CHAPTER 9

HIGH SPEED NETWORKS: AN OVERVIEW

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ABSTRACT

Several applications that demand high speed networking are becoming a reality. This paper presents an overview of new developments in the architectures and protocols for high speed networks. Comparisons are given between these architectures and protocols considering some typical guarantees that applications might want.

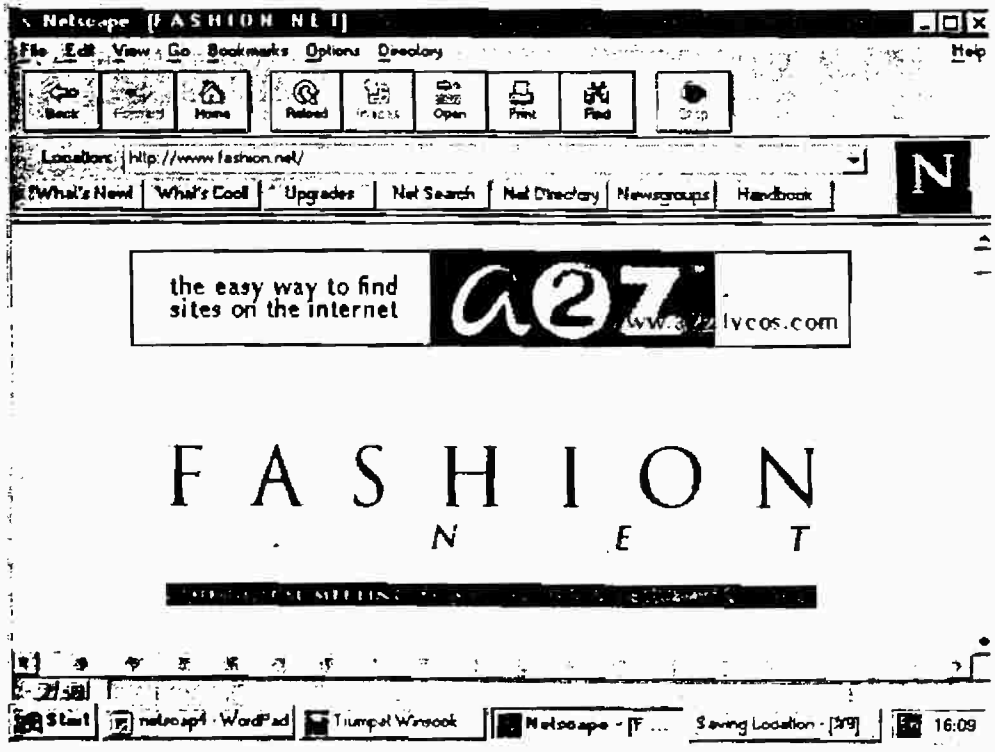
Typical new high speed networks are presented, discussed and compared in the light of the applications requirements.

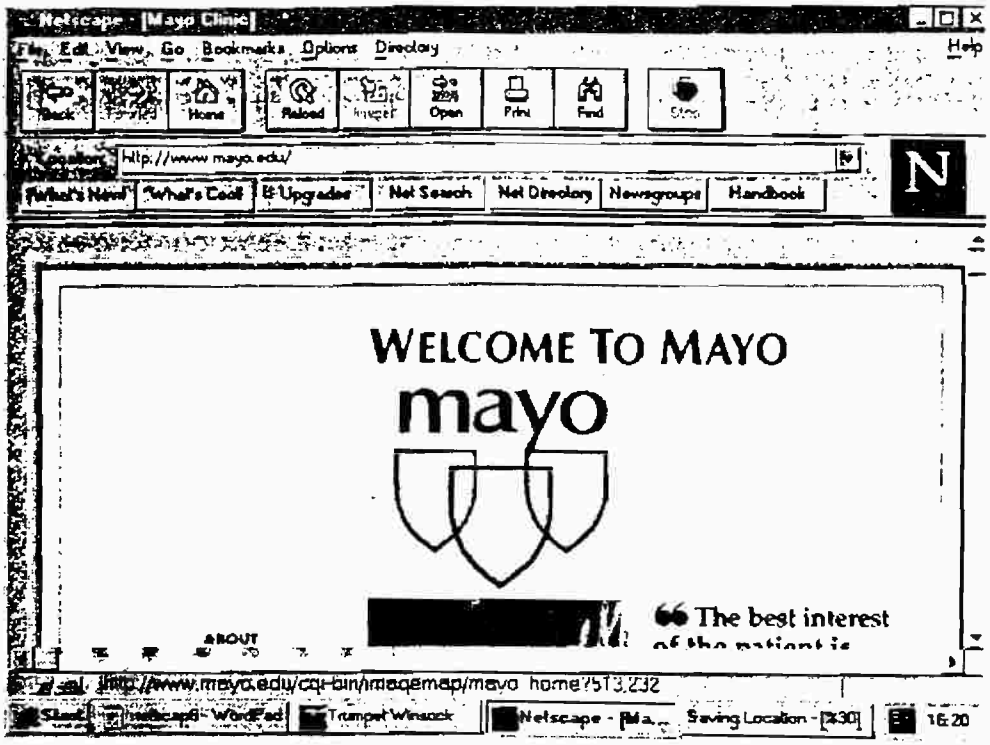
3D Internet Content

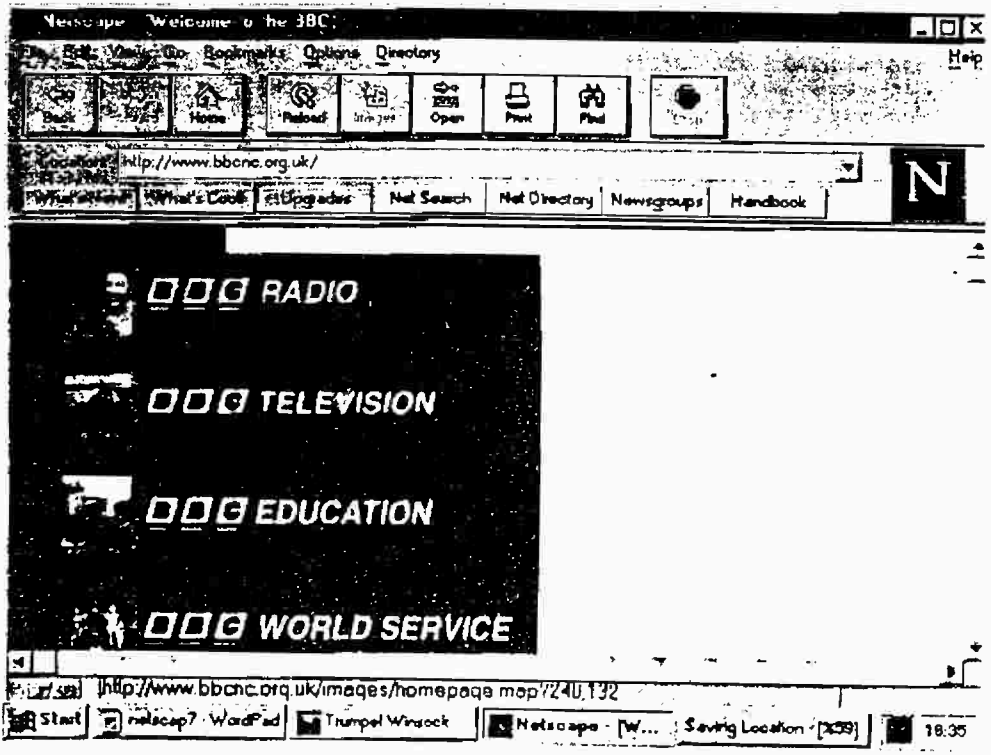
- **VRML (Virtual Reality Markup Language) is used for creation of 3D Internet content, as opposed to the two dimensional content characterised by HTML.**
- **Silicon Graphics has gathered the support of 56 Internet leaders for Moving Worlds, its proposed standard for the second generation of VRML (VRML 2.0).**
- **Navigator 3.0 from Netscape will support streaming audio and video using technology from InSoft Inc. It will also support 3D applications with VRML viewing technology and 3D extensions through Java and JavaScript in technology called Live3D.**
- **VRML manufacturers on the WWW**

