CHAPTER ONE

INTRODUCTION TO INTERNET, WEB AND PROTOCOL

Internet:

- describe a worldwide network of computer networks
- one of the largest, most widely used networks (in fact, a network of networks)
- It is a group of two or more networks that are :
  - Interconnected physically
  - Capable of communicating and sharing data with each other
  - Able to act together as a single network
- The Internet connects millions of computers globally and provides worldwide communications to businesses, homes, schools, and governments.

ADVANTAGES OF INTERNET

- The Internet helps in various ways:
  - **To get information :** about people, products, organizations, research data, electronic versions of the printed media, etc.
  - **To provide information :** considered global advertising
    - **Publishing**: including full test articles, reports, abstracts, computer programs, and demonstrations
    - **teaching:** both distance learning and assistance for students
  - **Ability to communicate**

DISADVANTAGES OF INTERNET

- In *Data security*
- the *danger of computer viruses*
- Unnecessary information (text, image, video, sound) can be disseminated for example photography

HOW THE INTERNET WORKS?

- The internet, as we have discussed, is used up of a bunch of network .Each network can be anything (an internet) with hundred of computers
- These networks talk to one another using a common protocol Called TCP/IP.
- ***TCP/IP (Transmission Control Protocol / Internet Protocol)***
- In order to talk about networking, you need to know what meant by protocol.
- Protocol is a set of rules that govern the transfer of data and communication between two or more entities in a network or it is the suite of networking protocol that let different type computers to communicate over the network... TCP/IP is the standard protocol for the Net.

IP (INTERNET PROTOCOL)

- The internet protocol allows data to travel in packets in that can be routed to different networks before being reassembled at their final destination

Internet Address

- An Internet has its own address
- Every internet address can be shown in the following two ways
  - ☞ They can be a group of four number (0-255) separated with periods (.). For example (199.60.103.1)
  - ☞ They can be a group of letter words with periods (.) between them

    (For example Microsoft.com)
- ***Domain:*** is the highest subdivision of the net. It is represented usually by country or type of organization. Such as .edu for education, or .com for commercial, .org for organization etc
- ***Domain Name:-***a complete address, including the domain and the unique name of the organization for example www.iju.edu.et, www.yahoo.com, www.ethionet.et etc

BASIC TERMS YOU HAVE TO KNOW TO WORK WITH INTERNET

- **Web page** is a document, typically written in HTML that is almost always accessible via HTTP. Or pages on which, information will be displayed on the internet.
- **Web site:** is a collection of web pages. Many commercial companies maintain web sites, or sets of web pages, that their customers can view
- **Hyperlink:** is an electronic path to another page or location (URL) on Internet.
- **Hypertext : it** allows a user to move from one web page to another by using a mouse to click on special hypertext links.
- **WWW:** World Wide Web is the way to organize and access information on the Internet.
- **web browser:** is a program that runs on users' computers and allows them to view and interact with the web pages on the World Wide Web.
- **web server:** is a computer that stores a web site, and is responsible for servicing requests for viewing that web site

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- URL(**U**niform **R**esource **L**ocator). To visit a Web site, users type the URL, which is the site's address, into the web browser
- **ISP** **I**nternet **S**ervice **P**rovider, a company whose business is to provide Internet connections to paying customers. The customer uses a modem to dial the telephone number of the ISP from their personal computer.
- Download /Upload
- HTML: The **H**yper**t**ext **M**arkup **L**anguage is the language used to write most web pages on the WWW
- XML: E**x**tensible **M**arkup **L**anguage is an alternative language for writing web pages.

What is Protocol?

- It is a set of rules that govern the transfer of data and communication between two or more entities in a network or
- it is the suite of networking protocol that let different type of computers to communicate over the network
- Protocols are rules and procedures for communicating. The term "protocol" is used in a variety of contexts.
- For example, diplomats in one country to adhere to rules of protocol designed to help them interact smoothly with diplomats from other countries.
- several computers are networked, the rules and technical procedures governing their communication and interaction are called protocols

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Keep three points in mind when you think about protocols in a network environment:

- There are many protocols. While each protocol facilitates basic communications, each has different purposes and accomplishes different tasks. Each protocol has its own advantages and restrictions
- Some protocols work only at particular OSI layers
- Protocols can also work together in a protocol stack, or suit

There are different protocols those are TCP/IP, HTTP/HTTPS, FTP, ICMP, SMTP, POP etc.

TCP/IP

- **TCP (Transmission Control Protocol)** is a set of rules (protocol) used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet.
- *While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packets)* that a message is divided into for efficient routing through the Internet.
- **TCP** is known as a connection-oriented protocol: which means that a connection is established and maintained.
- TCP is responsible for ensuring that a message is divided into the packets
- TCP is in layer 4, the Transport Layer.
- The TCP is responsible for the reliable transmission of data from one node to another

DOMAIN NAME SYSTEM

- DNS is the phonebook of the Internet
- Humans access information online through domain names, like yahoo.com or espn.com
- Web browsers interact through Internet Protocol (IP) addresses.
- DNS translates domain names to IP addresses so browsers can load Internet resources.

