

3 The Internet and the electronic mail

The chapter concerns the following;

- Internet operation
- Internet services
- Searching information
- Uniform Resource Locator-URL
- IP addresses
- Domain name
- Domain name server
- Protocol
- Electronic mail
- Video conference
- Social networks

3.1.1 Introduction of the Internet

The Internet is a collection of computer networks around the world. It is the fastest available way to share information with the world community (Information super highway). With the use of Internet today, the whole world has become a global village. The Internet, which renders such a big service, does not possess a single owner and a non profitable organization called "The Internet Society" is in charge of the ethics and principles related to the use of the Internet and the protocols which maintain Internet operations. When you access the Internet from your computer, it also becomes a computer which belongs to the Internet. Then it is possible for you to obtain any information related to any subject you need.



3.1.2 Let us examine what URL is

Information which helps us to improve our knowledge is a very important resource. Among the avenues of obtaining information, the Internet is the most powerful. To transmit this information among the computers in the Internet, the protocol called HTTP (Hypertext Transfer Protocol) is used. Further, the Internet contains a huge amount of information. The main server which provides this information is the World Wide Web (WWW). Therefore, the information in the World Wide Web is included in web sites. Thus, the system used to uniquely identify various resources in web sites is the Uniform Resource Locator (URL).

Let us identify parts of a URL

For example, let us consider the URL given below.

<http://www.edupub.gov.lk/e-books/english/ict.pdf>

We can separate the parts here as given below.

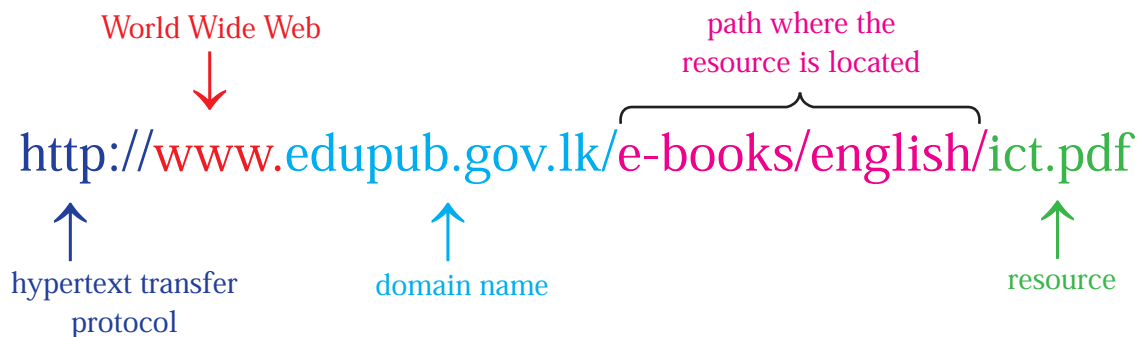


Figure 3.1 - Uniform Resource Locator

Note: In a Uniform Resource Locator, it is a must to have, from HTTP protocol to Domain name.

Given below are some URL related to the field of Education.

| | |
|---|---------------------------------------|
| http://www.moe.gov.lk | - Ministry of Education |
| http://www.nie.lk | - National Institute of Education |
| http://www.doenets.lk | - Department of Examinations |
| http://www.edupub.gov.lk | - Educational Publications Department |

3.1.3 What is an IP address?

Internet Protocol (IP) addresses are used to individually identify all the computers in the Internet. The IP address is indicated in four values from 0 to 255 separated by a decimal point. This is called Dotted Decimal Notation.