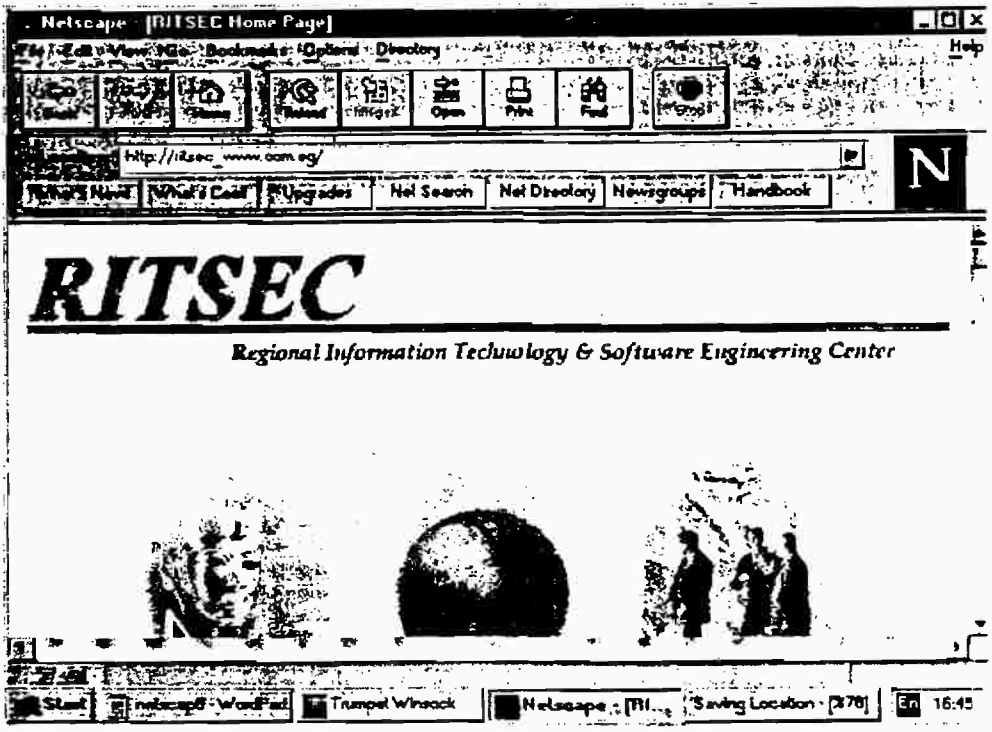
  - **WebFX for Netscape Navigator:ftp://ftp.paperine.com/pub/webfx/windows/16bit/plugin/npwfx16c.exe**
  - **Caligari Fountain: http://www.caligari.com.ftp/pub/fountain.exe**
  - **Silicon Graphics and Template Graphics WebSpace: ftp://ftp.sd.tgs.com/pub/template/WebSpace/Win95/WEBSPC10.exe**
  - **Intervista WorldView: ftp://ftp/webmaster.com/pub/VRML/intervista/win32s,exe**
  - **Chaco Communications VR Scout: ftp:// ftp.chaco.com/pub/vrscout/sc16-110.exe**
  - **VRweb: ftp://ftp.utdallas.edu/pub/Hyper-G/VRweb/Windows/VRW_WIN.ZIP**
  - **Superscape VisNet: http://www.superscape.com**

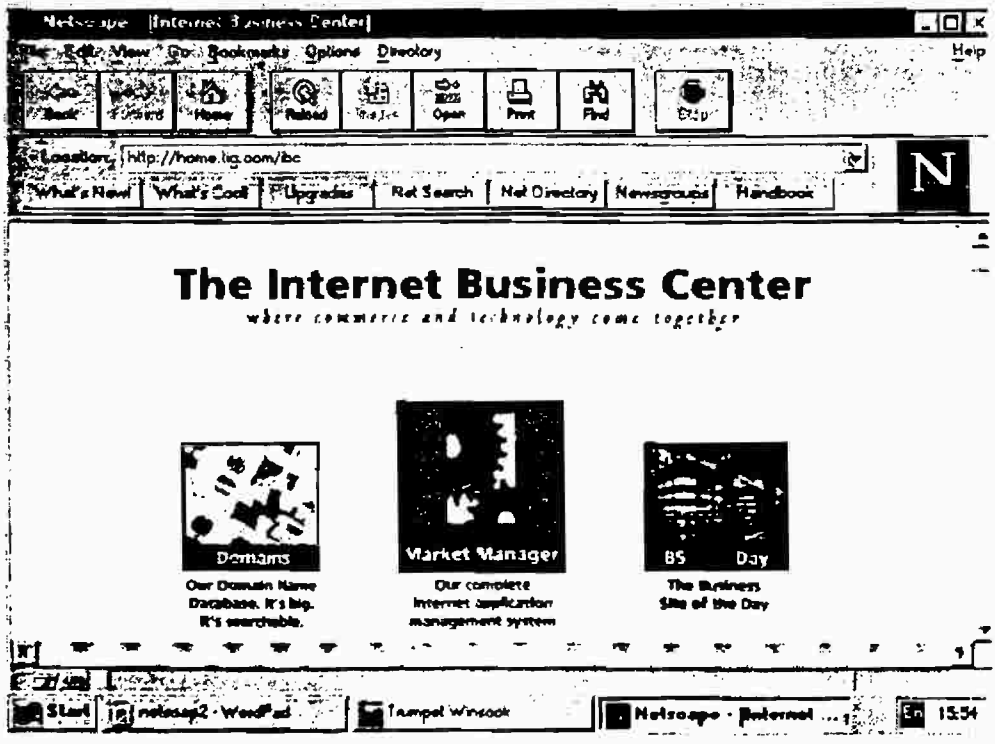
Netscape - [Superscape New Home Page]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://www.superscape.com/index.html
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
SUPERSCAPE
VIRTUAL REALITY SOFTWARE
The World's Most Popular Virtual Reality Software
Download Viscape Now!
Now you can download Superscape's Viscape, the fastest interactive 3-D viewer -- a fully compatible plug-in to Netscape's Navigator
Use Viscape to explore SuperCity...the richest, most complex
VISCAPE
Document Done
Start
netscape3 - WordPad
Trumpet Winsock
Netscape - [Superca...
En 16:01


Netscape [FASHION NET]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://www.fashion.net/
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
the easy way to find sites on the internet
a2z
lycos.com
FASHION
NET
Start
netscape1 - WordPad
Trumpet Winsock
Netscape - [F...
Saving Location - [39]
En 16:09


Netscape - [Mayo Clinic]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://www.mayo.edu/
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
WELCOME TO MAYO
mayo
The best interest
ABOUT
http://www.mayo.edu/cgi-bin/imagemap/mayo_home?513,232
Start netscape - WordPad Trumpet Winsock Netscape - [Ma... Saving Location - [330] 16:20


Netscape - [Welcome to the BBC]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://www.bbcnc.org.uk/
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
BBC RADIO
BBC TELEVISION
BBC EDUCATION
BBC WORLD SERVICE
http://www.bbcnc.org.uk/images/homepage.map?240,132
Start netscape? - WordPad Trumpet Winsock Netscape - [W... Saving Location - [339] 16:35


Netscape [RITSEC Home Page]
Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://ritsec_www.com.eg/
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
RITSEC
Regional Information Techuology & Software Engineering Center
Start netscape2 - WordPad Trumpet Winsock Netscape - [RI... Saving Location - [370] En 16:45


Netscape [Internet Business Center]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://home.iig.com/ibc
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
The Internet Business Center
where commerce and technology come together
Domains
Our Domain Name Database. It's big. It's searchable.
Market Manager
Our complete Internet application management system
BS Day
The Business Site of the Day
Start netscape2 - WordPad Trumpet Winsock Netscape - [Internet ... En 15:54

The Internet Mall (TM)
Shopping on the Information Highway

- Active since 5 Sep. 95
- Including over 4500 companies offering products and services through the Internet.

