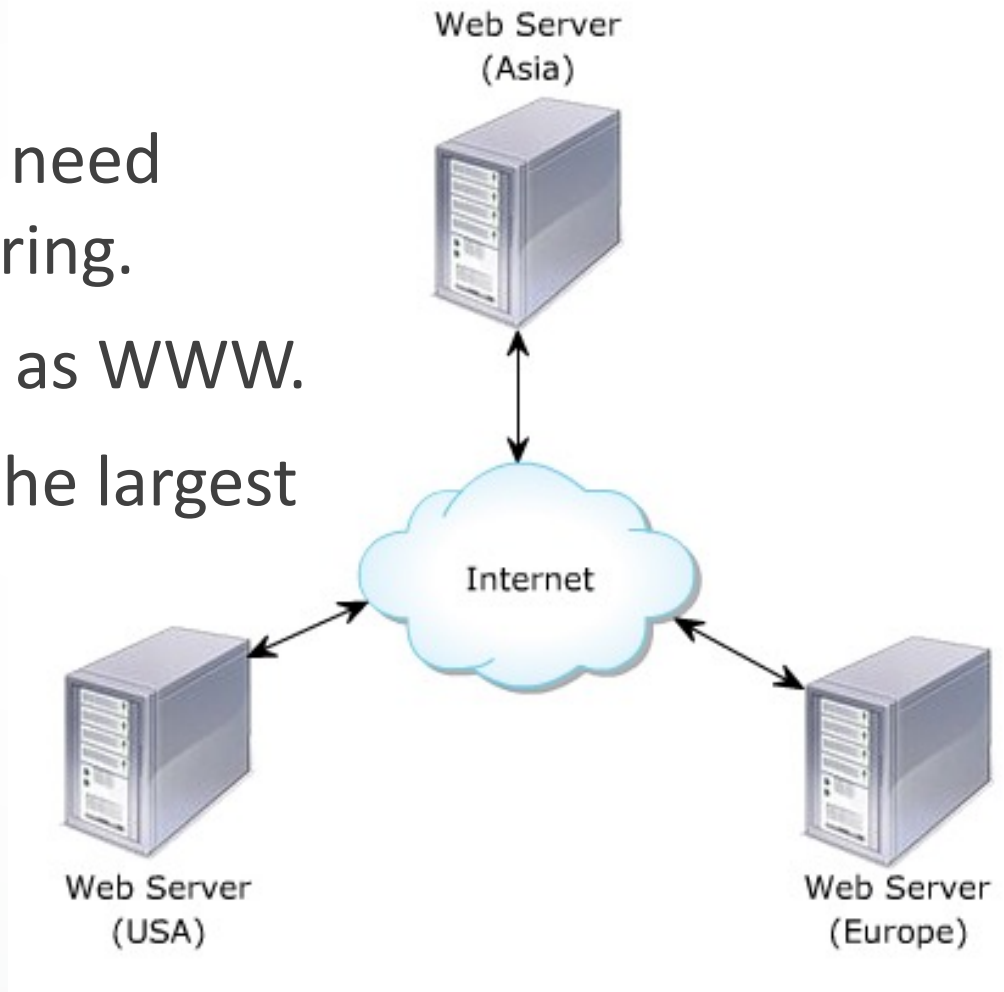
Evolution of Web

- The growth of computing expanded in multiple.
- Organizations connect together to share data.
- This makes the beginning of computer networks.



Web and Internet

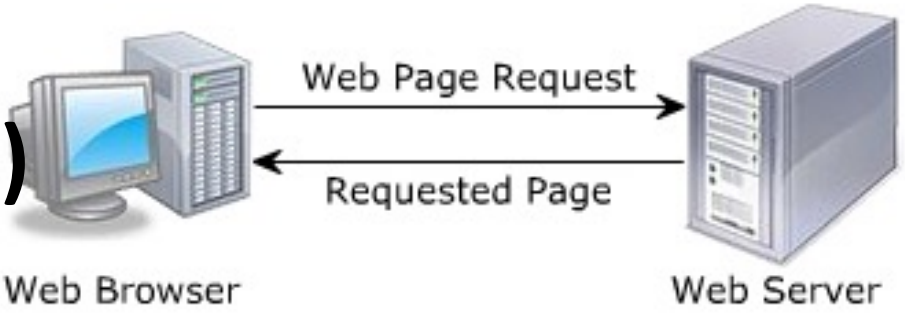
- WANs raised a strong need about global data sharing.
- This resulted referred as WWW.
- Internet is known as the largest WAN.