Example 172.64.85.42
 193.213.78.154

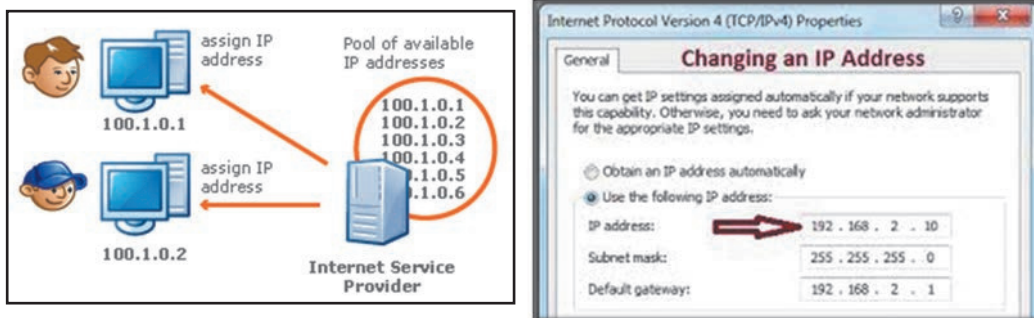


Figure 3.2 - Using IF addresses to identify computer in the internet

These IP addresses are given by an Internet Service Provider (ISP). An Internet Service Provider is a company and it provides internet and Electronic mail facilities. For this, the company charges the required fees.

3.1.4 What is a domain name?

Let us consider the domain name edupub.gov.lk of the Uniform Resource Locator given above. Here gov represents the government and lk represents Sri Lanka. Thus, lk domain which comes after gov domain is the higher domain name. Domain name gives an identity like this to all the websites which exist in the Internet.



Given below are the names used to represent the fields which the domains belong to.

| Domain | Meaning |
|--------|------------------------------|
| com | Commercial |
| org | Non profitable organizations |
| gov | Public |
| edu | Education |
| net | Web |

The following country domains are used to represent the country related to the domain.

| Domain | Meaning |
|---------------|----------------|
| in | India |
| au | Australia |
| Japan | jp |
| uk | United Kingdom |
| United States | us |

The domain at the right - most corner of a domain name is called the Top Level Domain.

Example

| URL | Domain Name | Top Level Domain |
|--|---------------|------------------|
| http://www.google.com | google.com | com |
| http://www.edupub.gov.lk | edupub.gov.lk | lk |
| http://www.nie.lk/pages/syllabus.asp | nie.lk | lk |
| http://www.unicode.org/consortium/consort.html | unicode.org | org |

3.1.5 How the internet work

Humans, being different from computers, have difficulty in retaining lots of similar numbers in mind. Working with names is much easier for them and cause less errors. That is why we rarely see the numbers as URLs on the Internet. When a URL is entered to the browser to view a website, the request must first be translated from the readable written address into an IP address that can be routed. This translation is done by the Domain Name System (DNS).

If a request is made to connect to certain website, for example www.yahoo.com, the request is first sent to the DNS server to translate into the correct IP address of 209.191.122.70. The actual connection to the website is done with this IP address. This process happens behind the screen quickly that the user does not notice.