- Organized by floors :
  - First Floor : Media.
  - Second Floor : Personal Items.
  - Third Floor : Computer Hardware and Software.
  - Fourth Floor : Services.
  - Fifth Floor : Clothes and Sporting Goods.
  - Sixth Floor : Furniture and Housewares.
  - Top Floor : Food and Beverages.

- Go there by using one of :
  - WWW http : //www.iw.com/imall
  - Gopher peg.cwis.uci.edu:7000 and look in pag / Internet Guides
  - FTP ftp.netcom.com and look in pub/GU/Guides'
  - Email taylor@netcom.com with SUBJECT "send mall"

HOW CAN I SEND A FAX FROM THE INTERNET ?

- There are Several Services for sending and receiving a fax via Internet mail (Some are free while others are pay services).
- To send a fax by e-mail, send a message
  To : remote-printer.<info>@phonenumber.iddd.tpc.int
  Where <info> contains information for the cover page.
  In <info>, " / " is turned into a line break and " - " is turned into a space.
- Example :

1. To : remote-printer.Arlo_Cats/Room_123@12025551212.1ddd.tpc.int
   would send a fax to +1-202-555-1212 with the cover page :
   Please deliver this facsimile to :
   Arlo Cats
   Room 123

2. Another way (work more reliable sometimes)
   To : remote-printer.Arlo-Cats/Room-123@2.1.2.1.5.5.5.2.0.2.1.tpc.int
   Note : the phone number is backwards.

- There Is a www page which provides information about TPC.INT fax service :
  http : //linux1.balliol.ox.ac.uk/fax/faxsend.html

Internet Phone from VocalTec

Minimum Configuration Needed:

- Sound Card and a microphone.
- 468 SX with 8MB of RAM.
- Full SLIP connection at 14.4 Kbps.
- TCP/IP Software with Winsock 1.1 Support.
- Download VocalTec program (http://www.vocaltec.com/).

Internet Phone connects to a special server prepared to connect people together. You will choose a server then you will be able to call others who are connected to the same server and they will be able to call you.

When you run the program for the first time

- You will be asked to type information about youself.
- Adjust sound levels by testing your speaking through the microphone.
- choose a server to connect to, then a list of users who are connected to that server will be displayed along with information about them.
- choose one of them and his/her program will notify them that you are calling.
- Then you will be answered.
- Start your conversation and while you do it, fine tune again your volume levels.

Internet Phone has a long way to go till it can compete with the real phone.

HOW CAN I USE THE INTERNET AS A TELEPHONE ?

You will need :

- **A 28.8 K modem to get good quality**
- **An Internet SLIP or PPP Connection**
- **A fairly Speedy Computer (at least 33 MHZ)**
- **A sound Card, Speakers and a microphone**
- **Internet audioconferencing software**

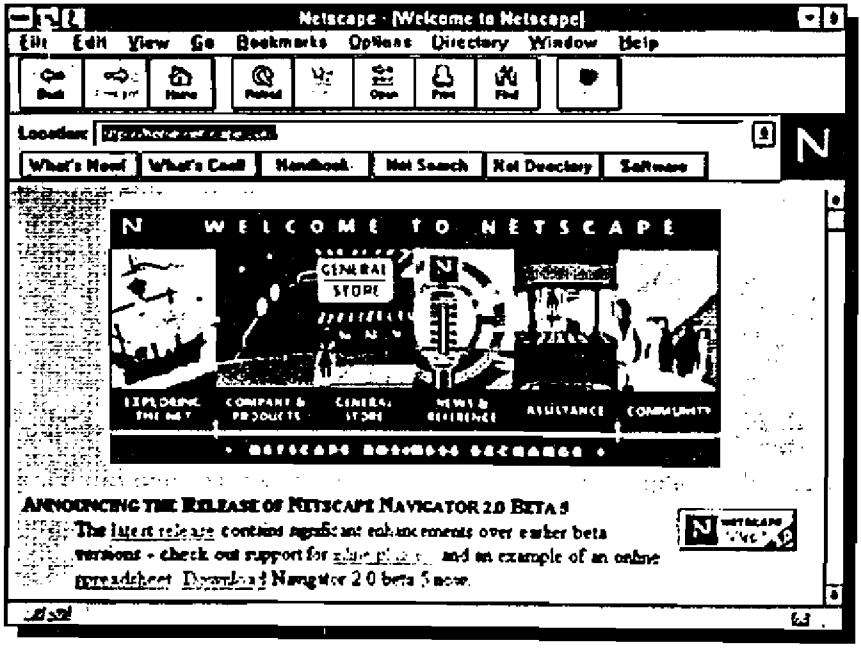
What Softwre is available ?

For Windows	For UNIX	For Mac
Speak Freely	Speak Freely	Maven
CU-See Me	Cyber Phone	Net Phone
Internet Phone	NEVOT	PGP fone
Digi Phone	Vat	CU-See Me
Intertnet Global Phone	mtalk	
Web Phone	ztalk	
Internet Voice Chat		

You and the associate you are talking to need to be using software that can transmit and receive the same encoding / compression protocol.

Standard encoding / compression are :
GSM, RTP, PGP, CVSD, DES

NETSCAPE



- **Netscape Navigator 2.0 & Netscape Navigator Gold 2.0**
- **Bringing Web exploring, email, newsgroups, chat, and FTP capabilities together**
- **It provides a superior platform for live online applications, supporting Live objects and other interactive multimedia content such as**

  Java Applets, Frames, and Netscape inline plug - ins
- **Netscape Navigator Gold 2.0 provides all the above mentioned capabilities plus integrated WYSIWYG document creation and publishing capabilities.**

MOSAIC (Cont.)

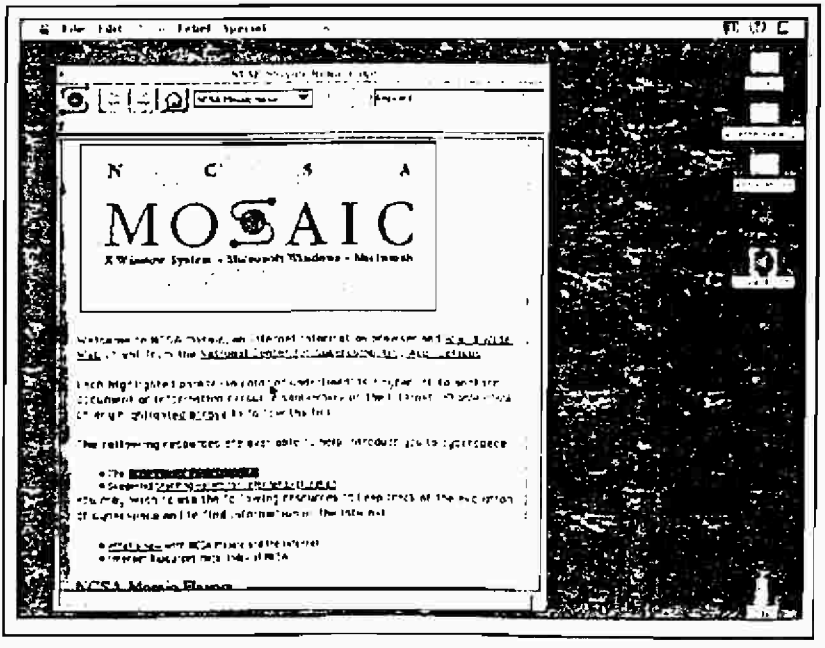
- A Mosaic session begins with a home page to get started.
- On the home bage, you'll notice :
  - specially colored (or underlined, on a mono monitor) text.
  - Images that have a thin colored lined around them.

