NEERAJ®

INTERNET CONCEPTS AND WEB DESIGN

By :
Neeraj Mishra

New Edition

23260329
55817881
Fax : 011-23285501

NEERAJ PUBLICATIONS
(Publishers of Educational Books)
1507, Ist FLOOR, NAI SARAK, DELHI - 110 006
E-mail : info@neerajbooks.com
Website : www.neerajbooks.com

Price : Rs. 140.00

Published by :

NEERAJ PUBLICATIONS

Admn. Office : **Delhi-110 007**
Sales Office : **1507, 1st Floor, Nai Sarak, Delhi-110 006**
E-mail : **info@neerajbooks.com** *Website* : **www.neerajbooks.com**

Typesetting by : *Competent Computers* *Printed at* : *Kalyan Enterprises*

Note :

1. *For the best & upto-date study & results, please prefer the recommended textbooks/ study material only.*
2. *This book is just a Guide Book/Reference Book published by NEERAJ PUBLICATIONS based on the suggested syllabus by a particular Board /University.*
3. *The information and data etc given in this Book are from the best of the data arranged by the Author, but for the complete and upto-date information and data etc see the Govt of India Publications/textbooks recommended by the Board/University.*
4. *Publisher is not responsible for any omission or error though every care has been taken while preparing, printing, composing and proof reading of the Book. As all the Composing, Printing, Publishing and Proof Reading etc. are done by Human only and chances of Human Error could not be denied. If any reader is not satisfied, then he is requested not to buy this book.*
5. *In case of any dispute whatsoever the maximum anybody can claim against NEERAJ PUBLICATIONS is just for the price of the Book.*
6. *If anyone finds any mistake or error in this Book, he is requested to inform the Publisher, so that the same could be rectified and he would be provided the rectified Book free of cost.*
7. *The number of questions in NEERAJ study materials are indicative of general scope and design of the question paper. However, the actual question paper might somewhat vary in its contents, distribution of questions and their level of difficulty.*
8. *Sample Question Paper given in this Book provides you just the approximate pattern of the actual paper and is prepared based on the memory only.*
9. *Subject to Delhi Jurisdiction.*

© **Reserved with the Publishers only.**

Spl. Note : *This book or part thereof can not be translated or reproduced in any form (except for review or criticism) without the written permission of the publishers.*

How to get Books by V.P.P. ?

If you require NEERAJ® BOOKS by post then please send us Rs. 100/- as advance money by BANK DRAFT and the books would be sent to you by V.P.P. Please write your Complete Address along with the Order for Books giving the Class, Course Code, University/Board and also the Medium/language of book and send it to the address given below. This will help us in sending your required NEERAJ® BOOKS to you at the earliest.

23260329
55817881
Fax : 011-23285501

NEERAJ PUBLICATIONS
(Publishers of Educational Books)
1507, 1st Floor, NAI SARAK, DELHI - 110 006
E-mail : **info@neerajbooks.com** *Website :* **www.neerajbooks.com**

CONTENTS

INTERNET CONCEPTS AND WEB DESIGN

✦✦✦

Sample Preview of The Chapter

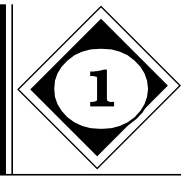
Published by:

NEERAJ PUBLICATIONS

www.neerajbooks.com

INTERNET CONCEPTS AND WEB DESIGN

The Internet



Neeraj Publications www.neerajbooks.com

INTRODUCTION

The Internet is a network of computer network. The Internet is a global network of computer network which are connected to each other through communication links such as cables, telephone lines and satellites and communication devices that make communication possible among them. There are many major networks connected to Internet. Some of them are ARPANET, NSFNET, NASANet, NICnet, DECnet etc.

Internet has made our work fast and easy as it provides facilities like on-line meeting with acknowledgement, sharing of ideas, online distant learning and education and many more. But the power of Internet lies behind World Wide Web (WWW) - a part of Internet, which stores a vast amount of information distributed over millions of Web servers (computers on WWW with large storage capacity and high speed processing power) all over the world. On each Web server information is stored in the form of HTML (Hypertext Markup Language) files. An HTML file can store text, sounds, images, videos and animation, which are different forms of information.

TCP/IP is a set of protocols that follows OSI reference model standards, it allows heterogenous networks and systems to be interconnected and work together to exchange their data and information. In TCP/IP suit of protocols, apart from TCP (Transmission Control Protocol) and IP (Internet Protocol), there are a lot of protocols, which will be discussed later on in this chapter.

World Wide Web is based on client/server architecture, where a client requests to server for services and the server provides those services to the client. In general a Web server is a computer that stores Web documents and makes them available to the client. A client is usually a Web browser such as Internet Explorer and Netscape Navigator. Examples of Web server software are Mac HTTP, CERN HTTP, NCSA HTTP, etc.

CLASSIFICATION OF NETWORKS

In the simplest form, data can be transferred between two devices which are directly connected through a communication channel. But, it is not practical for two devices to be directly point to point connected, due to following reasons:

- the devices may be far apart, and
- there may be a set of devices, each of which may require to connect to others at several times.