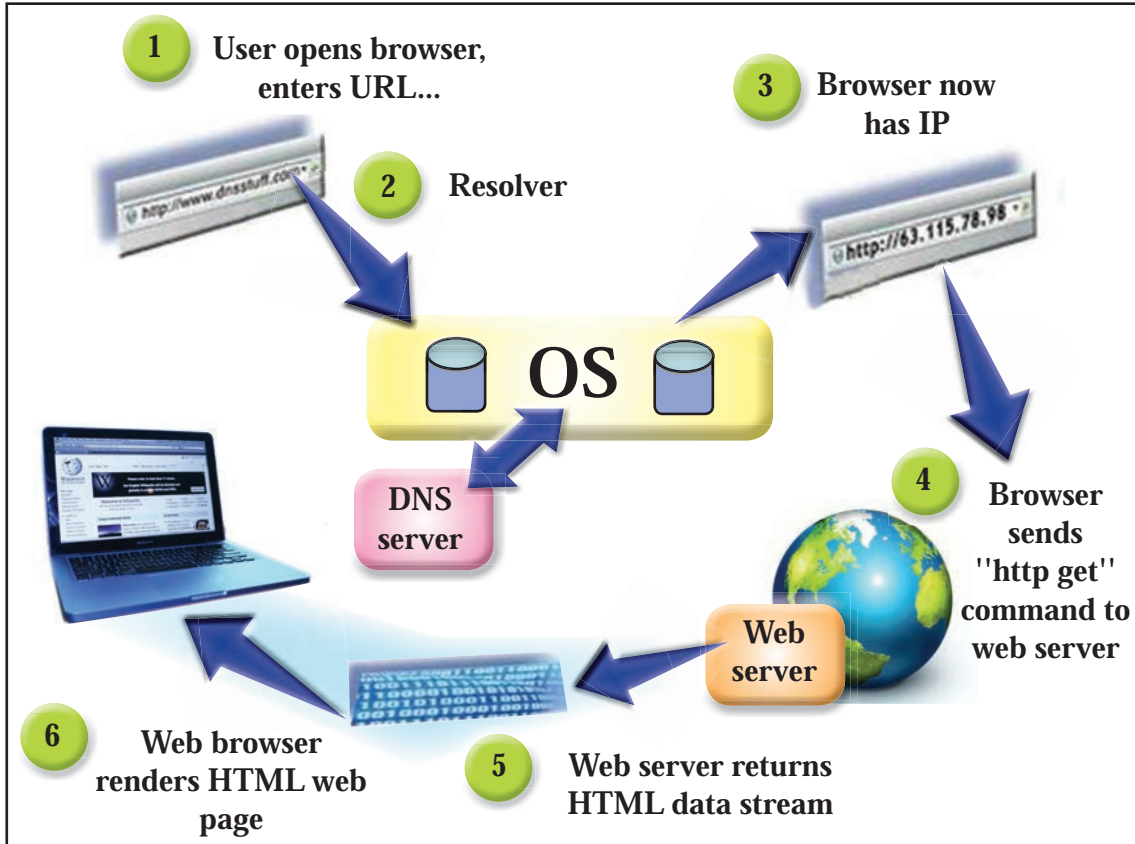


Figure 3.3 - Process how Internet operations are executed

The Internet, which does not possess any owner, is controlled by protocols. A protocol can be seen on a system of law operated in computer networks. Following are some protocols used in the Internet.

HTTP - Hypertext Transfer Protocol

TCP/IP - Transmission Control Protocol / Internet Protocol

FTP - File Transfer Protocol

SMTP - Simple Mail Transfer Protocol

ICMP- Internet Control Message Protocol

| Protocol | Usage |
|----------|--|
| HTTP | HTML document exchange |
| TCP/IP | Controlling the exchange of IP addresses |
| FTP | File exchange |
| SMTP | Electronic mail exchange |
| ICMP | Informing and controlling messages when there are errors |

The Internet is a Wide Area Network (WAN) which is based on a Client Server Model. Hence, all the computers in internet belong either to the type of servers or clients.

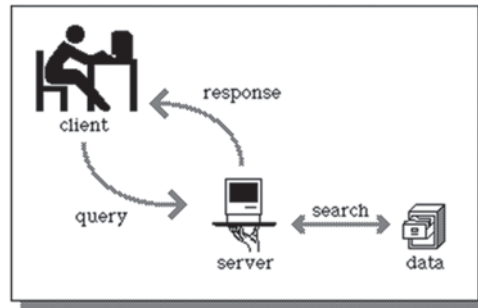


Figure 3.4 - Client server architecture in the Internet

The computer that distributes the resources required by the client computer is called the "server".

The activity of retrieving information from the server computers to client computers is called "downloading".



The activity of providing information from client computers to server computers is called "uploading".



Hence, transfer of information between server and client computers is two-way.

Let us identify some Internet server computers.

Web Server - Storing web pages and providing these to the client computers

Mail Server - Storing electronic mail and providing them to the client computers

DNS Server - translating URL to IP addresses

3.1.6 Services of the Internet

The following are some of the services of the internet;

1. World Wide Web - WWW
2. Electronic Mail - e mail
3. File Transfer Protocol
4. Remote Access
5. File Sharing
6. Streaming of media
7. Search Engines

3.1.7 World Wide Web - WWW

World Wide Web is a service provided by the Internet and it is a large collection of electronic documents saved in computers all around the world connected to the internet.

Sir Tim Berners Lee is considered the father of WWW. A user who uses WWW can access web sites through a Web Browser.

A Web Browser is an application software. Given below are some examples of Web Browsers.

A web site consists of several web pages. There can be written notes, pictures, videos and other multimedia and hyperlinks included in a web page. Use of hyperlinks makes browsing the web sites easy. To access a web site, Uniform Resource Locator – URL (web site address) should be typed on the address bar of the web browser and the 'Enter' key pressed. The page which contains the basic information about the web site is called the 'Home Page'. The other pages of the web site can be accessed through the hyperlinks included in it.