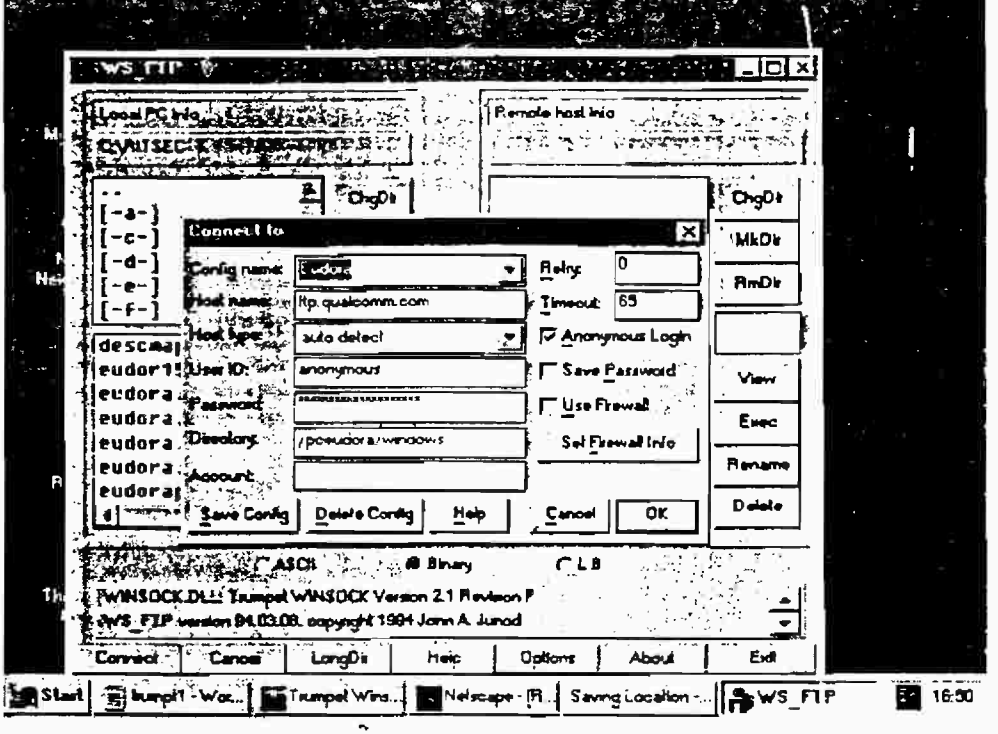
  These are lines that are hyperlinked to something else.
- Click on highlighted text or outlined images, and you navigate to a related page, and so on.
- Using Mosaic, you will be able to :
  - See text and in-line images inside the pages you are navigating
  - Listen to audio files
  - Playing video files.
- New web browsers have come up. Netscape is a new browser which is an extension to Mosaic.

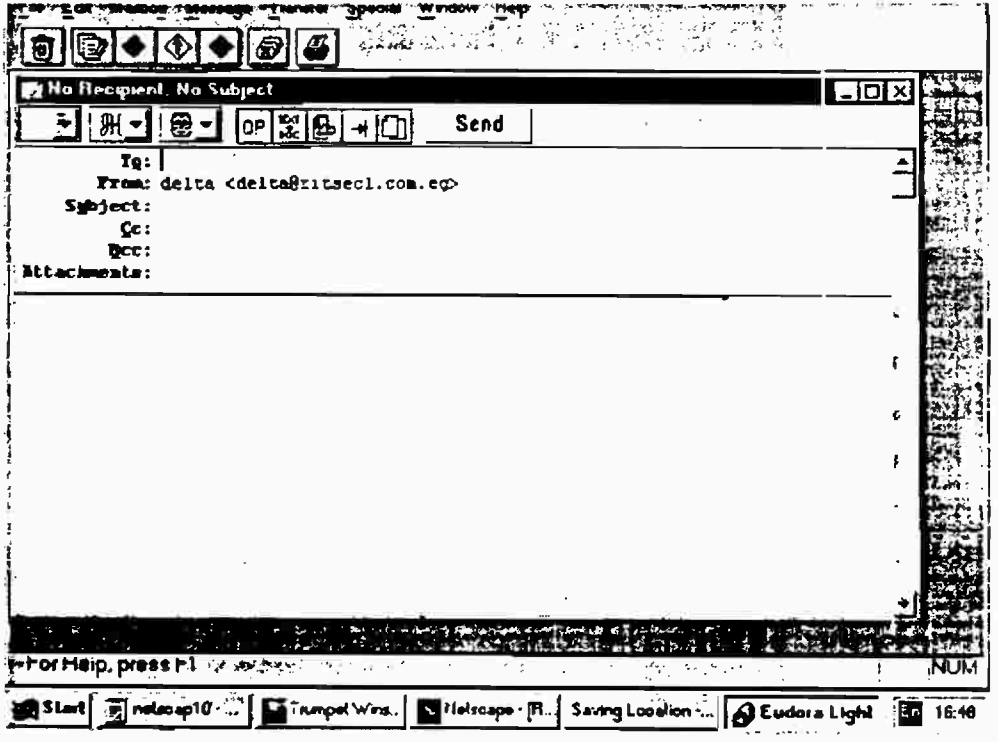
MOSAIC (Cont.)

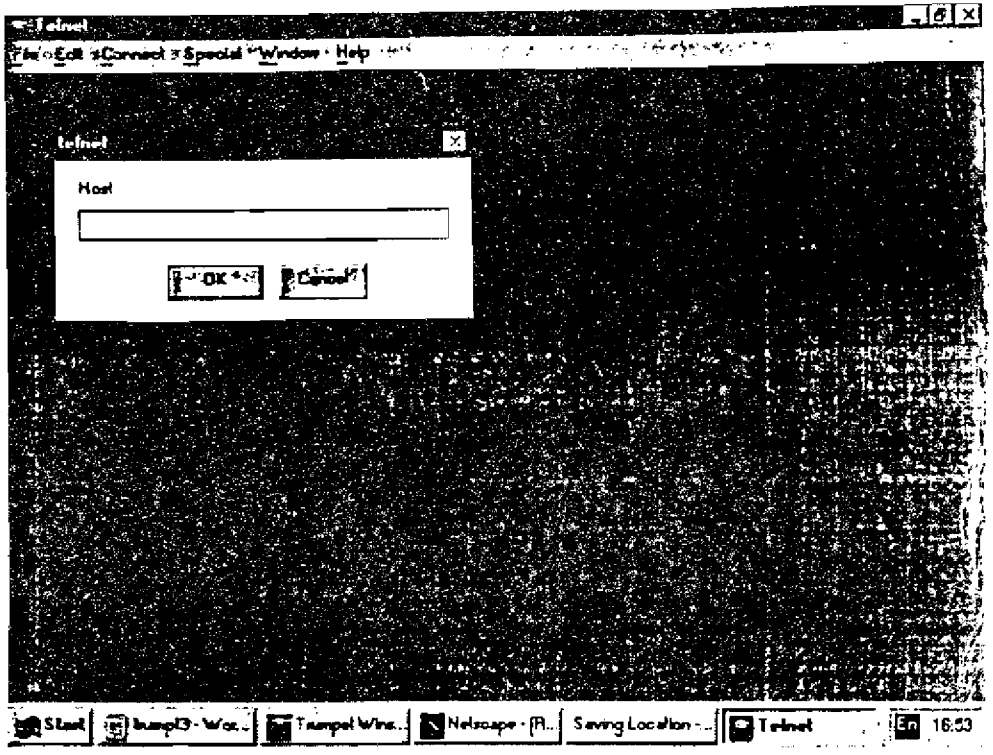
- Mosaic comes all ready to run, all you need to do is :
  - download the program
  - uncompress it using uncompress command.
  - make it executable using chmod command.

