Chapter 10 : Fundamentals of Internet

10.0 Overview

Q : 10-00-01 : Describe brief early history of the Internet ?

Answer :

Internet : In 1969, Advanced Research Project Agency (ARPA) established a small computer network among different universities and defense organizations. The goal was to establish a large computer network that could survive in war times. Initially ARPANET was a wide area network connecting a small number of users. There were only four hosts (A host is a computer that provide services to other computers of the network). But the network grew rapidly and spanned over countries. Meanwhile another research organization, National science foundation, joined the project. NSF established five supercomputing centers which were available to all researchers for academic purposes. To provide high speed access to supercomputers, NSF established a separate high speed network called NSFnet. During this period, some other small networks had also been established among various universities and organizations. The authorities decided to link ARPANET, NSFnet and other small networks so that they can communicate each other. This link among different networks is referred to as the Internet.

10.1 How the Internet Works ?

Q : 10-01-01 : Describe how Internet Works ?

Answer :

How the Internet Works ?

The Internet is a huge collection of millions of computers, all linked together on a computer network. The network allows all of the computers to communicate with one another. A home computer may be linked to the Internet using a phone-line modem, DSL or cable modem that communicates to an Internet Service Provider (ISP). A computer in a business or university will usually have a Network Interface Card (NIC) that directly connects it to a Local Area Network (LAN) inside the business. The business can then connect its LAN to an ISP using a high-speed phone line like a T1 line. A T1 line can handle approximately 1.5 million bits per second, while a normal phone line using a modem can typically handle 30,000 to 50,000 bits per second. ISPs then connect to larger ISPs, and the largest ISPs maintain Fiber-Optic "**backbones**" for an entire region. Backbones around the world are connected through fiber-optic lines, undersea cables or satellite links. In this way, every computer on the Internet is connected to every other computer on the Internet.

10.2 Addressing Schemes

Q : 10-02-01 : Describe Addressing Scheme ? Explain the two types of Addressing Schemes ?

Answer :

Addressing Scheme : The purpose of the Internet is to establish communication between widely spread computers. Computers can send and receive data to each other. Any computer may initiate a transaction at any time. For this reason the source machine (computer) must have a unique identification of the destination computer. On the Internet every computer has a unique address and can be contacted on this address. There are two types of addressing schemes recognized on the

Internet, these are :

IP Addressing : To keep all of these machines straight, each machine on the Internet is assigned a unique address called an IP address. IP stands for Internet Protocol, and these addresses are 32-bit numbers, normally expressed as four "octets" in a "dotted decimal number." A typical IP address looks like this : 216.27.61.137.

The four numbers in an IP address are called octets because they can have values between 0 and 255, which are 2^8 possibilities per octet. Every machine on the Internet has a unique IP address. A server has a static IP address that does not change very often. A home machine that is dialing up through a modem often has an IP address that is assigned by the ISP when the machine dials in. That IP address is unique for that session; it may be different the next time the machine dials in. This way, an ISP only needs one IP address for each modem it supports, rather than for each customer. As far as the Internet's machines are concerned, an IP address is all you need to talk to a server. For example, in your browser, you can type the URL **http:// 216.27.61.137** and arrive at the machine that contains the Web server for the specified IP-Address.

DNS Addressing : Because most people have trouble remembering the strings of numbers that make up TP addresses, and because IP addresses sometimes need to change, all servers on the Internet also have human-readable names, called domain names. For example, www.hotmail.com is a permanent, human- readable name. It is easier for most of us to remember it than it is to remember an IP Address. The name www.hotmail.com actually has two parts, a host name and domain. The domain represents the institution which uses the address. These domain names are called top-level domain. Following is a list of top level domains :

Domain	Type of Institution
.com	Business (Commercial)
.edu	Educational Institutes
.gov	Government Organizations
.mil	Military Organizations
.org	Other Organizations (non profitable)

Important Note : Some large organizations divide their top level domain into sub domains. This lets them organize their web references.

10.3 Web Browsing

Q : 10-03-01 : Explain Web Browsing ?

Answer :

Web Browsing : Searching information on the World Wide Web is referred to as Web browsing. A software known as Web browser is used to search and view web pages. Hundreds of thousands of web pages are available on the World Wide Web that covers information on almost every topic.

Q : 10-03-02 : Explain World Wide Web (WWW) ?

