

CS355 Web Technologies

Dr. Ismail Hababeh

German-Jordanian University

Lecture 2

Introduction to Internet

- A **global** computer network providing a variety of information and communication facilities.
- Consists of interconnected networks using standardized communication **protocols**.
- Consists of wide range of networks and carries huge amount of information resources and services.

Internet Protocols

- The Internet protocol suite (TCP/IP)
Transmission Control Protocol / Internet Protocol is used to link devices worldwide.
- A protocol is a description of the rules that computers must follow to communicate with each other.

Internet Protocol Suite TCP/IP

- **TCP/IP** protocols are working together.
- **TCP** breaks down data into IP **packets** before data send and assembles IP packets when they arrive.
- **IP** is responsible for sending the packets to the correct **IP address**.

World Wide Web

- The World Wide Web (**WWW**) is an information space where web resources and documents are identified by Uniform Resource Locators (**URLs**), interlinked by **hypertext links**, and can be accessed via the Internet.
- **Web pages** are primarily text documents formatted and marked up with Hypertext Markup Language (**HTML**).

World Wide Web

- Web pages may contain **multimedia components** (images, video, audio, ...etc.) that are concentrated in the user's web browser as pages.

World Wide Web

- Embedded **hyperlinks** permit users to navigate between web pages.
- **Website** consists of multiple web pages with a common theme and a common domain name.
- Websites may be mostly informative for commercial, governmental, or non-governmental organizational purposes.

World Wide Web

- WWW is an example of **client/server** computing.
Each time a hyperlink is clicked, the client is requesting a component from a **Web server**.
- Web server uses Hyper Text Transport Protocol **HTTP** to navigate hypertext documents.
- Hyper Text Markup Language **HTML** is used for creating hypertext documents for the WWW.

IP Addresses

- **IP address** is required for each computer to connect to internet.
- A **Web site** is identified by an IP address or a URL
- **TCP/IP** uses IP address for internet communication.
- An IP address is a set of **four numbers** separated by a period, each number between 0 and 255. For example, 80.50.20.70

IP Addresses

- **IP address** is 32-bit (4 bytes) numbers.
- A **byte** can hold 256 different values: 00000000, 00000001, 00000010, ... 11111111
- **TCP/IP** uses 32-bit addresses.
- The rapid growth of the Internet has led to a new version of IP address referred to as **IPng** (IP Next Generation) by lengthening the IP address from 32 bits to **128 bits**.

Domain Names

- Web sites are identified by **Domain Names**.
- Domain names are easier to remember than IP address.
- Domain name like <http://www.gju.edu.jo> is translated to a number by a Domain Name Server (**DNS**)
- When a new domain is registered together with a TCP/ IP address, all DNS servers in the world are updated with the new domain.

URLs

- String of alphanumeric characters that represents **location or address** of a resource on Internet and how that resource should be accessed.
- Defines uniquely where documents (resources) can be found.

URLs

URL consists of three main parts:

- Connection protocol
- Host name
- Path name on the host (where resource stored).

URL can optionally specify:

- port through which connection to the host should be made.

URL usually has the following syntax rules:

`Http://host.domain.country_code:port/path/file_name`

Hypertext Transfer Protocol **Http**

- Responsible for the **communication** between a web server and a web browser.
- Used for **sending requests** from a client browser to a web server and **receiving web response** (content pages) from the server back to the client.

Hypertext Transfer Protocol **Http**

Http protocol includes the following messages:

- **Connection**: Establishes a connection between the client and the server
- **Request**: sending request from a client browser asking for a resource
- **Response**: receiving web response content pages (resource pages)
- **Close**: Terminates the connection

Web navigating Mechanism

- Web communication begins on the client's side by **typing resource URL** into the browser.
- The browser **translates** the resource URL into **IP address**.
- The browser then **sends a request** to the **web server** (server side) using the HTTP protocol
- The **web server returns** the requested page **contents** to the client browser.

Port Number

- Part of the addressing information used to **identify the senders and receivers** of messages.
- Used to **distinguish between** the different networking **applications** that are running concurrently above the TCP/IP protocol stack.
- A Web server will normally be listening for connections on **port 80**.
- A web browser will use a default **port 80** to connect to the remote computers.

Browsers

- An application that provides a way to **access the World Wide Web**.
- It **interacts** with the information on the WWW.
- It **retrieves, presents, and traverses** web pages, images, video, and other multimedia content.
- Most popular web browsers:
 - Firefox
 - Google Chrome
 - Microsoft Edge
 - Apple Safari
 - Opera
 - Brave
 - ...

The Web Programming Languages

- **HTML:**
 - a hypertext markup language to describe the general form and layout of documents.
 - An **HTML document** is a mix of content and controls (tags) that specify how the content should be displayed in the document.
- **XML:**
 - A **meta-markup language** (a language for defining markup language).
 - Used to **create a new markup language** for a particular purpose or field.

The Web Programming Languages

- **JavaScript:**
 - A **client-side** HTML-embedded **scripting language**
 - Provides a way to access elements of HTML documents and **dynamically change** them.
- **PHP:**
 - A **server-side scripting language**
 - Used for form processing and database access through the WWW.
- **Ruby:**
 - A pure **object-oriented interpreted scripting language**.
 - **Data** is stored in an **object**, and all **operations** are done via **method** calls, Both classes and objects are **dynamic**.