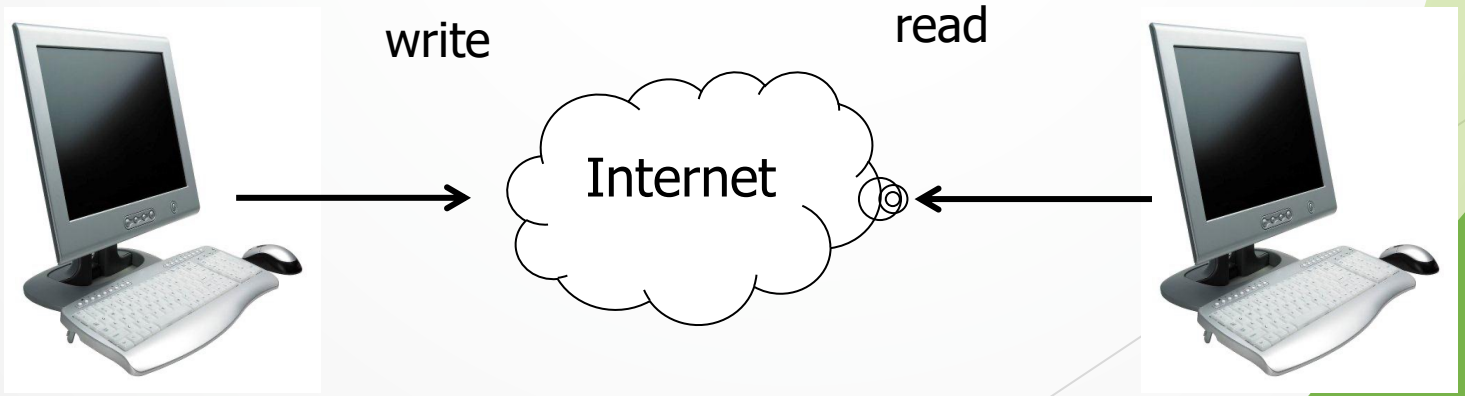
Web can be classified

- Web 1.0 (Static Web) (1990 – 2000)
- Web 2.0 (Dynamic Web) (2000 – 2010)
- Web 3.0 (Semantic Web) (2010 – 2020)
- Web 4.0 (Mobile Web) (2020 ~)
- Web 5.0 (Emotional Web)

Web 1.0 (Static Web)