For instance, let us consider the official web site of the Department of Examinations, Sri Lanka.



Figure 3.5 - Web Browsers



Figure 3.6 - Department of Examinations, Sri Lanka

3.1.8 File Transfer Protocol (FTP)

File of smaller size can be sent with an e mail as an attachment. But files with larger capacities cannot be sent in an e mail attachments.

FTP is used to transfer large files of one computer in the Internet to another computer. This protocol is operated on TCP/IP and used to upload files of a client computer to the Internet and to download files from server computers in the Internet.

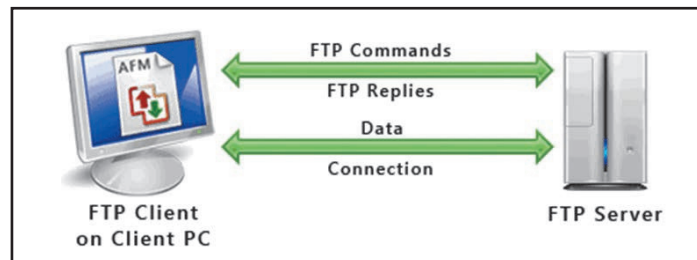


Figure 3.7 - File transfer system

3.1.9 Remote Access

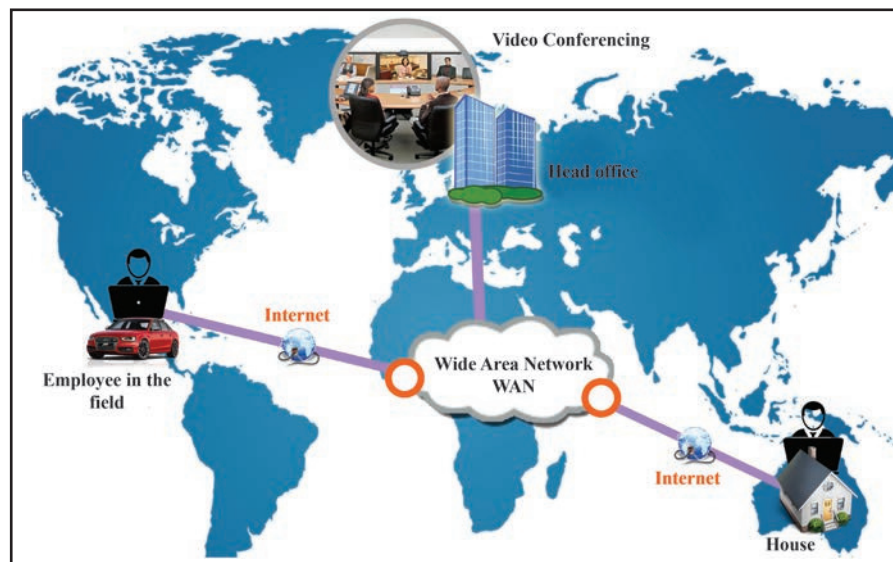


Figure 3.8 - Remote access

Controlling and operating a computer in the Internet remotely is performed through remote access. Following are certain functions which can be performed through Remote Access after accessing the Internet.

1. Installing software of server computers to client computers.
2. Fixing problems on client computers.

Using remote access functionality sometimes hackers steal important data and information stored on computers without owner's knowledge (This is called hacking).

3.1.10 File Sharing

The main objective of computer networking is to share resources. Such resource sharing includes file sharing. Thus, sharing of various files in the Internet take place often.



Example

1. When you check exam results on line, that file is accessed by a large number of clients at the same time.
2. Thousands of users can be connected to a web site at the same time.