Solution to this problem is to connect each device to a communication network. Computer networks refer to a set of autonomous systems that permit distributed processing of information.

www.neerajbooks.com

There are different approaches to the classification of computer networks.Our such classification is based on geographical coverage or distance approach. On the basis of distance approach networks can be classified into three classes:

- LAN (Local Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)

1.1.1 Local Area Network (LAN)

A local area network is relatively smaller and owned by private body. It can span over in a maximum radius of 10 kms. to provide local connectivity within a building or small geographical area. In a local area network two or more competing devices are connected by same physical medium, such as a transmission cable. The LANs are distinguished from other kinds of networks by three characteristics:

- Size (Small)
- Transmission speed (10-100Mbps)
- Topology (the physical and logical layout of a LAN)

A wide variety of LANs have been built and installed, but a very few types have become dominant. Ethernet and Token Ring are the two LAN architectures that are widely used. Bridges, repeaters and switches are the network connecting devices used to interconnect LANs to expand the local network or to form larger LANs. A router is a device that can be used to connect a LAN to another LAN or WAN or MAN.

A LAN facilities user to share resources such as data, information, printers, hard disks, etc. within an organization.

1.1.2 Metropolitan Area Network (MAN)

A MAN can be considered as a bigger version of a LAN that can span in a radius of 50 km. and can provide regional connectivity within a campus. It is designed to extend over an entire city. It may be a single network, such as a cable television network or it may be a means of interconnecting a number of LANs into a large network; so that resources may be shared LAN to LAN as well as device to device. For example, a business organization can use a MAN to connect to the LANs in all of its offices throughout a city.

1.1.3 Wide Area Network (WAN)

A wide area network (WAN) is not restricted to geographical area. It may cover a geographical area of a country or continent. A WAN connects several LANs in a network, which may spread all over the globe. A wide area network interconnects LANs with a device called a router. This unable each LAN to offer its users access to resources stored on other interconnected LANs without compromising its own identity. In other words, a router interconnects them, without condensing them into just one big LAN. But, repeaters are needed to support the extension of WAN facilities across great geographic distances. The data transfer rate of WANs is relatively slower than LANs. Transmission rates are typically 2 Mbps, 34Mbps, 155Mbps, 1625Mbps or more.

Public switched networks, banking networks, military networks, large corporate networks, stock brokerage networks and airline reservation networks are a few examples of WANs. Internet is also an example of WAN.

1.2 Networking Models

ISO (International Organization for Standardization) developed the OSI (Open System Interconnection) reference model to facilitate the open interconnection of computer systems. An open interconnection is one that can be supported in a multi-vendor environment. OSI reference model is a networking model that established a global standard for defining the functional layers required to support such a connection between computers.

The purpose of OSI reference model is to open communication between devices without requiring changes to the logic of the underlying hardware and software. The OSI reference model is not a stack of protocols; it is a network model for understanding and designing a network model that is inter-operable, flexible and robust. TCP/IP model is a network model that follows OSI reference model standards.

The OSI reference model categories the various processes that are needed in communications session into seven distinct functional layers. These seven layers are organized on the natural sequence of events that takes place during a communications session. The seven layers of OSI reference model from top-to-bottom are as follows:

1. Application layers
2. Presentation layer
3. Session layer
4. Transport layer
5. Network layer
6. Data Link Layer
7. Physical layer

Neeraj Publications www.neerajbooks.com

www.neerajbooks.com

www.neerajbooks.com

OSI Model Layers	Layer Number
Application	7
Presentation	6
Session	5
Transport	4
Network	3
Data Link	2
Physical	1

The OSI Reference Model

Layer 1: Physical Layer

The bottom layer of OSI reference model is called Physical Layer. This layer is responsible for the transmission of bit stream. It accepts frames of data from layer 2 (Data Link Layer), and transmits them serially, bit-by-bit. This layer is also responsible for receiving incoming streams of data, bit-by-bit. It does not provide any mechanism for determining the sequence of bits it transmits or receives. It is internally concerned with the physical characteristics of electrical and/or optical signaling techniques. This includes the voltage of electrical current used to transport the signal, the media type, and the physical shape of the connector used to terminate the media.

Layer 2: Data Link Layer

Data Link Layer is the 2nd layer of OSI reference model. This layer has two sets of responsibilities: transmitting and receiving. On the transmit side this layer is responsible for the packing instructions and data into frames. A frame is such a structure to Data Link Layer that contains enough information to make sure that it can be successfully sent across a local area network to its destination. The frame must also contain a mechanism to verify the integrity of its contents upon delivery.

Following are the two things that must happen for guaranteed delivery to occur.

- The sender (Computer) must receive an acknowledgment of each frame received intact by the destination node.
- The destination/receiver (computer), prior to acknowledging receipt of a frame, must verify the integrity of that frame's contents.

The Data Link Layer is also responsible for detecting and correcting damaged or lost data frames during transit. This layer is also responsible for reassembling any binary streams that are received from Physical Layer back into frames.

Physical Layer and Data Link Layer are required for each and every type of communication, regarding of whether the network is a LAN or WAN.

