

# Web Applications

## How the Web came about

Martin Caminada

# The World Wide Web

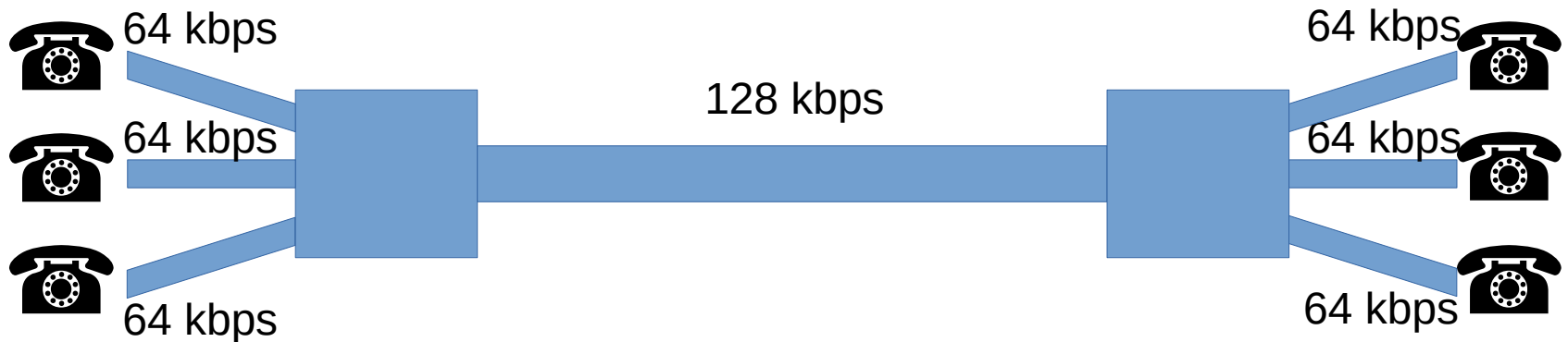
- When did it start?
- Where?
- Who?
- Components of the Web