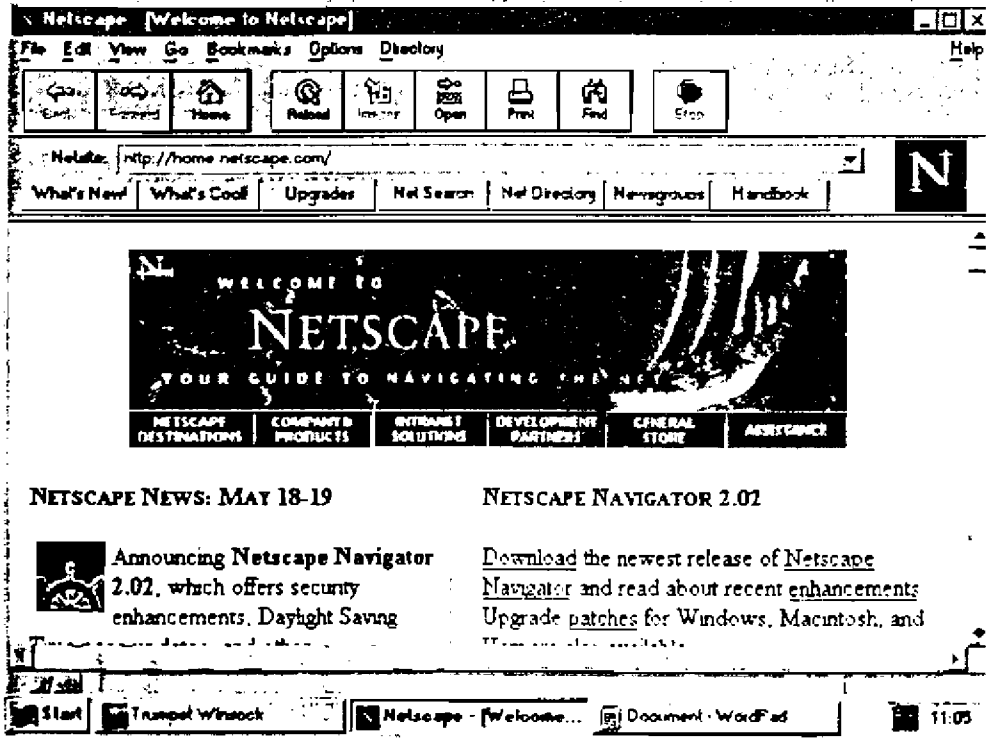
- The Mosaic screen

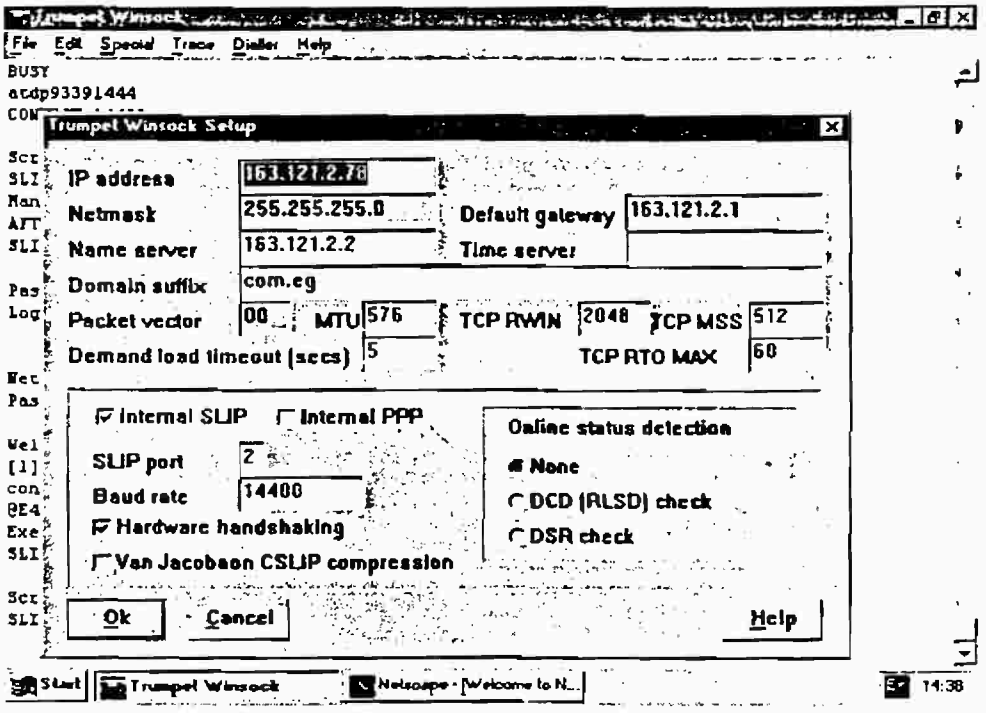


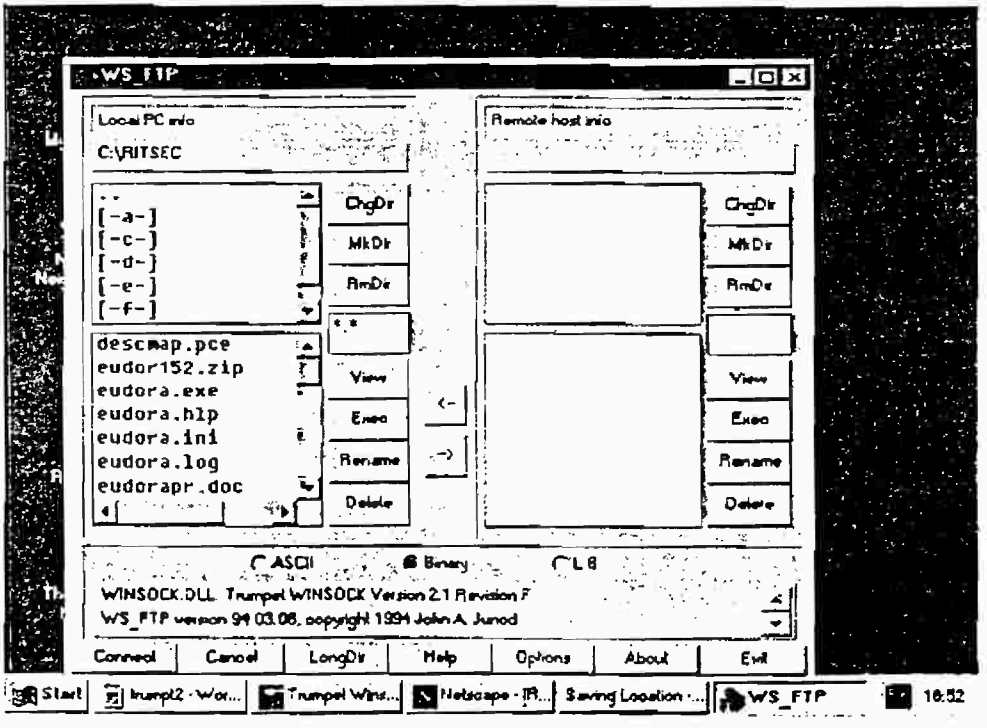

WS_FTP
Local PC Info
Remote host info
ChgDir
MkDir
RmDir
View
Exec
Rename
Delete
Connect to
Config name:
Host name:
Host type:
User ID:
Password:
Directory:
Account:
Retry:
Timeout:
Anonymous Login
Save Password
Use Firewall
Set Firewall Info
Save Config
Delete Config
Help
Cancel
OK
ASCII
Binary
LS
WINSOCK.DLL: Trumpet WINSOCK Version 2.1 Revision F
WS_FTP version 94.03.08, copyright 1994 John A. Junod
Connect
Cancel
LongDir
Help
Options
About
Exit
Start
Trumpet Wins...
Netscape - [R...
Saving Location -...
WS_FTP
16:50


No Recipient, No Subject
Send
To:
From: delta <delta@ritsecl.com.eg>
Subject:
Cc:
Bcc:
Attachments:
For Help, press F1
NUM
Start
netscape10 -...
Trumpet Wins...
Netscape - [R...
Saving Location -...
Eudora Light
16:48


Telnet
File Edit Connect Special Window Help
Telnet
Host
OK
Cancel
Start
Trumpet Wins...
Netscape - [R...
Saving Location -...
Telnet
En 16:53


Netscape [Welcome to Netscape]
File Edit View Go Bookmarks Options Directory Help
Back Forward Home Reload Images Open Print Find Stop
Location: http://home.netscape.com/
What's New! What's Cool! Upgrades Net Search Net Directory Newsgroups Handbook
WELCOME TO
NETSCAPE
YOUR GUIDE TO NAVIGATING THE NET
NETSCAPE DESTINATIONS
COMPANY'S PRODUCTS
INTRANET SOLUTIONS
DEVELOPMENT PARTNERS
GENERAL STORE
ASSISTANCE
NETSCAPE NEWS: MAY 18-19
Announcing Netscape Navigator 2.02, which offers security enhancements, Daylight Saving
NETSCAPE NAVIGATOR 2.02
Download the newest release of Netscape Navigator and read about recent enhancements
Upgrade patches for Windows, Macintosh, and
Start
Trumpet Winsock
Netscape - [Welcome...
Document - WordPad
11:05