3.1.11 Streaming of Media

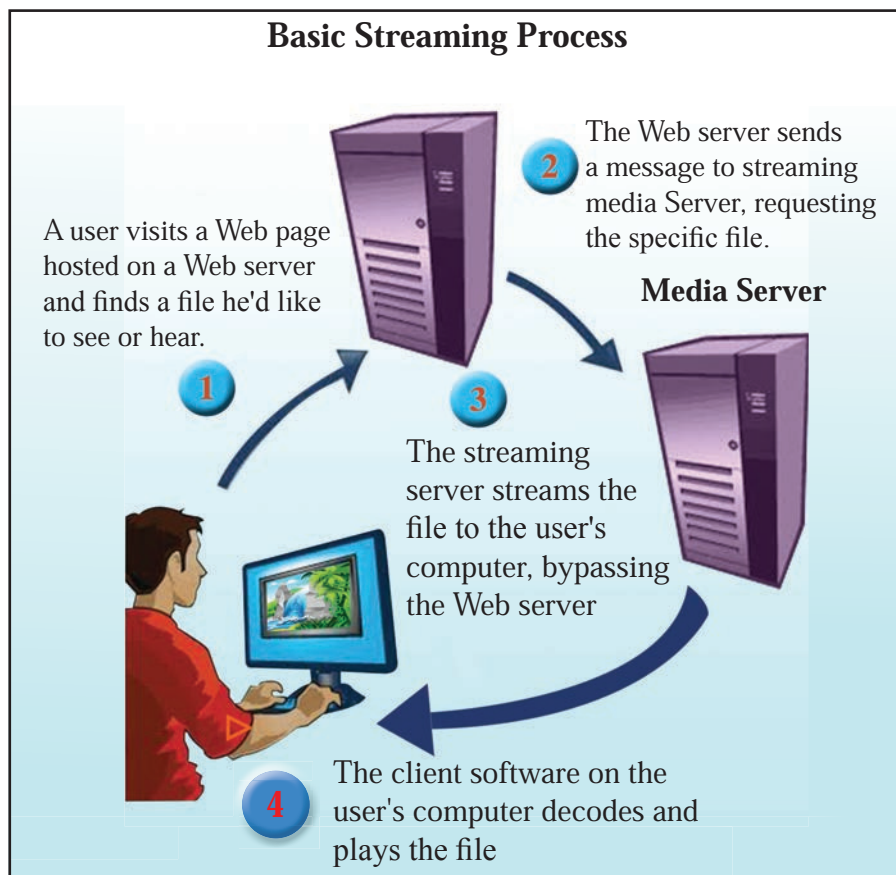


Figure 3.9 - Streaming of media

Internet provides much assistance to share all sorts of information which consists of multimedia such as text, images audio and video. Downloading images, songs and videos etc from the Internet can be considered as an example.

3.1.12 Search Engines

Web sites largely contain information on the Internet. These websites should obtain information. For this, you should know the address (URL) of the web site. However, the unlimited number of websites in the Internet makes it practically very difficult.

Search engines are designed for the Internet users to find any information easily.

After typing the key words in the search box of the search engine and clicking the search button, you will get a large number of web sites with hyperlinks which contain the information you need. You can obtain the necessary information by clicking one or several hyperlinks.



Given below are some examples of search engines used often.

<http://www.google.com> or <http://www.google.lk>

<http://www.yahoo.com>

<http://www.ask.com>

<http://www.msn.com>

3.1.13 Domain Name Server

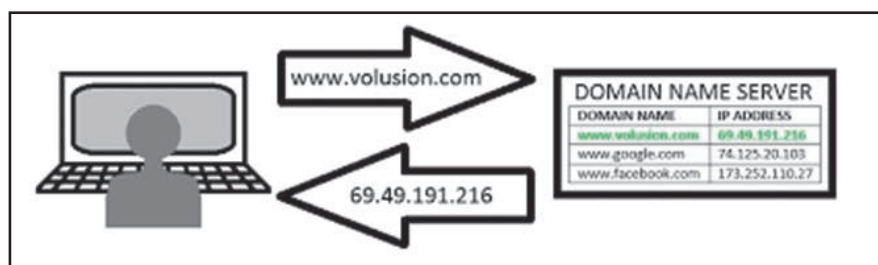


Figure 3.10 - Domain names are converted to IP address by domain server

Domain name is used to uniquely identify a web site. This makes the users remember it somewhat easily. However, an IP address is used to uniquely identify a computer on the Internet. What the Domain Name Server does is converting the domain name to an IP address.