# Arpanet (1969)

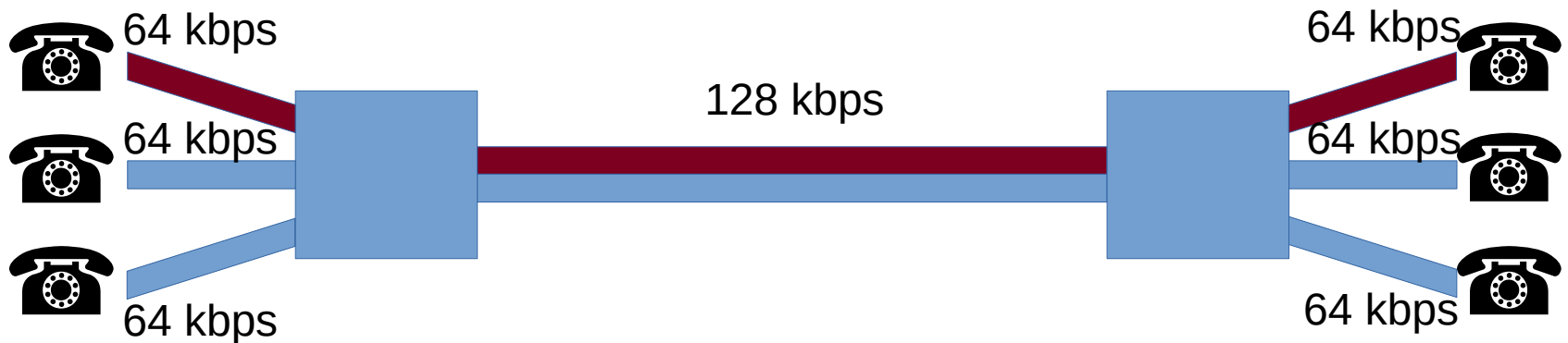


# Circuit Switching vs Packet Switching



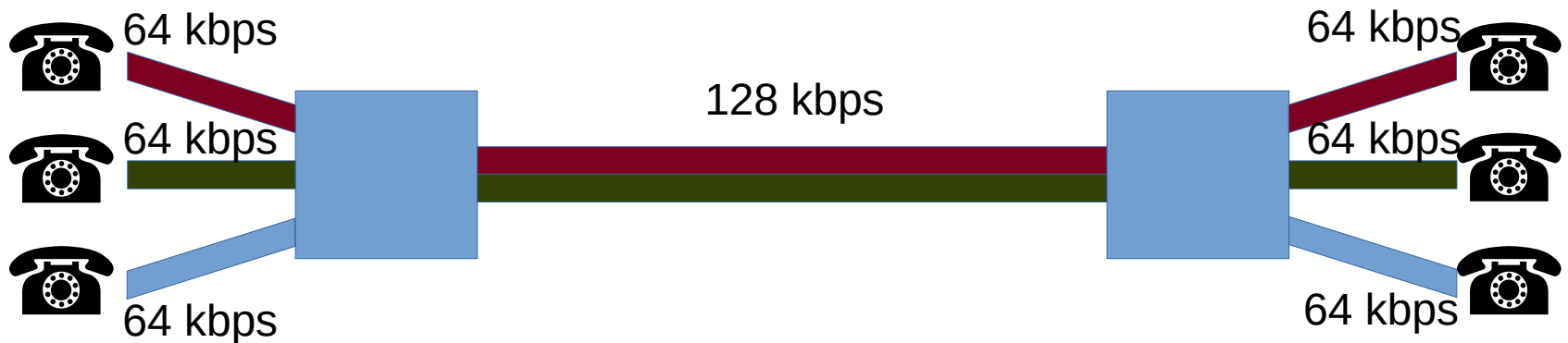
Circuit Switching

# Circuit Switching vs Packet Switching



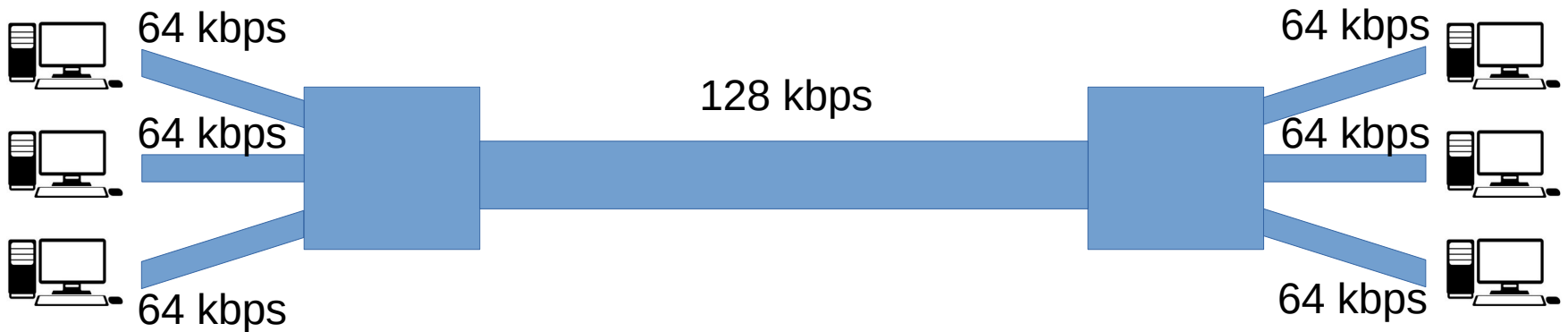
Circuit Switching

# Circuit Switching vs Packet Switching



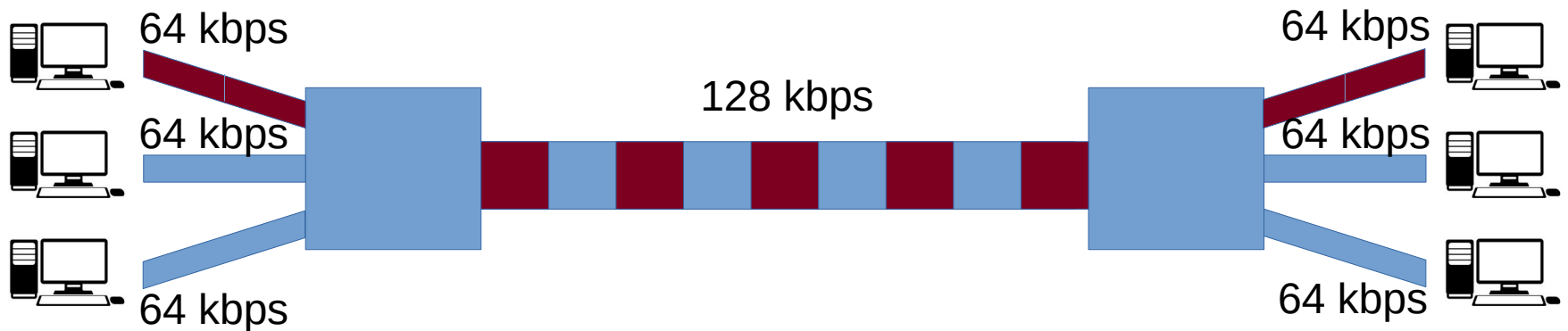
Circuit Switching

# Circuit Switching vs Packet Switching



Packet Switching

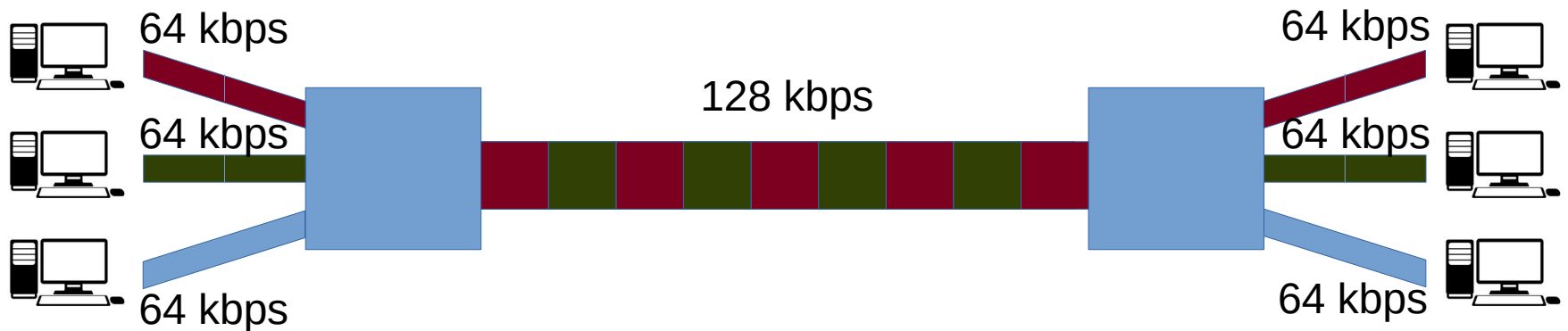
# Circuit Switching vs Packet Switching



Packet Switching