File Edit Special Trace Dialler Help
BUSY
atdp93391444
Trumpet Winsock Setup
IP address 163.121.2.78
Netmask 255.255.255.0
Default gateway 163.121.2.1
Name server 163.121.2.2
Time server
Domain suffix com.eg
Packet vector 00
MTU 576
TCP RWIN 2048
TCP MSS 512
Demand load timeout (secs) 5
TCP RTO MAX 60
Internal SLIP
Internal PPP
SLIP port 2
Baud rate 14400
Hardware handshaking
Van Jacobson CSLIP compression
Online status detection
None
DCD (RLSD) check
DSR check
Ok
Cancel
Help
Start
Trumpet Winsock
Netscape - [Welcome to N...
14:38


WS_FTP
Local PC info
C:\RITSEC
Remote host info
ChgDir
MkDir
RmDir
[-a-]
[-c-]
[-d-]
[-e-]
[-f-]
descmap.pce
eudor152.zip
eudora.exe
eudora.hlp
eudora.ini
eudora.log
eudorapr.doc
View
Exec
Rename
Delete
ASCII
Binary
LS
WINSOCK.DLL Trumpet WINSOCK Version 2.1 Revision F
WS_FTP version 94.03.08, copyright 1994 John A. Junod
Connect
Cancel
LongDir
Help
Options
About
Exit
Start
Trumpet Wins...
Netscape - [P...
Saving Location -...
WS_FTP
16:52

WORLD WIDE WEB (WWW) (cont.)

- The first part of an URL (the stuff before :) tell the browser how to access that particular file (protocol).

- The common protocols are :

ftp	--- File Transfer Protocol
file	--- File Transfer Protocol (same as ftp)
news	--- Internet News Protocol (Usenet)
gopher	--- Gopher
telnet	--- Telnet
http	--- Hypertext Transport Protocol

- The main site for www is
  nxoc01.cern.ch switzerland

- The two slashes (//) after the colon indicates a machine name or address.

- When using the http protocol, this file is the HTML (HyperText Markup Language) file --- the coding language used to create Hypertext documents for use on WWW.

- HTML file has the extension (.html) for non-DOS servers or (.htm) for DOS-based servers.
  EX. http://ritsec_www.com.eg:8080/mieg/mieg.html

- Several types of browsers
  - txt-based (Lynx)
  - graphics-based (Mosaic,Netscape,Cello,MS Internet Explorer, I-comm,and Slipknot)

- Both Lynx and Mosaic are freeware

WORLD WIDE WEB (WWW)

- The World Wide Web is based on hypertext.
- Hypertext Generally, any text that contains "links" to other documents-words or phrases in the document that can be chosen by a reader and which cause another document to be retrieved and displayed.
- You can access the web through something called a "browser" (web clients).
- A browser can read documents, fetch documents, access files by FTP, read usenet newsgroups, telnet into remote sites, and travel around Gopherspace.
- A web address is called URL (Universal Resource Locator), it looks like

  <protocol>://<Internet address>[: port]/<file specifications>

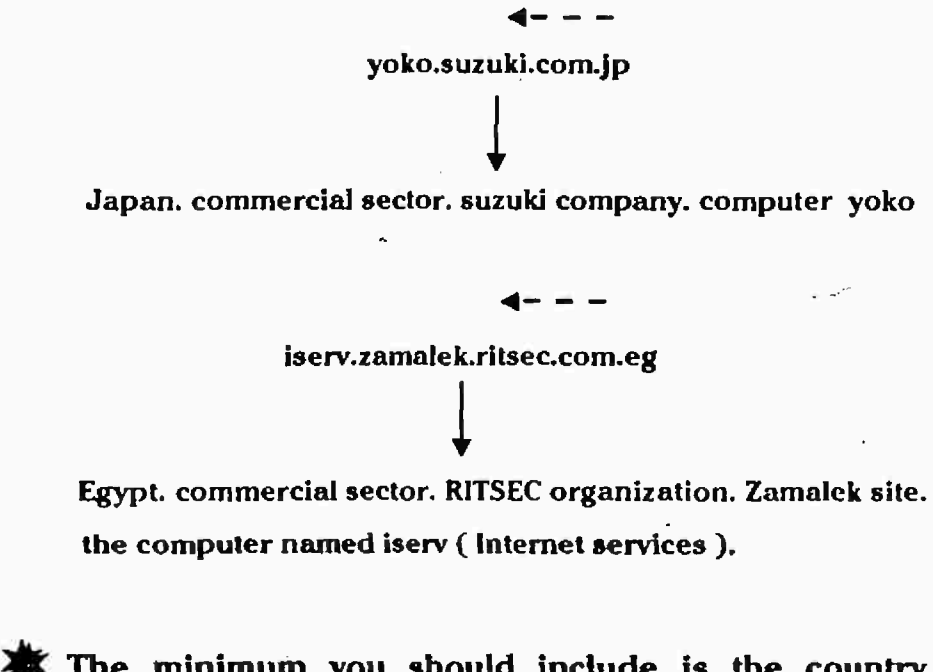
  (the default port number is 80)

- Here are a few basic URLs :

  file://wuarchive.wustl.edu/mirrors/msdos/graphics/gifkit.zip
  file://wuarchive.wustl.edu/mirrors
  http://www.w3.org/default.html
  news: alt.hypertext
  telnet://dra.com

INTERNET ADDRESSES (cont.)

EXAMPLES :



The minimum you should include is the country domain (other than US) and the sector subdomain.

INTERNET ADDRESSES (Cont.)

- Every machine that is on the Internet has a unique IP number.
- IP addresses and name addresses are equivalent and exist together.
- The translation of name addresses into numeric addresses in handled by machines on the Internet, called name servers.
- you can use either type of address

mfahmi @ ritsec.com.eg

↓

mfahmi@163.121.2.3

- There are three classes in address allocation, namely:

- class A : allow user to allocate any address in parts B,C,D

126.*.*.*

- class B : allow user to allocate any address in parts C,D

163.121.*.*

- class C : allow user to allocate any address in the part D.

193.227.1.*

INTERNET ADDRESSES (Cont.)

- The Internet name addressing is a flexible process
- The user name is usually defined at the host level.

☞ mfahmi @ ritsec.com.eg

↓

this address is of the user whose account name is mfahmi and is on the computer whose address is ritsec.com.eg

- The actual address is a numerical address, called IP address or number. Some times called a " dotted quad ". A unique number consisting of 4 parts separated by dots, e.g.

A.B.C.D

each part have a number ranging from 1 to 254

e.g.