Answer :

World Wide Web (WWW) : The World Wide Web was launched in 1 989 at the European Particle Physics Laboratory in Geneva, for adding footnote, and cross references in hypertext documents. The www uses http (hyper text transfer protocol) to link hypertext documents (web pages) on the World Wide Web. A web page is a document that is written in HTML (Hypertext Markup Language), in addition to simple text certain tags of HTML are included in the document. The language allows embedding hyperlinks (or simply link) in the document. A hypertext document is also called a Web

Page. A collection of related web pages is called a Web site. Web sites are hosted on server computers on the Internet. These computers are called Web Servers. The process of launching web page is called publishing the page.

Q : 10-03-02 : Explain URL (Uniform Resource Locator) ?

Answer :

URL (Uniform Resource Locator) : Every page has a unique address on World Wide Web. This is called Uniform Resource Locator (URL). If you want to access a web page on the World Wide Web, **you** will have to specify the URL of the required page in the web browser. The general format of the URL is :

"type://address/path/"

The type specifies the type of the server on which the page is hosted, address specifies the address of the server and **path** is the path of the page on the disk of the server e.g. http://www.yahoo.com/ .

Q : 10-03-02 : Explain Search Engine ?

Answer :

Search Engine : A website that uses powerful data searching techniques to help the user locate web sites containing specific types of contents or information is known as a Search Engine e.g. google.com, ask.com, altavista.com etc. are very popular search engines. Search engines have become very popular all over the world. Millions of people use Search Engines to find out information on various topics. Search Engines maintain a list of billions of web pages containing information on variety of topics. Search engines ask you to enter some key words about the data or information you want to search on the Internet. On the basis of your provided information, search engine traverse the list of web pages it maintain, and finally display the links of the web pages containing required information.

10.4 Email

Q : 10-04-01 : Explain Email ? Describe Limitations of Email ?

Answer :

Email : Email is a system for delivering messages over the Internet. An e-mail sender or recipient can be anywhere in the world. E-mail is the first really popular Internet application; it allows people to hold discussions over great distances.

E-Mail can take as little as *few seconds* to go across a country, or even around the world.

It leaves a written record. You can keep copies of e-mail messages you send and receive, for your record.

To create, send and receive email you need email-program, also called email client. Once you send the message, your computer connects to your **email server** and transmits a copy of your message. Email Server is a host computer on the Internet which keeps track of information about millions of email account holders. The server checks the address you have typed and figures out where the recipient email server is. It connects to that server and transmits another copy of the message. Once the receiving email server has received the message, the recipient is able to retrieve the message when connected to the server. Attachment is a powerful feature of email, which enables you to enclosed additional files with your email. You can attach word processing documents, spreadsheets, programs, images, even audio, to your email messages when using email programs that support the Internet protocol for multimedia attachments i.e. MIME (Multipurpose Internet Mail Extension).

Most email clients allow you attach files to the message. In this way you can send and receive data as well as program files. Attachment size varies from one email service provider to the other e.g. for free email accounts, Yahoo allows a file of size up to 10MB to be attached. This limit varies for paid accounts.

Limitations on Email :

Email is Not Necessarily Private : Since messages are passed from one system another, and sometimes through several systems or networks, there are many opportunities for someone to intercept or read email. Many types of computer systems have protections built in to stop users from reading others email, but it is still possible for a system administrator to read the email on a system or for someone to bypass the security of a computer system.

Some Email Systems can Send or Receive Text Files Only : Even though you can send and receive images, programs, tiles produced by word processing programs, or multimedia messages, some individuals may not be able to properly view your message.

It is possible to Forge Email : This is not common, but it is possible to forge the address of the sender. You may want to take steps to confirm the source of some email you receive.

It is Difficult to Express Emotion Using Email : The recipient does not have the benefit of viewing your facial expressions or hearing your voice. You have to be careful with humor or irony, since it is easy for someone to take your message the wrong way.

You can Receive Too Much or Unwanted Emails : You can receive "junk" email in the same way you receive other types of junk mail. On the Internet, junk mail is called spam. You may have to take active steps to delete the email you receive and try to stop it from being sent to you in the first place.

You may not know about the person with whom you are Communicating : The communication is often in text and it is possible for us to get an incorrect impression of the person sending us email. Also, some people misrepresent themselves.

Q : 10-04-02 : Explain Email Address ?