3.2 Using Internet for communication

3.2.1 Electronic Mail

Electronic mail enables exchanging messages as electronic mails or files between two or more people. There are several organizations which provide e mail service free of charge through the Internet. Hence, the cost is only for the use of the Internet. This is the cheapest and fastest communication method in the world.

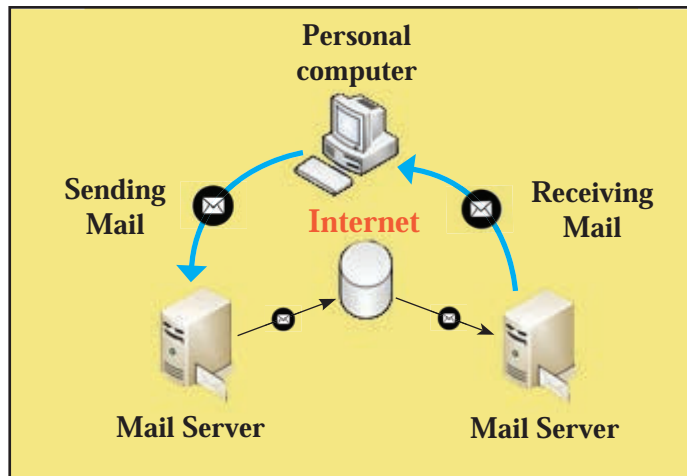


Figure 3.11 - Exchange of e mails in the Internet

Any person in the world can create an electronic mail account through the Internet and this can be used to identify this person within the internet.

An electronic mail address takes the form as follows.

Let us consider the email address of the Department of Examinations, Sri Lanka for instance.

exams@doenets.lk

↑ ↑

User name Domain name

Here, exams is the user name and doenets.lk is the domain name. @ symbol separates the user name and the domain name.

It is essential for the sender as well the receiver to have email accounts.

An electronic mail account should be created before using an electronic mail. The web sites which provide electronic mail services on the Internet provide facilities free of charge. It is essential for an electronic mail (e mail) account to have an email address and a password. The email account should be opened to send mails or to check the received mails. User name and password should be entered accurately for this and then click 'Sign In'.

Sign in to your account

Username

Password

☐ Keep me signed in

Sign In

Sending an email

Sending an e mail can be performed in the following manner.

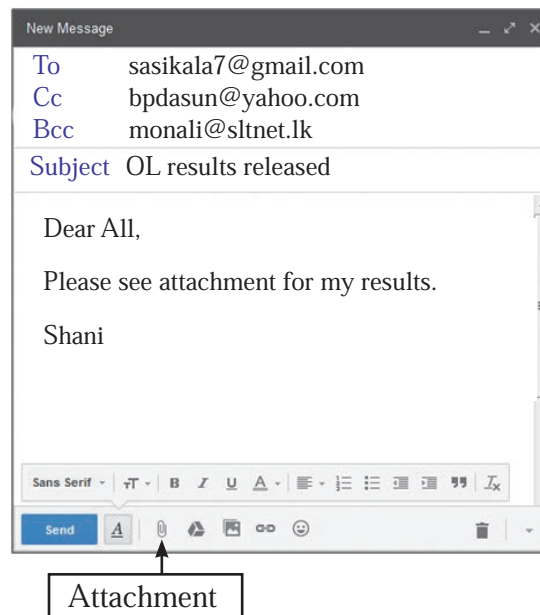


Figure 3.12 - sending an e mail

- Type the receiver's email address in To (sasikala7@gmail.com)
- Type the email address of the others (bpdasun@yahoo.com) who should receive the copies of the email in Cc (Carbon copy)
- Type the email addresses of those who should receive the mail without the awareness of those receivers typed

TO: Primary Addressee(s)
All recipients can see list

CC: Secondary Addressee(s)
All recipients can see list

BCC: Tertiary Addressee(s)
No recipients can see list

under To and Cc in Bcc (Blind carbon copy). Those who receive Bcc copies can view all the receivers of the mail. However, the receivers typed under To and Cc cannot view the receivers of Bcc copies (monali@sltnet.lk)

- The person who receives Bcc copy (monali@sltnet.lk), can see all the e mail addresses (sasikala7@gmail.com) and (bpdasun@yahoo.com) that this letter sent. Persons under To and Cc (sasikala7@gmail.com) and (bpdasun@yahoo.com) cannot see the e mail address of Bcc
- Type the title or relevant subject related to the mail in Subject. (O/L results released)
- Attach other file or files which should be sent with the e mail by clicking the attachment button with the paper clip icon. (Results.jpg)
- Send the email by clicking "Send".

e mails are categorized inside an e mail account for easy use.