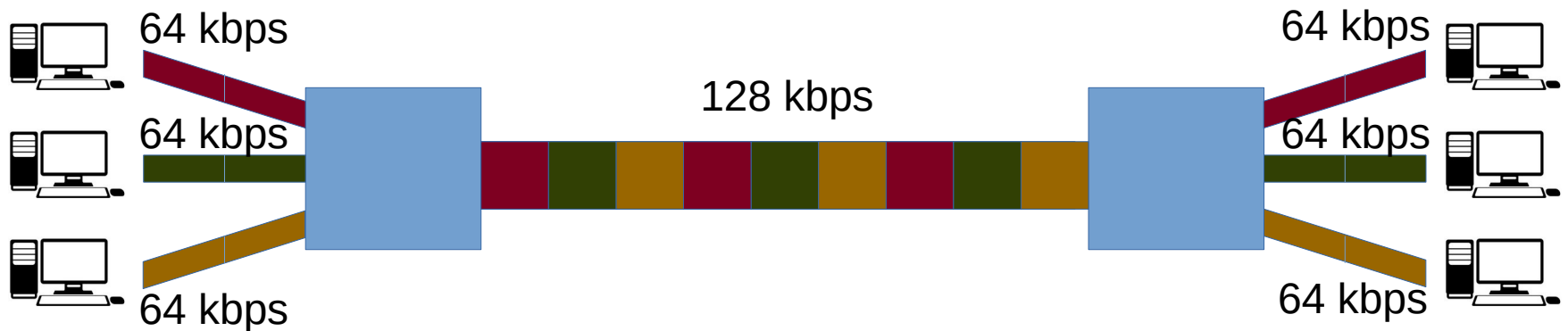


# Circuit Switching vs Packet Switching



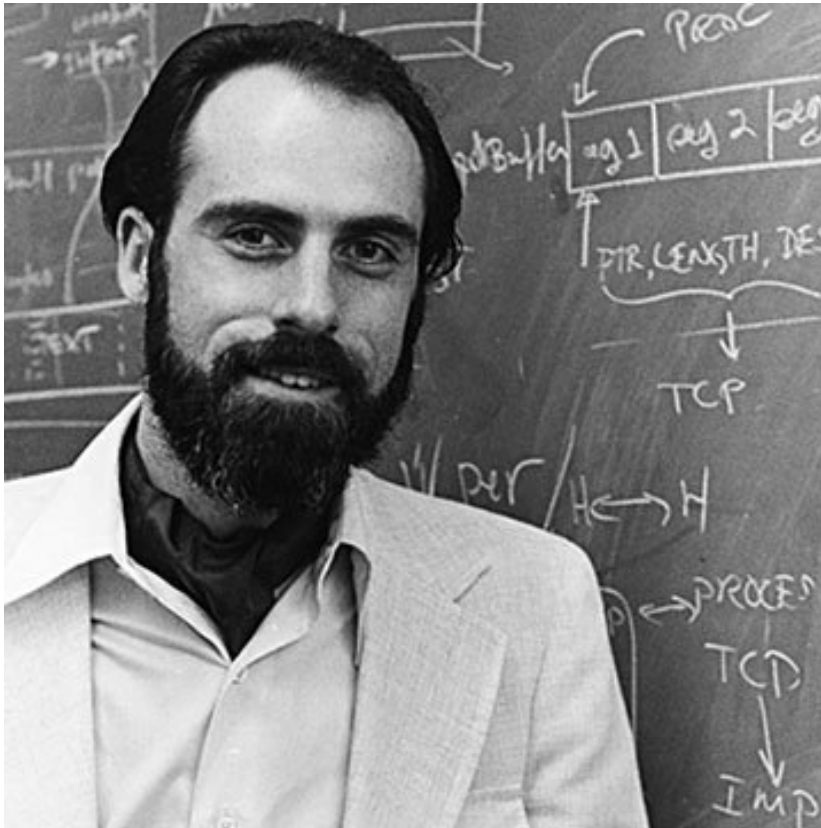
Packet Switching

# Circuit Switching vs Packet Switching

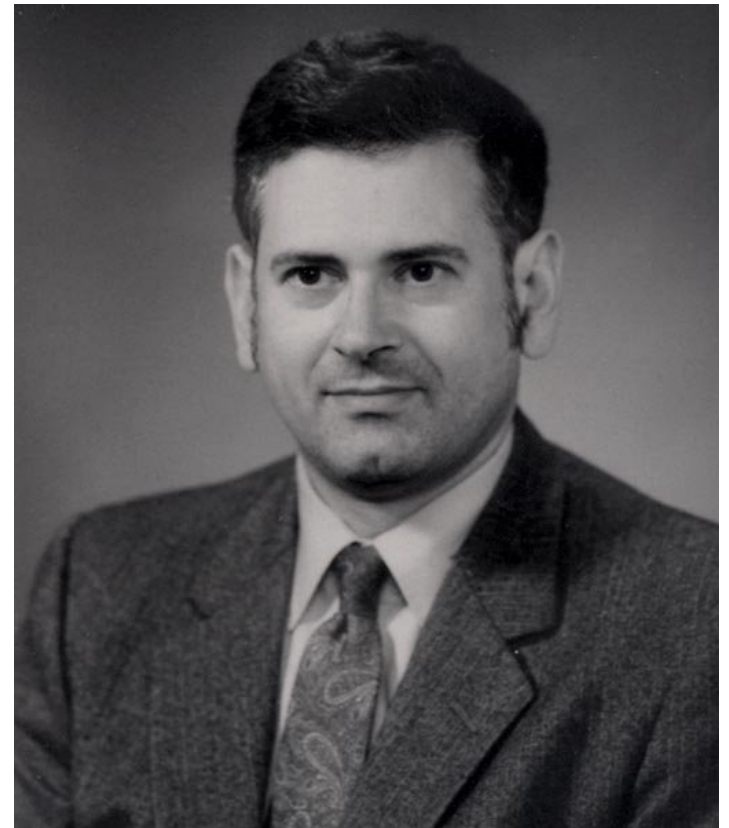


Packet Switching

# TCP/IP (1983)



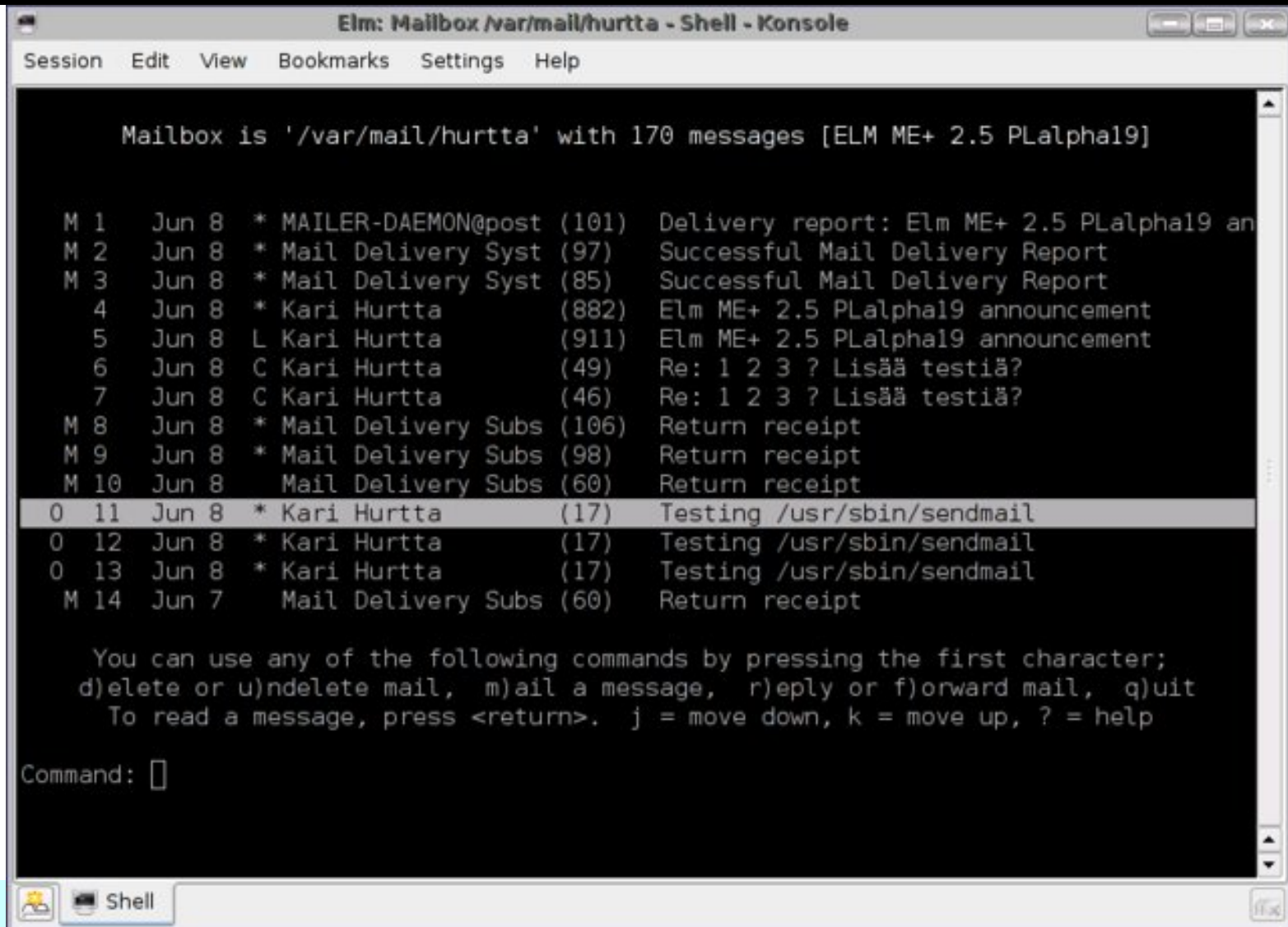
Vinton Cerf



Robert Kahn

# The Internet in the early 1990s

## email



The screenshot shows the Elm email client window titled "Elm: Mailbox /var/mail/hurtta - Shell - Konsole". The window has a menu bar with "Session", "Edit", "View", "Bookmarks", "Settings", and "Help". The main area displays the mailbox status: "Mailbox is '/var/mail/hurtta' with 170 messages [ELM ME+ 2.5 PLalpha19]". Below this is a list of messages, with message 11 highlighted. The messages are as follows:

Msg No	Date	From	Size	Subject
M 1	Jun 8	* MAILER-DAEMON@post	(101)	Delivery report: Elm ME+ 2.5 PLalpha19 an
M 2	Jun 8	* Mail Delivery Syst	(97)	Successful Mail Delivery Report
M 3	Jun 8	* Mail Delivery Syst	(85)	Successful Mail Delivery Report
4	Jun 8	* Kari Hurtta	(882)	Elm ME+ 2.5 PLalpha19 announcement
5	Jun 8	L Kari Hurtta	(911)	Elm ME+ 2.5 PLalpha19 announcement
6	Jun 8	C Kari Hurtta	(49)	Re: 1 2 3 ? Lisää testiä?
7	Jun 8	C Kari Hurtta	(46)	Re: 1 2 3 ? Lisää testiä?
M 8	Jun 8	* Mail Delivery Subs	(106)	Return receipt
M 9	Jun 8	* Mail Delivery Subs	(98)	Return receipt
M 10	Jun 8	Mail Delivery Subs	(60)	Return receipt
0 11	Jun 8	* Kari Hurtta	(17)	Testing /usr/sbin/sendmail
0 12	Jun 8	* Kari Hurtta	(17)	Testing /usr/sbin/sendmail
0 13	Jun 8	* Kari Hurtta	(17)	Testing /usr/sbin/sendmail
M 14	Jun 7	Mail Delivery Subs	(60)	Return receipt

Below the message list, instructions are provided: "You can use any of the following commands by pressing the first character; d)delete or u)ndelete mail, m)ail a message, r)eply or f)orward mail, q)uit. To read a message, press <return>. j = move down, k = move up, ? = help". At the bottom, the "Command:" prompt is followed by a cursor.