Answer :

Email Address : To send and receive an email, you must have an email account on an email server. When you open an email account, you are assigned a unique email address. You receive all incoming emails on this account address and send email to others by specifying their email addresses. The general format of an email address is:

10.5 Newsgroups

Q : 10-05-01 : Explain Newsgroups ?

Answer :

Newsgroups : These are discussion groups on the Internet (not on the Web, which is only one area of the Internet). Newsgroups are classified by subject and do not necessarily deal with journalism or "news". Health, hobbies, celebrities, and cultural events are the subjects of many newsgroups. Participants in a newsgroup conduct discussions by posting messages for others to read, and responding to the messages posted by others. Because you have time to think of what to write in a newsgroup posting, the discussions in newsgroups tend to be of a more serious nature, though not necessarily less amusing. You need software to obtain articles from the news server. A news server is

a host computer that exchanges articles with other servers on the Internet. These servers use Network News Transfer Protocol (NNTP) to communicate. To view articles on a specific topic, you need to be subscribed on a news group.

List of ASCII Codes

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Code	Symbol	Code	Symbol	Code	Symbol	Code	Symbol	Code	Symbol	Code	Symbol	Code	Symbol
0	null	37	%	74	J	111	o	148	ö	185	╣	222	▌
1	start of heading	38	&	75	K	112	p	149	ò	186	║	223	▀
2	start of text	39	'	76	L	113	q	150	û	187	╗	224	α
3	end of text	40	(	77	M	114	r	151	ù	188	╝	225	ß
4	end of transmission	41	)	78	N	115	s	152	ÿ	189	╜	226	Γ
5	inquiry	42	*	79	O	116	t	153	Ö	190	╛	227	π
6	acknowledge	43	+	80	P	117	u	154	Ü	191	┐	228	Σ
7	bell	44	,	81	Q	118	v	155	¢	192	└	229	σ
8	backspace	45	-	82	R	119	w	156	£	193	┴	230	µ
9	horizontal tab	46	.	83	S	120	x	157	¥	194	┬	231	τ
10	line feed/new line	47	/	84	T	121	y	158	Pts	195	├	232	Φ
11	vertical tab	48	0	85	U	122	z	159	ƒ	196	─	233	Θ
12	form feed/new page	49	1	86	V	123	{	160	á	197	┼	234	Ω
13	carriage return	50	2	87	w	124	|	161	í	198	╞	235	δ
14	shift out	51	3	88	X	125	}	162	ó	199	╟	236	∞
15	shift in	52	4	89	Y	126	~	163	ú	200	╚	237	φ
16	data link escape	53	5	90	Z	127	DEL	164	ñ	201	╔	238	ε
17	device control 1	54	6	91	[	128	Ç	165	Ñ	202	╩	239	∩
18	device control 2	55	7	92	\	129	ü	166	ª	203	╦	240	≡
19	device control 3	56	8	93	]	130	é	167	º	204	╠	241	±
20	device control 4	57	9	94	^	131	â	168	¿	205	═	242	≥
21	negative acknowledge	58	:	95	_	132	ä	169	⌐	206	╬	243	≤
22	synchronous idle	59	;	96	`	133	à	170	¬	207	╧	244	⌠
23	end of transmission block	60	<	97	a	134	å	171	½	208	╨	245	⌡
24	cancel	61	=	98	b	135	ç	172	¼	209	╤	246	÷
25	end of medium	62	>	99	c	136	ê	173	¡	210	╥	247	≈
26	substitute	63	?	100	d	137	ë	174	«	211	╙	248	≈
27	escape	64	@	101	e	138	è	175	»	212	Ô	249	·
28	file separator	65	A	102	f	139	ï	176	░	213	╒	250	·
29	group separator	66	B	103	g	140	î	177	▒	214	╓	251	√
30	record separator	67	C	104	h	141	ì	178	▓	215	╫	252	ⁿ
31	unit separator	68	D	105	i	142	Ä	179	|	216	╪	253	²
32	space	69	E	106	j	143	Å	180	┤	217	┘	254	■
33	!	70	F	107	k	144	É	181	╡	218	┌	255	□
34	"	71	G	108	l	145	æ	182	╢	219	█		
35	#	72	H	109	m	146	Æ	183	╖	220	▄		
36	$	73	I	110	n	147	ô	184	╕	221	▌		