165.113.245.2

INTERNET ADDRESSES

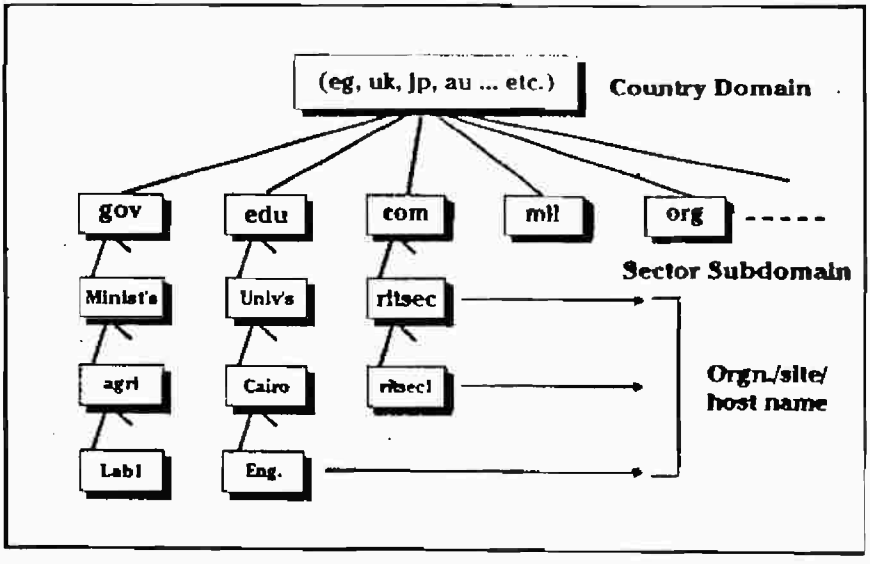
- **Are generally in two parts :**

  <User name>@<domain or hierarchical name>

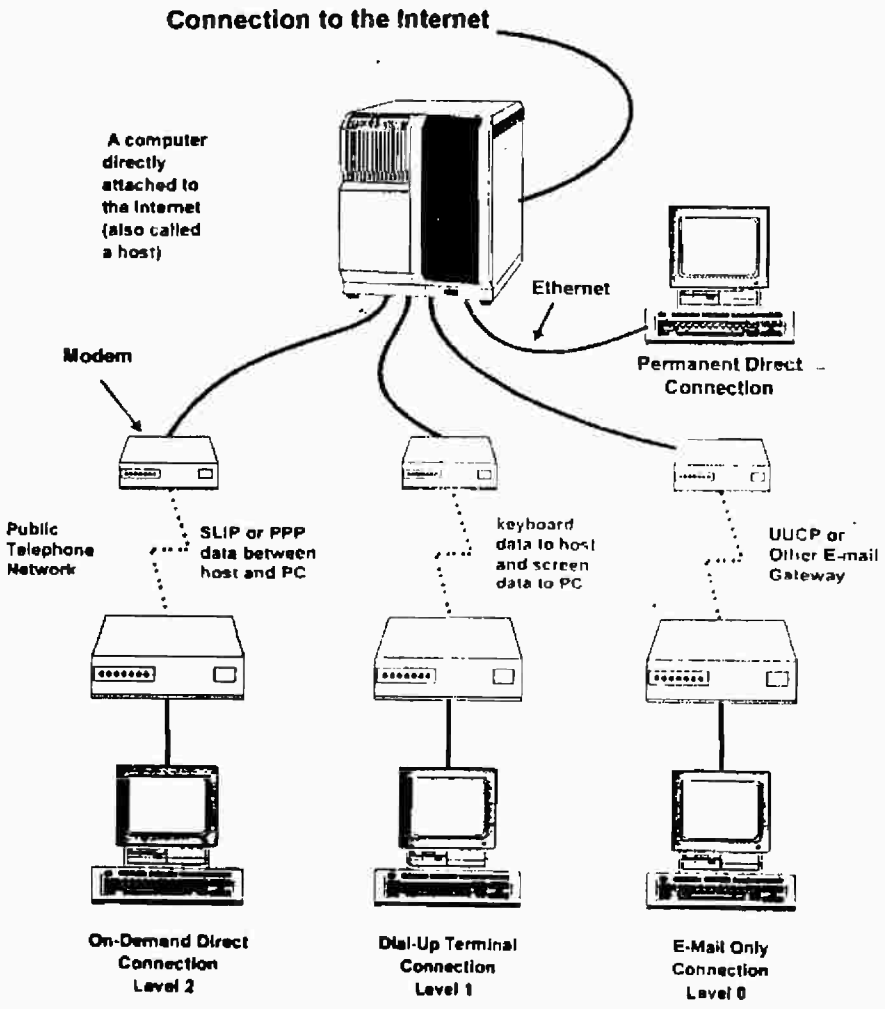
  or

  <site/host address>

- **Generally, the hierarchical name may look like this**

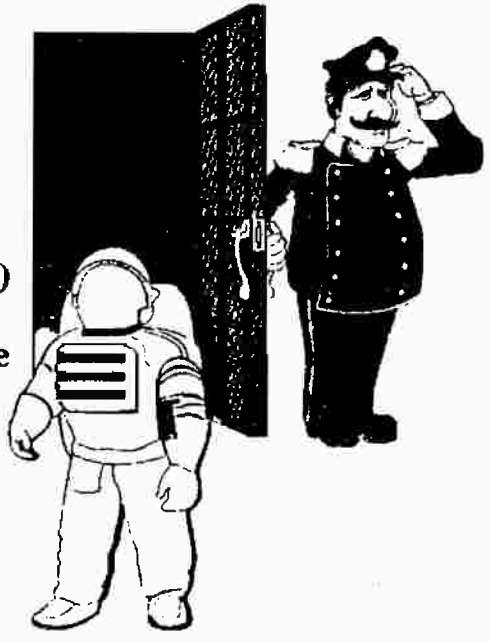


GETTING CONNECTED TO THE INTERNET



INTERNET MAJOR TOOLS

- Telnet
- Electroinc mail & LISTSERV
- File Transfer Protocol (FTP) & Archie
- Gopher, Veronica & Jughead
- Finger, Whois & Netfind
- IRC & USENET
- WAIS
- World Wide Web (WWW)
- Lynx, Mosaic & Netscape
- MUDs and MOOs



Catalog on Internat Resources

Agriculture
Archeology
Art
Astronomy
Automobiles
Aviation
BBSs
Biology
Bizarre
Books
Business and Finance
Calculators
Chemistry
Childresn
Computer Culture
Computer Hardware
Computer Literature
Computer Networks
Computer Technology
Computer Vendors
Consumer Services
Cybe punk
Economics
Education
Environment
Food and Drink
Fun
Games
Games (Video)
Geoculture
Geography
Geology
Government
Health
Historical Documents
History
Hobbies
Humanities
Humor
Humor Archives
Internet
Intrigue
Languages
Law
Libraries
Literature: Authors
Literature: Collection
Literature: Titles
Locks and Keys
Magazines
Mathematics
Medicine
Military
Movies
MUDs
Music
News
Oceanography
Operating Systems
Organizations
Pets
Physics
Pictures and Sound
Politics
Programming
Publications
Religion
Science
Sex
Sotware
Software: Archives
Sofare: Internet
Sofware: Macintosh
Software: Utilities
Space
Sports and Athletics
Technology
Telephones
Television
Travel
Trivia
Unix
Usenet
Weather

WHAT WE CAN DO ON THE INTERNET ?

(cont.)

- X500 :
  Searchable phone book of people or services.

- Archi :
  Searching and retrieval of document archives.

- Veronica :
  Gopher server searching.

- WAIS :
  allows the indexing of huge quantities of information, and then making those Indices searchable across networks such as the Internet.

- Play Games :
  Play games and join simulations

- Using it as telephone and Fax.

- Electronic shopping, Banking, Commerce, Learning, etc. ...

WHAT WE CAN DO ON THE INTERNET ?

(cont.)

Integrating Services :

By collecting various information forms into a usable interface, the following services are user - friendly ways to organize and access Internet data :

- Gopher :

  Menu - based information organization and retrieval

- World Wide Web :

  Hypertext document based linking and retrieval.

Information Searching :

considering the size of the Internet and the uneven distribution of valuable resources, automated services provide useful interfaces for locating such data with little or no time investment is essential :

- Figer :

  Information about a particular user on a computer system.

WHAT WE CAN DO ON THE INTERNET ?

- **Electronic Mail :**
  Message exchange between individuals or groups.
- **File Transfer :**
  Exchange of files between Internet sites (hosts or servers / clients) FTP.
- **Network News :**
  Public message and response bulletin board.
- **Run Programs on other computers :**
  Remote Login-Telnet (Server/Client communication protocol).
- **TALK :**
  Two person text - based communication.
- **Internet Relay Chat (IRC) :**
  Multi - person text communication organized by channel.
- **CU - See Me :**
  Multi - person audio / video communication.

INTERNET SERVICE PROVIDER'S (cont.)