- Inbox - To store mails received
- Drafts - To store mails that are composed to be sent but could not be completed
- Sent - To store mails sent
- Trash/Deleted - To store mails for a certain period that are deleted
- Spam/Junk - To store mails that are unwanted

Unwanted e mails stored in a separate folder without disturbing the Inbox are known as Spam.

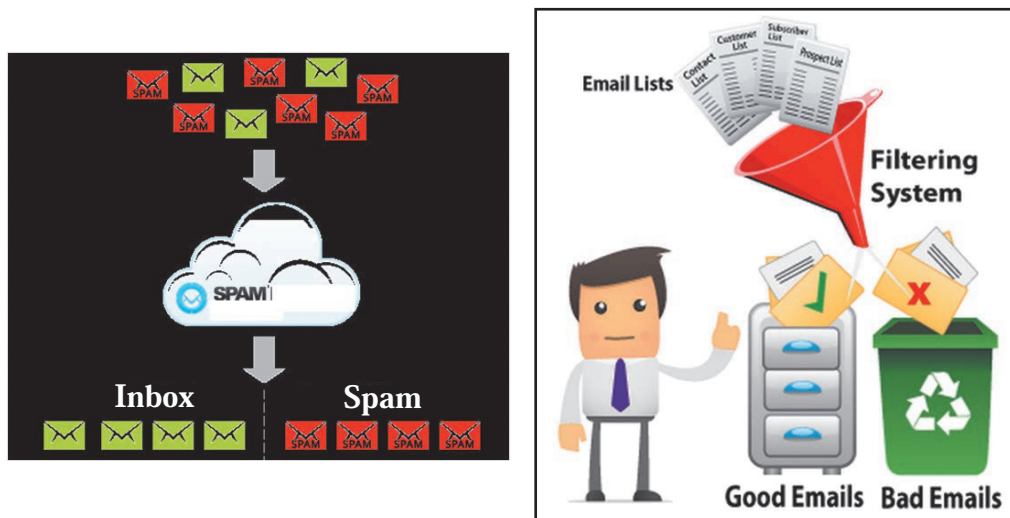


Figure 3.13 - Spam mail

3.2.2 Sending instant messages - IM

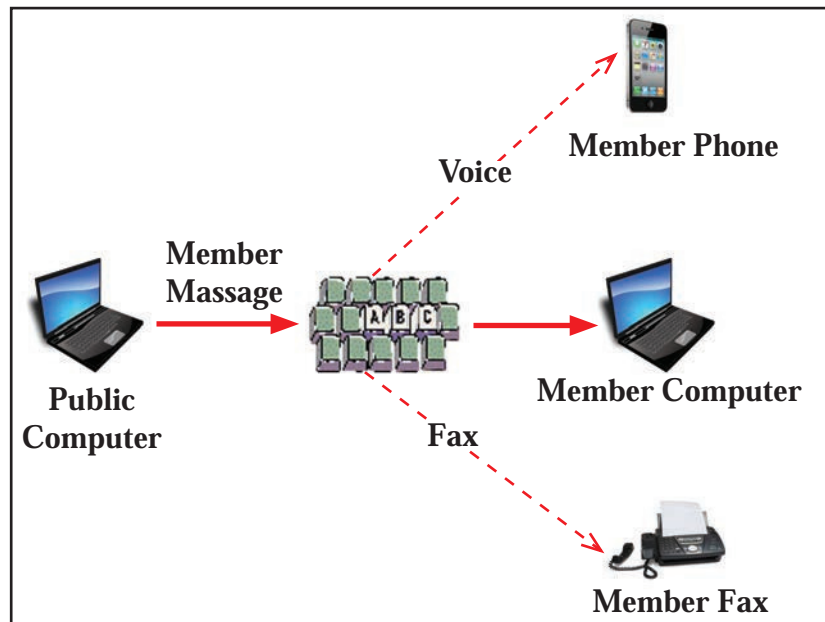


Figure 3.14 - Sending instant messages

Two persons can exchange short messages very fast (chat) over the Internet using the chat facility.

