Communication Using Internet

5.0 Introduction

In 1969, the US Department of Defense started a project to allow researchers and military personnel to communicate with each other in an emergency. The project was called ARPAnet and it is the foundation of the Internet. Throughout the 1970's, what would later become the Internet was developed. While mostly military personnel and scientists used it in its early days, the advent of the World Wide Web in the early 1990's changed all that. Today, the Internet is not owned or operated by any one entity. This worldwide computer network allows people to communicate and exchange information in new ways.

5.1 Objectives

In this chapter we will learn about:

1. Networks – LAN and WAN
2. Concept of Internet
3. Applications of Internet

5.2 Basics of Computer Network

A network is made of two or more computers connected to each other. Depending on the size of the network, i.e. the number of computers connected and the average distance between them, there can be two types of network:

1. Local Area Network (LAN)
2. Wide Area Network (WAN)

5.2.1 Local Area Network (LAN)

It connects network devices over a relatively short distance like in a single building or campus. LANs are typically owned, controlled and managed by a single person and organization.

5.2.2 Wide Area Network (WAN)

A WAN provides long distance transmission of data, voice, image and video information over large geographical areas that may comprise a country, continent, or even the whole world.

5.3 Internet

5.3.1 Concept of Internet

The Internet can be defined as a network of globally connected computers that is decentralized by design. A network is a collection of inter-connected computers. The Internet can also be referred to as a network because it is a collection of millions of computers. These computers may be situated in any part of the world. When we

say that the Internet has a decentralized design, we mean that there is no centralized body that controls the way in which the Internet functions. Each computer connected to the Internet is called a host. The operator/ user of a particular host can choose from the millions of available Internet services and can also make services available through the Internet.

When we talk of so many computers and other devices communicating with each other, there must be some rules and regulations defined to do so. These rules, followed by two devices to communicate with each other, are called protocols. The commonest form of internet, the Ethernet, uses TCP/IP protocol. TCP/IP is actually a protocol suite, i.e. group of protocols, consisting of TCP (Transmission Control Protocol) and IP (Internet Protocol) protocols.

TCP/IP Protocol Layers
Like most networking software, TCP/IP is modeled in layers. This layered representation leads to the term protocol stack, which refers to the stack of layers in the protocol suite. By dividing the communication software into layers, the protocol stack allows in ease of implementation and code testing, and the ability to develop alternative layer implementations. Layers communicate with those above and below via concise interfaces. In this regard, a layer provides a service for the layer directly above it and makes use of services provided by the layer directly below it. These layers include:

1. **Application Layer**:   The application layer is provided by the program that uses TCP/IP for communication. An application is a user process cooperating with another process usually on a different host. Examples of applications include Telnet and the File Transfer Protocol (FTP).
2. **Transport Layer**: The transport layer provides end-to-end data transfer by delivering data from an application to its remote peer. Multiple applications can be supported simultaneously. The most used transport layer protocol is the Transmission Control Protocol (TCP), which provides connection-oriented reliable data delivery.
3. **Internetwork Layer**: The internetwork layer, also called the internet layer or the network layer, provides the "virtual network" image of an internet (this layer shields the higher levels from the physical network). Internet Protocol (IP) is the most important protocol in this layer. IP provides a routing function that attempts to deliver transmitted messages to their destination. A message unit in an IP network is called an IP datagram. This is the basic unit of information transmitted across TCP/IP networks.
4. **Network Interface Layer**: The network interface layer, also called the link layer or the data-link layer, is the interface to the actual network hardware. In fact, TCP/IP does not specify any protocol here, but can use almost any network interface available.

5.3.2 Applications of Internet
Internet enables us to connect to different types of information networks and exchange information. Some of the applications of Internet are:

- Communication via e-mail, chat and Instant Messaging (IM) tools
- Research
- Job Searches
- Shopping
- Entertainment
- Tutorials and study materials

- Business Development

5.3.3 Connecting to the Internet

To connect to the internet, you must have access to the following resources:

1. **Computer System** – A Processor with 400 MHz or faster speed is recommended, With Windows 95/98 at least 48 MB of RAM and more will help increase the computer's speed for faster Internet cruising. A Sound Card and Speakers also are recommended so one can hear the audio information on the Internet.
2. **Modem** – Computer and other electronic devices work with digital signal while the cable used for networking uses analog signal. Modem converts digital signal to analog and vice-versa.
3. **Internet Service Provider (ISP)** – ISPs are organizations that allow users to dial into ISP computers (for a fee) to connect to the ISP's Internet link. ISPs generally provide an Internet connection and an e-mail address.
4. **Software** – The software or application needed to access internet is called web browser or Internet browser.

5.3.4 Troubleshooting

Losing access to one's e-mail and favorite Web sites can be as frustrating as picking up a dead telephone receiver. Although the problem may lie with the ISP, it's worth knowing how to troubleshoot user's own end of the line, too.

Instructions

1. Make sure that the cable is correctly connected to both a phone line and user's modem and that, when user is using an external modem, it's connected to the PC.
2. If modem is internal, skip this step. Unplug the power cord from modem and shut down user's computer. Plug the modem back in and restart the computer.

Connection Refusal by ISP

1. Make sure regarding that username and password are correct. These are usually entered through a connection program provided by the ISP.
2. Check whether the host name and domain name information are correctly entered in the TCP/IP settings. This information will be supplied by ISP.

Problems in Loading Web Pages or Sending E-mail

1. Call ISP's support number to find out if the user has been affected by a service outage.
2. Unplug the power from modem for at least 10 seconds, shut down the computer, plug the modem back in and restart the computer.