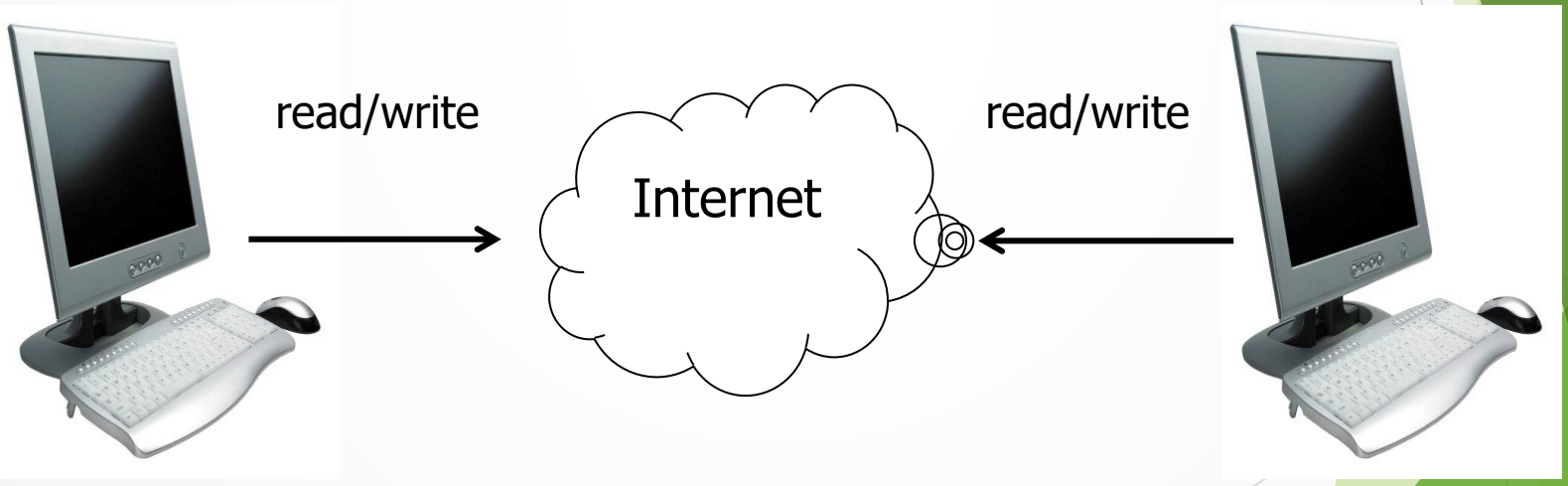


- To be Known as traditional web.
- Authors write/publish content on the web.
- The published content has read-only format.
- Posing the problem of User interactivity.



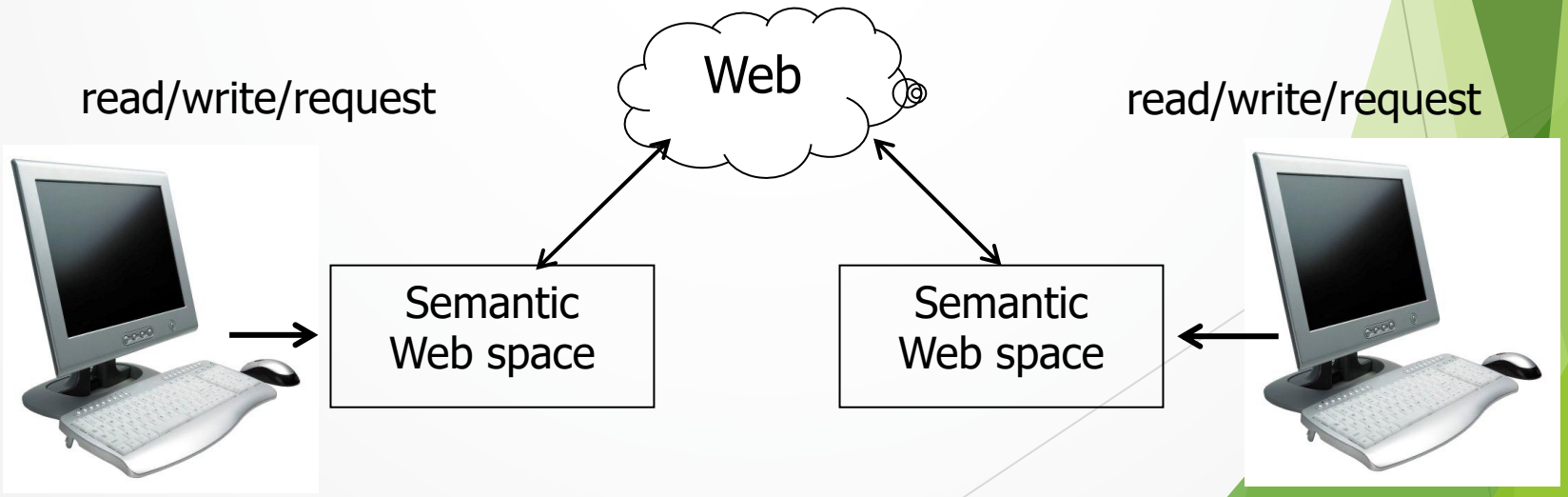
Web 2.0 (Dynamic Web)

- It’s great platform for the readers to share their viewpoints with the authors.
- The Web space is limited in web 1.0 and 2.0.



Web 3.0 (Semantic Web)

- It is defined as semantic web and includes integration, automation, discovery, and data. It encourages mobility and globalization.
- It allows users to find, share and combine more easily
- The user can send the request for Web space.