Layer 3: The Network Layer

The Network Layer is responsible for establishing the route to be used between sender and destination computers for commutations. This layer does not have any transmission error detection/ correction mechanism, thus, it relies on the end-to-end reliable transmission service of Data Link Layer. Actually, this layer is used to establish commutations with computer systems that lie beyond the local LAN segment. For this it has its own addressing architecture, which is distinct from Layer 2 machine addressing. IP, IPX and AppleTalk are a few examples of routable protocols (mechanism) that work on Network Layer. Any of these routable protocols is required only when the computer systems reside on different network segments which are separated by a router.

Layer 4: The Transport Layer

The Transport Layer is responsible for the end-to-end integrity of transmissions beyond the local LAN segment. It can detect packets that have been discarded by routers and automatically generate a retransmit request.

This layer is also responsible for re-sequencing of packets that may have arrived out of order. It is capable of identifying the original sequence of packets and put them back into that sequence before placing their contents to the Session Layer.

Layer 5: The Session Layer

The fifth layer of the OSI reference model is called the Session Layer. This layer is responsible to manage the flow of communications during a connection between two computer systems. And, this flow of communications is known as a **session.** It determines whether communications will be uni-directional or bi-directional. It also ensures that one request is completed before a new one is accepted.

Layer 6: The Presentation Layer

The Presentation Layer is responsible for managing encoding of data. When two hosts (Computers) are communicating with each other they might use different data-encoding schemes. And, the Presentation Layer is responsible for providing the translation between incompatible data-encoding scheme, such as ASCII and EBCDIC. This layer is also responsible for data encryption and decryption for security, compression and translation.

Neeraj Publications www.neerajbooks.com

www.neerajbooks.com

www.neerajbooks.com

Layer 7: The Application Layer

The top layer in the OSI reference model is called the Application Layer. This layer provides the interface between network applications and the networks services. The responsibilities of the application layer are:

- File access and transfer
- Mail services
- Remote login etc.

1.2.1 TCP/IP Networking Model

TCP/IP is an acronym for Transmission Control Protocol/Internet Protocol. TCP/IP is a network model that follows the standards defined by OSI reference model. TCP/IP is a set of protocols, applications and services. The TCP/IP model, developed long after the protocol it explains, offers more flexibility than its OSI counterpart because it emphasizes the tier hierarchical arrangement of functions rather than strict functional layering.

There are only four layers in TCP/IP model. Network Access Layer, Host to Host Layer, Internet Layer and Process/Application Layer. These four layers correlate to the seven layers of the OSI reference model without compromising functionality.

A comparative view of OSI reference model and TCP/IP model is shown in Fig 1.2:

OSI Reference Model Layer Name	OSI Layer Number	TCP/IP *Equivalent Layer Name*
Application	7	Process/ Application (4)
Presentation	6	
Session	5	
Transport	4	Host-to-host (3)
Network	3	Internet (2)
Data Link	2	Network Access (1)
Physical	1	

A comparative view of OSI Reference Model and the TCP/IP Model

Layer 4: The Process/Application Layer

The Process/Application Layer provides protocols for remote access and resource sharing. Applications and protocols such as FTP, TELNET, SMTP, HTTP and many others all reside and cooperate in this layer and depend on the functionality of the underlying layers.

Layer 3: The Host-to-Host Layer

The TCP/IP model's Host-to-Host Layer correlates to the OSI reference models Session and Transport layers. This layer consists of two protocols: TCP (Transmission Control Protocol) and UDP (User Datagram Protocol)

TCP provides a connection oriented data transmission between two or more hosts. It performs flow and error control and reordering of packets. It can support multiple data streams.

UDP corresponds to Transport Layer of OSI reference model and provides connectionless data-transmission, and so it is unreliable. It is useful for applications that do not require flow control, acknowledgements and recording of data packets, but a faster communication.

Layer 2: Internet Layer

The Internet Layer includes all protocols and procedures that are necessary to unable data communications between hosts to transfer multiple networks. The Internet protocol (IP) is responsible to make the data-packets routable. This layer does not provide any of the acknowledgements, flow-control and segmenting mechanism. The Internet layer supports many route management functions. It also provides mechanisms for resolving layer 2 addresses into layer 3 addresses and vice-versa.

1.4 What is Packet Switching?

In a WAN, two computing devices are not connected directly. A network of switching nodes provides a transfer path between two devices. The process of transferring data blocks from one node to another is called **data switching**. There are three switching techniques commonly employed and they are: **Circuit switching**, **Message switching** and **Packet switching**.

Packet switching is a switching technique in which data to be transmitted is broken into many small segments called *packets.* Each packet may be sent to its destination separately. Each packet to be transmitted is stored by the first switching node it meets in the network and is forwarded to the next and subsequent downstream nodes until it reaches the destination. The length of a data packet is limited in a packet switched network. Typical maximum length of packets is between 128 bytes to 4096 bytes. There are two approaches to packet switching.

- Datagram, and
- Virtual circuit

Neeraj Publications www.neerajbooks.com

www.neerajbooks.com