# The Internet in the early 1990s

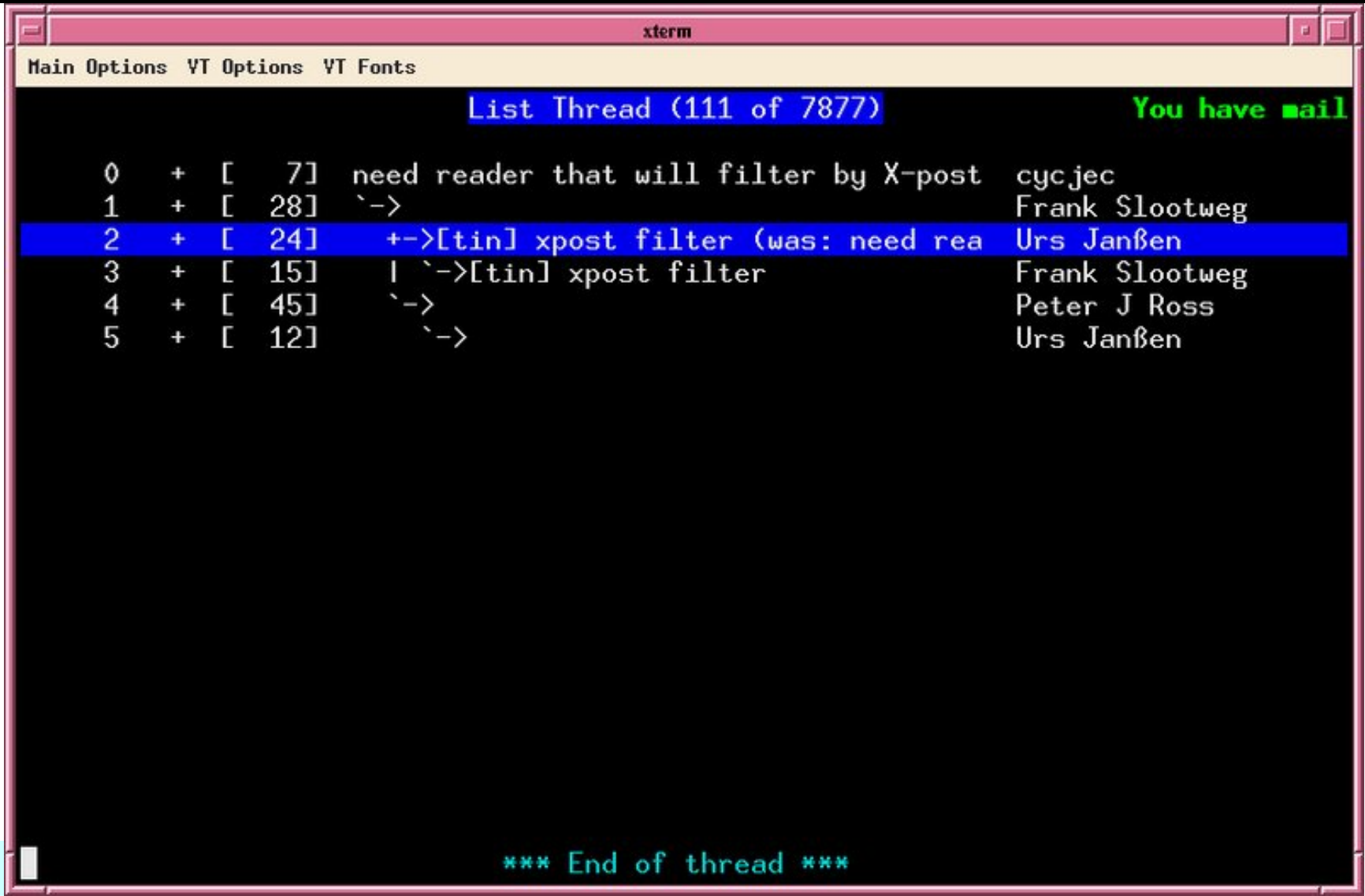
## FTP (file upload/download)

C:\myftp.exe

```
226-Transfer complete.
226 Quotas off
ftp> chdir pub
Invalid command.
ftp> cd pub
250 CWD command successful
ftp> ls
pics
temp
msruntime.exe
3dftp70.zip
3dftp60.zip
3dftp.ico
226-Transfer complete.
226 Quotas off
ftp> cd pics
250 CWD command successful
ftp> ls
3dftp.ico
3dftp_icon.gif
226-Transfer complete.
226 Quotas off
ftp> get 3dftp_icon.gif
226 Transfer complete.
ftp>
```

# The Internet in the early 1990s

## USENET (discussion groups)



The screenshot shows an xterm window with a title bar labeled 'xterm'. Below the title bar is a menu bar with 'Main Options', 'VT Options', and 'VT Fonts'. The main content area displays a thread listing titled 'List Thread (111 of 7877)' in blue. In the top right corner, a green status message reads 'You have mail'. The thread listing consists of six entries, each with a line number, a status indicator, a bracketed number, a subject line, and a name. Entry 2 is highlighted with a blue background. At the bottom of the window, a green status message reads '\*\*\* End of thread \*\*\*'.

```
xterm
Main Options VT Options VT Fonts
List Thread (111 of 7877)
You have mail

0 + [ 7] need reader that will filter by X-post cycjec
1 + [ 28] `-> Frank Slootweg
2 + [ 24] +->[tin] xpost filter (was: need rea Urs Janßen
3 + [ 15] | `->[tin] xpost filter Frank Slootweg
4 + [ 45] `-> Peter J Ross
5 + [ 12] `-> Urs Janßen

*** End of thread ***
```