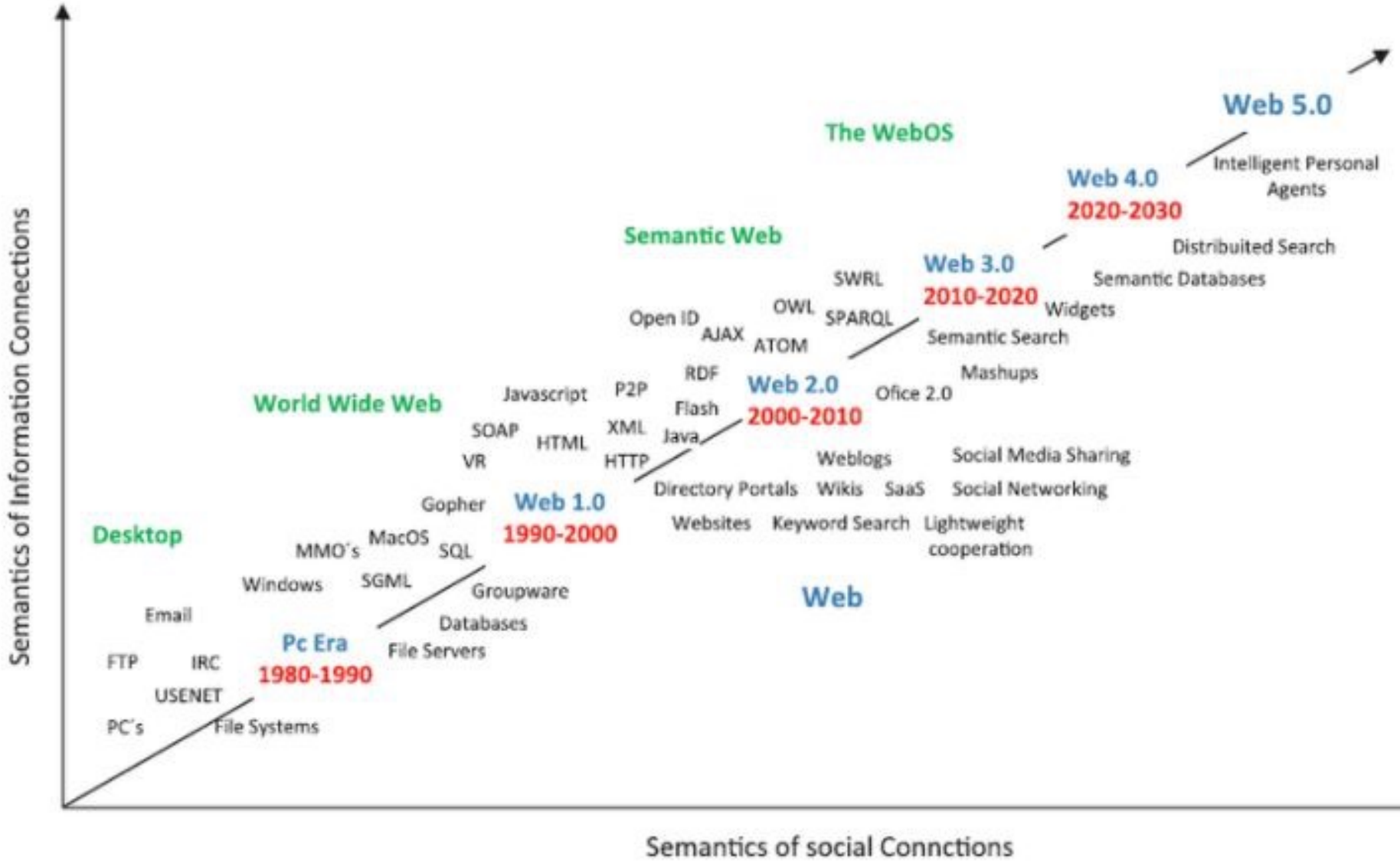


Web 4.0 (Mobile Web)

- Web 4.0 is “based on wireless communication (mobile devices or computer) connecting people and objects whenever and wherever in the physical or virtual world in real time”.
- The GPS which helps people to find their way is a good example for this type.

Web 5.0 (Emotion Web)

- Web 5.0 is the next step in the evolution of the internet, which aims to provide a decentralized platform to users while also incorporating human emotions through the use of artificial intelligence.
- Web 5.0 will be the read-write-execute-concurrency web. Web 5.0 will be about the (emotional) interaction between humans and computers. The interaction will become a daily habit for a lot of people bases on neuro technologies.
- One example with headphones on, users will interact with content that interacts with their emotions or changes in facial recognition.