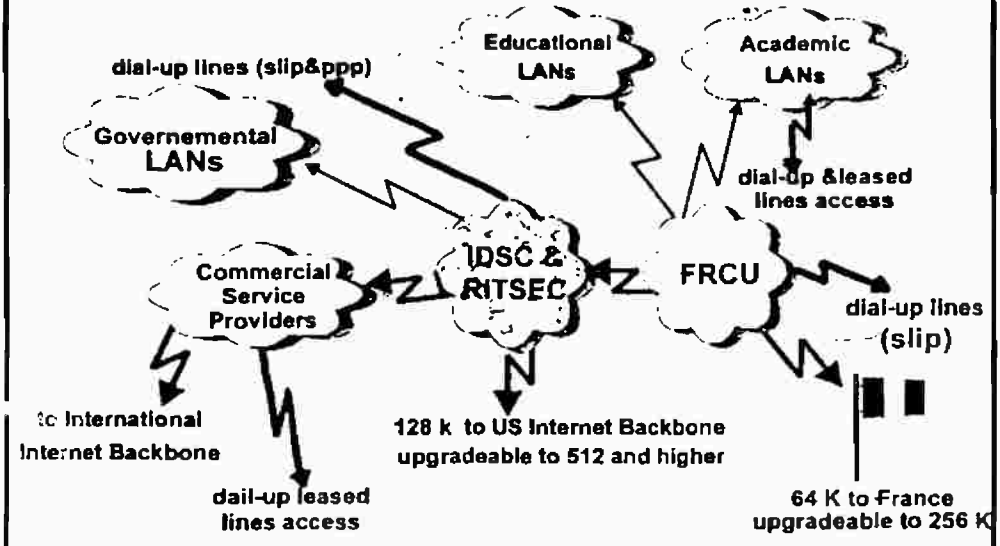
- Jordan
  - National Information Center (NIC), http://petra.nic.gov.jo
- Lebanan
  - DM, http://www.dm.net.lb
  - AUB, http://www.aub.ac.lb
  - IncoNet, http://www.inco.com.lb
- Qatar
  - InterGulf (later, service not yet avaiable)
- Morocco
  - Al Akhawayn University, http://www.alakhawayn.ma
  - ONPT , http://www.maghreb.net/morocco
- Saudi Arabia
  - KFUPM (e-mail & usenet), http:// www.ccse.kfupm.edu.sa
- Palestinian autonomous Areas
  - Palnet (e-mail) , http:// www.palnet.com
- Oman
  - Sultan Qaboos University (SQU) , e-mail only

INTERNET SERVICE PROVIDER'S

- Egypt
  - FRCU
  - IDSC / RITSEC
  - InTouch (3376407)
  - RITE (3403114)
  - VIDEO ON LINE (3372041)
  - MASH (3362335)
  - IBM Egypt (3492533)
  - Soficom (3421952)
  - StarNet (3930915)
  - Dr. Ahmed Bahgat & Co. (3562882)
  - PACC (3455951)
  - NTG (5874557 - 5877604)
  - DATUM (2903501)
  - EGYPT ON LINE (3490133 - 3405952)
  - AT&T (5703266)
- Kuwait
  - GulfNet Kuwait, http://www.kuait.com
  - GulfNet International, http://www.moc.kw
- United Arab Emirates
  - Etisalat, http://www.emirates.net.ae
- Bahrain
  - batelco, http://www.batelco.com.bh

INTERNET IN EGYPT

Current Configuration



Current Users Community (May 1996)

Commerical	~7,000 Users
Academic	~7,000 Users
Governmental	~1,500 Users
Non-Governmental	~200 Users

AMAZING INTERNET FACTS

1. It is estimated that the Internet now connects roughly more than 21,000 independent networks into a vast global Internet.

2. More than 1000 computers are added to the Internet each day.

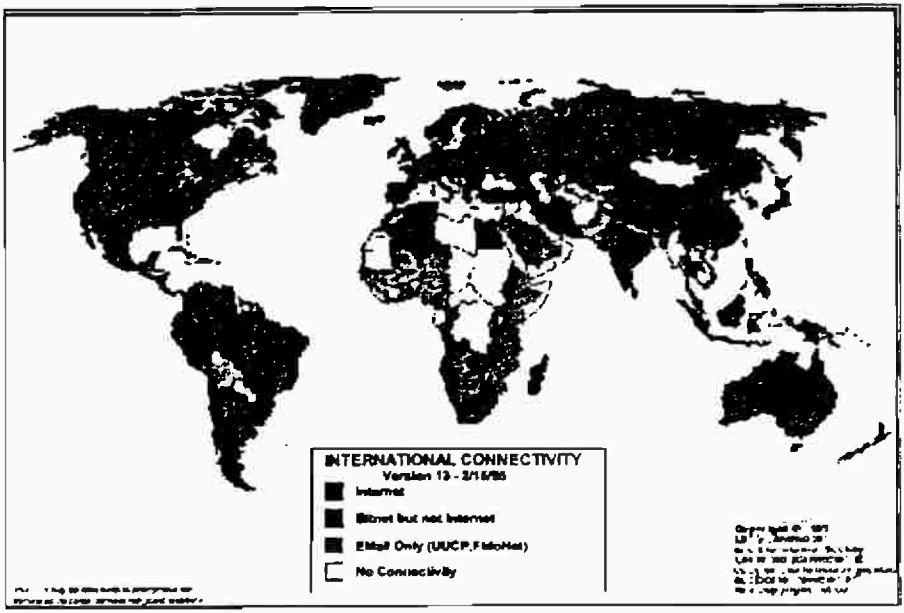
3. The amount of data crossing the Internet grows by 10 % per month. That's 214% per annum !.

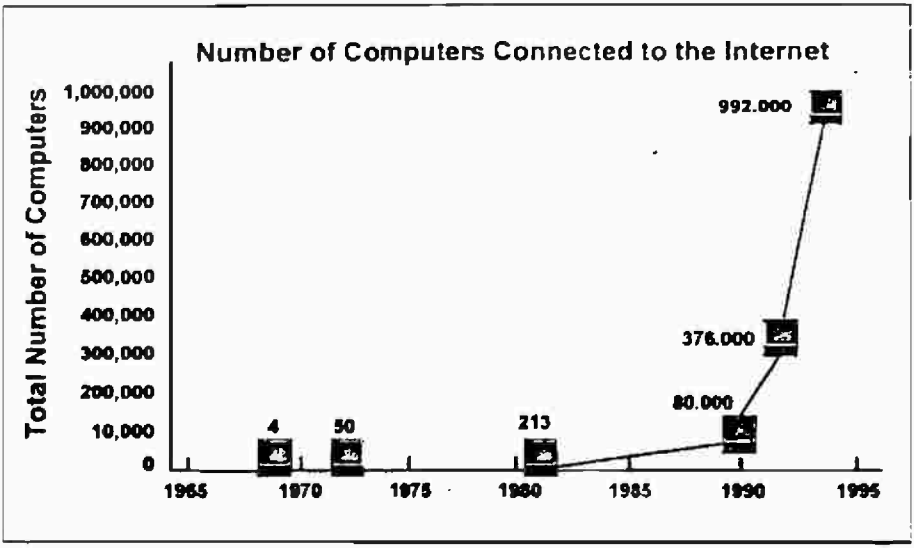
4. Each day , worldwide, around 10 million people directly (and some 25 million indirectly) use the Internet to send and receive electronic mail.

5. By the year 2000 all schools and colleges in the United States will be linked to the Internet, just as all universities are today.

6. Internet growth predictions

Number of	1995	2000
Networks	21,000	1,000,000
computers	2,000,000	100,000,000
Service providers	1,000	10,000
Direct users	10,000,000	1,000,000,000


INTERNATIONAL CONNECTIVITY
Version 13 - 2/15/95
Internet
Bitnet but not Internet
EMail Only (UUCP,FidoNet)
No Connectivity


Number of Computers Connected to the Internet
Total Number of Computers
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
10,000
0
4
50
213
80,000
376,000
992,000
1965
1970
1975
1980
1985
1990
1995

WHAT IS THE INTERNET ?

- The simplest way to describe the Internet is with one ward, Communication. The shortest definition is " The network of information networks ".

- Today , the Internet is a web of different, intercommunicating networks funded by both commercial and Government organizations. It also has spread overseas to connect to networks in most of the countries.

- The Internet has grown rapidly in the last few years. There are now over 15 million computers connected, and about 1000 more join each day !

- Computers of every kind are connected to the Internet. There are PCs, Macintoshes, UNIX machines, LANs, Various minicomputers, Various mainframes, and Supercomputers.