Like yahoo.com to ip address 198.162.1.1

INTERNET PROTOCOL (IP)

- It is the transmission mechanism used by the TCP/IP protocols
- IP is an unreliable and connectionless datagram protocol
- IP is a *best-effort delivery* service. The term *best-effort* means that IP provides no error checking or tracking.
- All devices connected to a network have their IP addresses

HYPERTEXT TRANSFER PROTOCOL (HTTP)/HTTPS

- **HTTP** is the protocol that supports communication between web browser and web server. It is used to access HTML documents, or web pages.
- **HTTPS** is the **s**ecure version of HTTP. HTTPS is used on web sites where sensitive information such as bank details is exchanged.
- HTTP specifies how clients request data, and how servers respond to these requests.

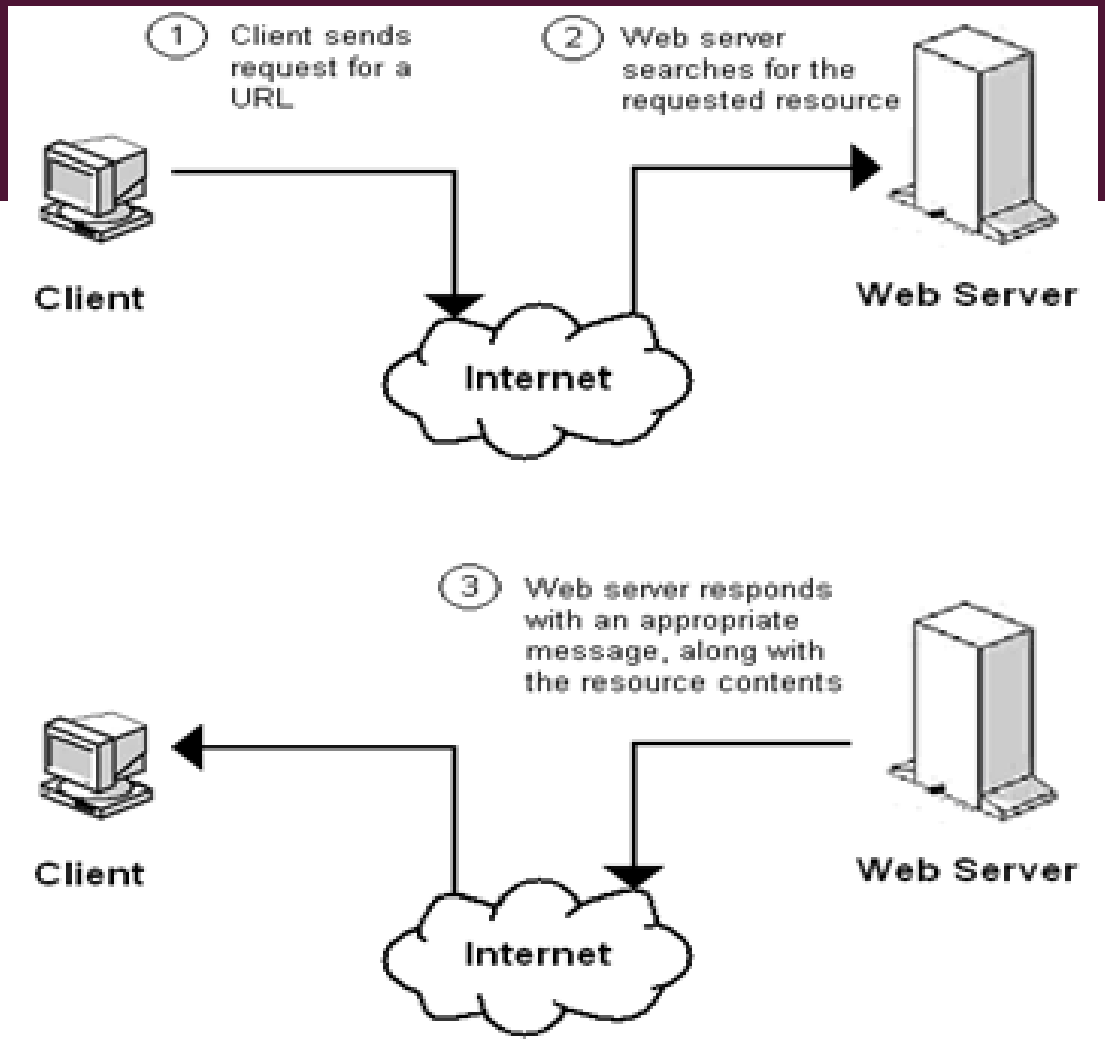

Figure 1 – A client computer interacting with a web server on the Internet

- In HTTP, messages sent between computers consist of a set of ***methods*** and ***headers***.
- An HTTP method is simply an instruction telling the other computer what type of request is being made
- **Request**
  - To illustrate this further, in step 1 of Figure 1, the web browser sends an HTTP request message to the web server. The request will look something like what is shown in Figure 2 below