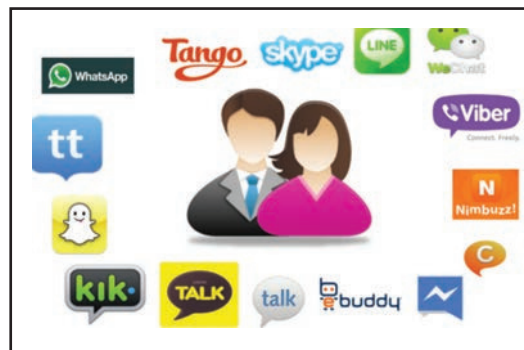


Figure 3.15 - Tools for sending instant messages

3.2.3 Video conference

Video conferencing is conducting a conversation between two or more persons in different (remote) locations using audio and video transmission over computer networks.



The requirements are as follows for a video conference

- Computers
- Web cam
- Internet connection
- Communication software (with audiovisual facilities)

3.2.4 Social Networks

Social networks are, used to maintain social relationships over the Internet.

These social networks facilitate the people to exchange personal details, photographs, videos and daily activities. As a result, social relationships are widened and also can create social issues.

Given below are some examples of social networks.

<http://www.facebook.com>

<http://www.twitter.com>

<http://www.youtube.com>

<http://www.flickr.com>

<http://www.pinterest.com>

<http://www.secondlife.com>



3.3 Cloud Computing

Cloud computing is the concept of using computer networks including personal computers and mobile devices, to facilitate retrieving and storing information from anywhere at any time.

The main services of cloud computing are

- Infrastructure as a Service-IaaS
- Platform as a Service-PaaS
- Software as a Service-SaaS



Infrastructure as a Service (IaaS)

This provides a virtual environment of servers to provide space to store data and software applications with the help of server computers and also to provide various resources through the use of large data centres established.

E.g. - Obtain the facilities of server space and firewall through cloud computing even though you do not own them

Platform as a Service (PaaS)

This platform provides necessary server environment for software development. This gives facilities including operating system, programming language environment, database and web server.

E.g. - Software can be developed in the cloud computer service even though you do not have installed operating system or compilers in your computer.

Software as a Service (SaaS)

This provides software installed in cloud without installing the software required by the user.

This reduces the cost and complexity of buying and managing hardware and developing software needed for software by the user.

E.g. - In Android devices, word processing software, spreadsheet packages etc that can be used not by installing them in the device but using a web browser.

Advantages and Disadvantages

| | |
|----------------------|---|
| Advantages | <ul style="list-style-type: none">• Lower software cost• Improve performance• Fewer maintenance issues• Instant software updates |
| Disadvantages | <ul style="list-style-type: none">• Requires a constant Internet connections• Does not work well in low speed Internet connections |

Activity



1. Match A and B columns

| A column | B column |
|--------------------------|---------------------------------------|
| e mail address | doenets.lk |
| Domain name | 172.92.83.106 |
| Uniform Resource Locator | somasiri@gmail.com |
| IP address | http://www.nie.lk/syllabus/ol/ict.pdf |

| A column | B column |
|---------------------------|--|
| Web address | Converts domain name into IP addresses |
| A service in the internet | Google |
| Domain name | Mozilla Firefox |
| Search engine | World wide web |

Summary

- Uniform Resource Locator (URL) helps identify resources available in the web sites uniquely.
- IP addresses help identify every computer in the Internet uniquely.
- To identify a web site, the domain name is used.
- Domain name server transforms the domain name into an IP address.
- All processes in the internet are done by protocols.
- World Wide Web and e mail are some of the main services provided by the Internet.
- To view the web pages, web browsers are used.
- Search engines are used to find information in the Internet.
- e mail is the fastest and the cheapest method of communication.
- An e mail address is unique.
- Instant messages, video conferencing and social media are also used in communication.