Semantics of Information Connections
Semantics of social Connctions
Desktop
Email
FTP
IRC
USENET
PC´s
File Systems
Pc Era
1980-1990
Windows
MMO´s
MacOS
SGML
SQL
Groupware
Databases
File Servers
World Wide Web
Gopher
VR
SOAP
HTML
HTTP
Javascript
P2P
XML
Java
Flash
RDF
Web 1.0
1990-2000
Web 2.0
2000-2010
Directory Portals
Websites
Keyword Search
Weblogs
Wikis
SaaS
Ofice 2.0
Social Media Sharing
Social Networking
Lightweight cooperation
Mashups
Web
Semantic Web
Open ID
AJAX
OWL
SWRL
SPARQL
ATOM
Web 3.0
2010-2020
Semantic Search
Widgets
Semantic Databases
Distributed Search
The WebOS
Web 4.0
2020-2030
Intelligent Personal Agents
Web 5.0

How to access the Web?

- Once you have your Internet connection, then you need special software called a browser to access the Web.
- Web browsers are used to connect you to remote computers, open and transfer files, display text and images.
- Web browsers are specialized programs.
- Examples of Web browser: Chrome, Safari, Firefox, IE, Edge

Static Web Pages

- Static web pages have a limitations.
- Difficult to maintain.
- Updated manually.
- Don’t allow any user interaction.

Dynamic Web Pages

- Include static as well as dynamic web pages.
- Allows customizing the content and its appearance in the browser.
- Generates content “on-demand”.
- Accepts the user inputs through web browser.
- Several technologies evolved to make web sites more flexible and dynamic.
- Variety device such as PDAs, Cell phones, and so on is used XHTML Documents.

Addresses on the Web: IP Addressing

- Each computer on the internet does have a unique identification number, called an IP (Internet Protocol) address.
- The IP addressing system currently in use on the Internet uses a four-part number.
- Each part of the address is a number ranging from 0 to 255, and each part is separated from the previous part by period.
- For example, 106.29.242.17, 192.168.0.1
- The combination of the four IP address parts provides 4.2 billion possible addresses (256 x 256 x 256 x 256).