REQUEST

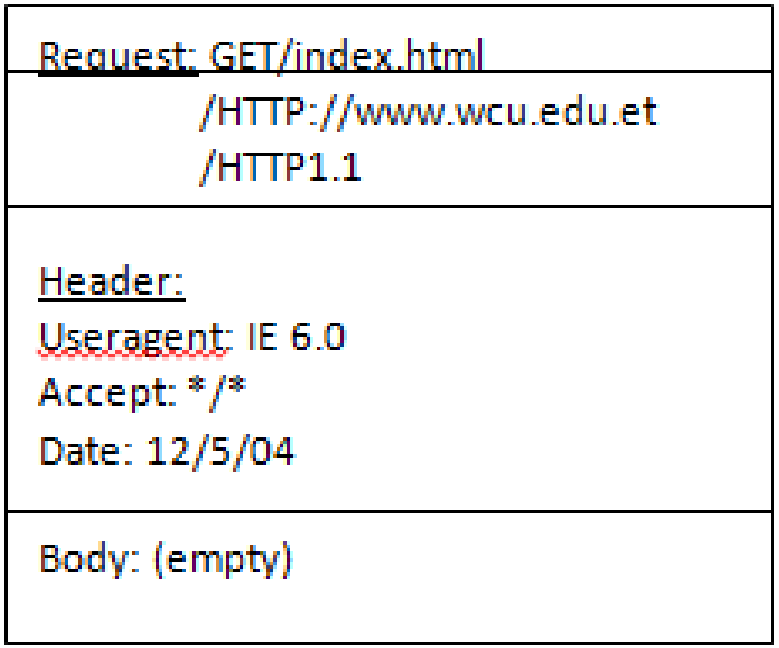

Figure 2 – a HTTP request

RESPONSE

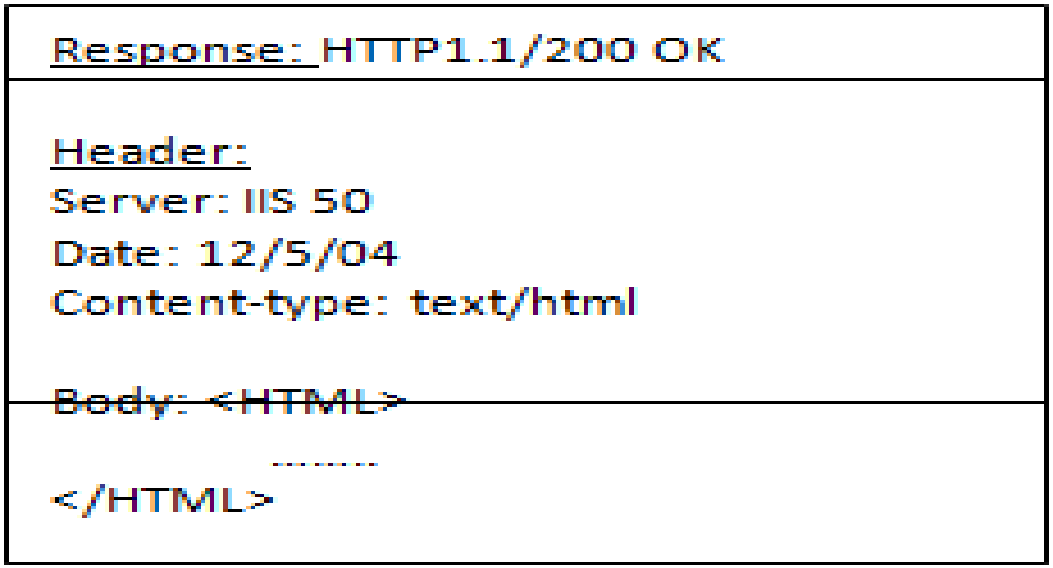

Figure 3 – a HTTP response

Codes Range	Description
100-199	Information, indicating that the request is being processed
200-299	Success
300-399	Request not carried out because the information has been moved
400-499	A client error – the request was incomplete or incorrect
500-599	A server error – the request appeared to be valid, but the server could not process it

FILE TRANSFER PROTOCOL (FTP)

- The File Transfer Protocol (FTP) is used widely on the Internet for transferring files to and from a remote host. FTP is commonly used for uploading pages to a Web site and for providing online file archives.

Internet Control Message Protocol (ICMP)

- The *ICMP* is used by IP and higher-level protocols to send and receive **status reports** about information being transmitted.
- Routers commonly use ICMP to control the flow, or speed, of data between themselves
- The two basic categories of ICMP messages are ***reporting errors*** and ***sending queries***.

SMTP - Simple Mail Transport Protocol

- The Simple Mail Transport Protocol (SMTP) controls the transfer of email messages on the Internet. SMTP defines the interaction between Internet hosts that participate in forwarding email from a sender to its destination.

POP - Post Office Protocol

- The Post Office Protocol (POP) allows you to fetch email that is waiting in a mail server mailbox. POP defines a number of operations for how to access and store email on your server.