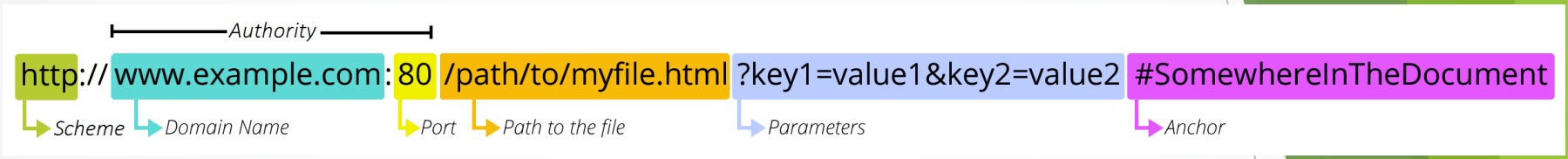
Domain Name Addressing

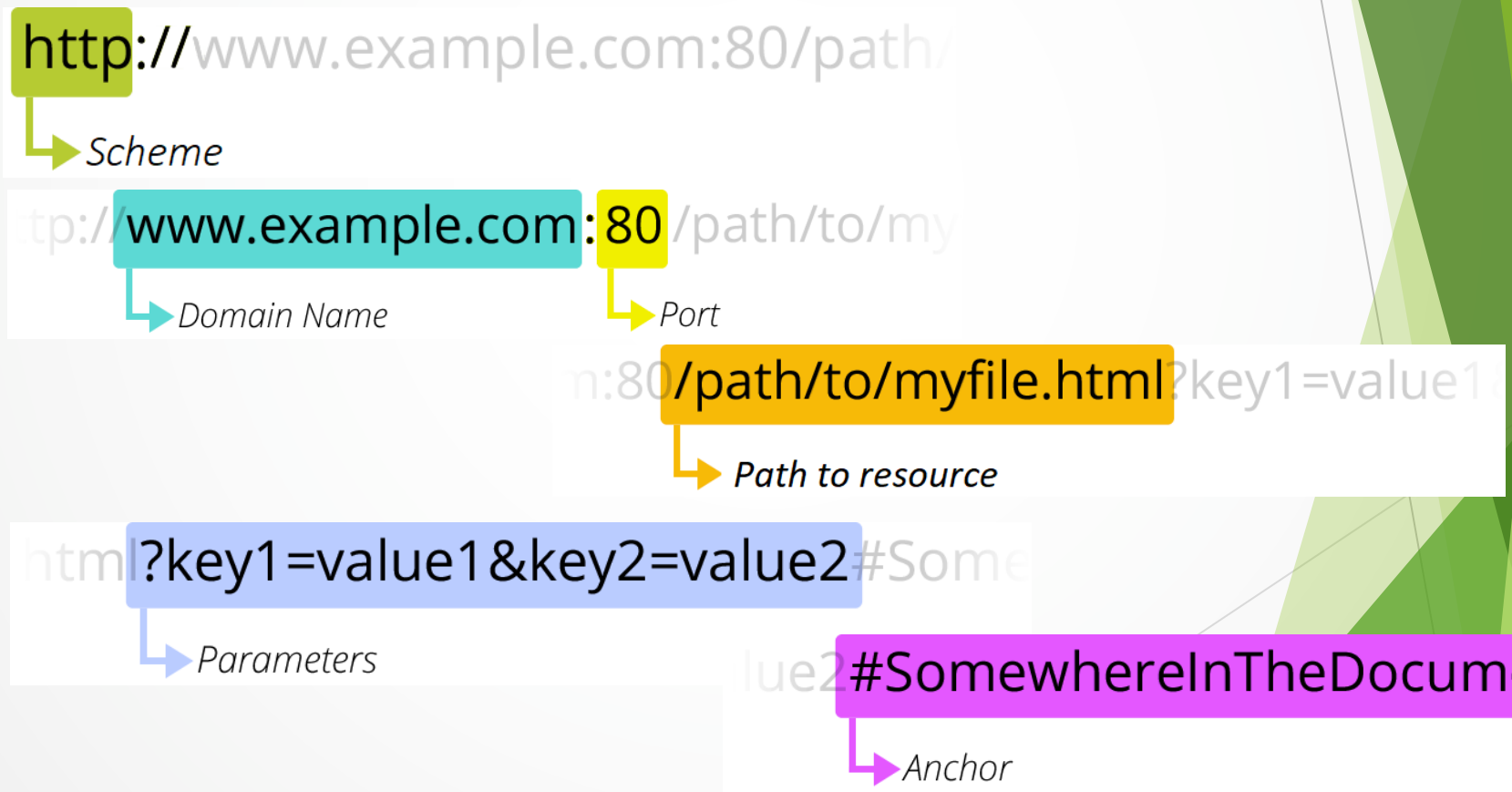
- Most web browsers do not use the IP address t locate Web sites and individual pages. They use domain name addressing.
- A **domain name** is a unique name associated with a specific IP address by a program that runs on an Internet host computer. This program, which coordinates the IP addresses and domain names for all computers attached to it, is called **DNS (Domain Name System)** software.
- The host computer that runs this software is called a **domain name server**.
- No other Website on the Internet has the same domain name.

URL – Uniform Resource Locators

- A URL (Uniform Resource Locator) is a unique identifier used to locate a resource on the Internet. It is also referred to as a web address.
- A URL contains the following information:
  - The protocol used to access the resource.
  - The location of the server (whether by IP address or domain name).
  - The port number on the server (optional).
  - The location of the resource in the directory structure of the server.
  - A fragment identifier (optional).

Structure of a Uniform Resource Locators





HTTP – Hypertext Transfer Protocol

- It is a protocol used to access the data on the World Wide Web (www).
- The HTTP protocol can be used to transfer the data in the form of plain text, hypertext, audio, video, and so on.
- This protocol is known as HyperText Transfer Protocol because of its efficiency that allows us to use in a hypertext environment where there are rapid jumps from one document to another document.
- Two other protocols that you can use on the Internet are the File Transfer Protocol (FTP) and the Telnet Protocol.

Types of Web Application

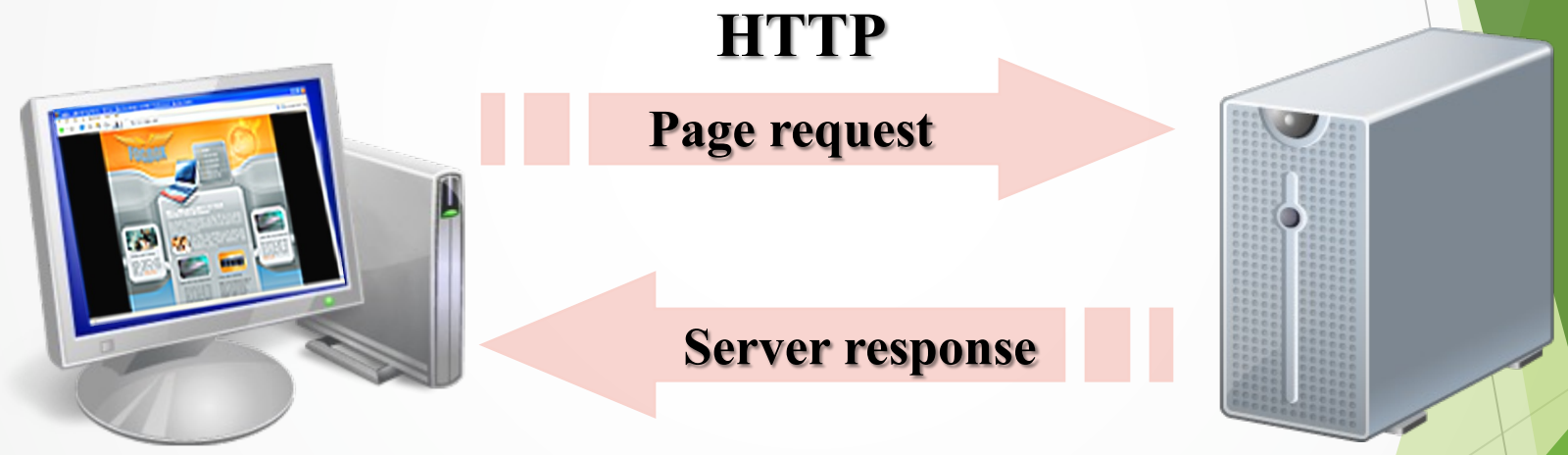
- Static Web Application
- Dynamic Web Application
- Shop online or e-commerce
- Portal Web Application
- Animation Web Application
- Web Application with CMS

Client/Server Structure of the Web

- Web is a collection of files that reside on computers, called Web servers, that are located all over the world and are connected to each other through the Internet.
- When you use your Internet connection to become part of the Web, your computer becomes a Web client in a worldwide client/server network.
- A Web browser is the software that you run on your computer to make it work as a web client.

Web Application Architecture

- WWW use classical client / server architecture
- HTTP is text-based request-response protocol



Server-side code

- Languages/frameworks include but are not limited to Ruby (Rails), Node.js,) Python, PHP, C#, and Java; but the list of possibilities is infinite. Any code that can run on a computer and respond to HTTP requests can run a server.
- Stores persistent data (user profiles, my page, etc.).
- Cannot be seen by the user (unless something is terribly wrong).
- Can only respond to HTTP requests for a particular URL, not any kind of user input.
- Creates the page that the user finally sees (this is generally only true in web applications that choose to render most of their layouts on the server).

Client-side code

- Languages used include: HTML, CSS, and JavaScript.
- Parsed by the user's browser.
- Reacts to user input.
- Can be seen and edited by the user in full.
- Cannot store anything that lasts beyond a page refresh.
- Cannot read files off of a server directly, must communicate via HTTP requests.
- Creates the page that the user finally sees (this is generally only true in single page applications)

Introduction to Web Services

- A Web service is a software module that has a URL or an Internet address so they can be called upon to perform a operation via the Internet.
- One Web service makes a request of another Web service to perform its task or tasks and pass back an answer creating a highly distributed system.
- Using XML based messages via internet-based protocols.
- Web Services are latest distributed technology.

Introduction to Web Services (cont.)

- Benefits of Web Services:
  - Loosely Coupled: Each service exists independently of the other services that make up the application. Individual pieces of the application to be modified without impacting unrelated areas.
  - Ease of Integration: Data is isolated between applications creating 'silos'. Web Services act as glue between these and enable easier communications within and across organizations.
  - Service Reuse: Takes code reuse a step further. A specific function within the domain is only ever coded once and used over and over again by consuming applications.

World Wide Web Consortium (W3C)

- Founded in 1994 by Tim Berners-Lee
  - Devoted to developing non-proprietary and interoperable technologies for the World Wide Web and making the Web universally accessible
- Standardization
  - W3C Recommendations: technologies standardized by W3C include Extensible Hyper Text Markup Language (XHTML), Cascading Style Sheets (CSS) and the Extensible Markup Language (XML)
  - Document must pass through Working Draft, Candidate Recommendation and Proposed Recommendation phases before considered for W3C Recommendation

Q&A