# The Internet in the early 1990s

## USENET (discussion groups)

Pan: gmane.org.gnu.discuss

File Edit View Go Groups Articles Post Help

Group Name Subject or Author

**Subscribed Groups**

- alt.anarchism (6346)
- alt.binaries.dvd.classic.movies (3)
- alt.binaries.dvd.english
- alt.binaries.mp3.audiobooks (384)
- alt.config (996)
- alt.config.faq
- alt.config.proposals
- alt.configuration
- alt.consciousness (11)
- alt.cyberpunk (76)
- alt.cyberspace (1)
- alt.cyberspace.rebels (22)
- alt.fan.disguising.godiva
- alt.rave (4)
- alt.society.neutopia (2)
- free.alt.config
- free.answers (11)
- free.cyberpunk.literature
- free.england.config
- free.eu
- free.free
- free.ftp (1)
- free.uk.config
- free.uk.politics.libertarian (9)
- free.uk.technology.alternative
- gmane.linux.ubuntu.marketing (100)
- gmane.org.freeculture.discuss (10)
- gmane.org.freeculture.uk (1)
- gmane.org.fsf.announce (6)
- gmane.org.gnu.discuss (299)
- gmane.org.wikimedia.common

Subject	Score	Author	Lines	Date
+ Web 2.0 (1)		Kip Warner	62	Mar 17 11:23 PM
NYC LOCAL: Tuesday 2 March 2010 NYLUG Programming Sy...		secretary	82	Mar 02 6:15 PM
+ Anatomy of "GPL Enforcement" fraud (1)		Alexander Terekhov	20	Feb 27 4:18 PM
+ Settlements (80)		Hyman Rosen	9	Feb 25 6:52 PM
+ From the Best Buy et. al. case (9)		RJack	26	Feb 25 12:16 AM
NYC LOCAL: Corrected and Improved Announcement ...		secretary	95	Feb 24 4:07 AM
NYC LOCAL: Wednesday 24 February 2010 NYU Law S...		secretary	51	Feb 23 10:12 PM
+ Re: A simple question (12)		Hyman Rosen	15	Feb 22 6:55 PM
+ Re: A simple question (1)		Alan Mackenzie	36	Feb 22 9:41 AM
+ Jacobsen v. Katzer settled (90)		Hyman Rosen	21	Feb 19 8:15 PM
NYC LOCAL: Wednesday 17 February 2010 NYLUG: Lu...		secretary	126	Feb 16 9:36 AM
NYC LOCAL: Tuesday 16 February 2010 Hack Fests: P...		secretary	153	Feb 16 9:04 AM
+ GNU aclocal - regenerated aclocal.m4 does not m4 in...		Mark Hobley	18	Feb 14 4:08 AM
+ Re: Bye - Bye , open source derivative works litigio...		Alexander Terekhov	94	Feb 13 2:47 PM
+ Re: The SFLC dismissals should be coming soon (88)		Hyman Rosen	7	Feb 12 9:42 PM

+ NYC LOCAL: Tuesday 2 March 2010 NYLUG Programming S...hop: Squeak from secretary at 2 Mar 2010 11:15:50 -0500

<blockquote  
what="official NYLUG Workshop / Hacking Society announcement"  
note="This is a regular event.  
The NYLUG Workshop / Hacking Society meets every other Tuesday."  
edits="">

From: NYLUG Announcements <info@nylug.org>  
To: NYLUG Announcements <nylug-announce@nylug.org>  
Date: Mon, 1 Mar 2010 09:20:01 -0500 (EST)  
Subject: [nylug-announce] NYLUG Workshop / Hacking Society, (Smalltalk, C++, Python) TOMORROW March 2 6:00PM-8:00PM  
X-BeenThere: [nylug-announce@nylug.org](mailto:nylug-announce@nylug.org)  
Reply-To: Announcements from NYLUG <nylug-announce@nylug.org>

This is a reminder for the event detailed below.

1 @ 0.0 KiB/s No Tasks

# The Internet in the early 1990s

## Gopher (information service)



The image shows a terminal window titled "Terminal" with a menu bar containing "File", "Edit", "View", "Terminal", and "Help". The terminal displays a telnet session to "sdf.org". The output text is as follows:

```
sdf.org

Welcome to the SDF Public Access UNIX System .. est. 1987
=====
We offer FREE and inexpensive memberships for people interested
in the UNIX system and internetworking.  Personal GOPHERSPACE
is available to all users as well as hundreds of UNIX utilities,
games and networking utilities.  We are a federally recognized
non-profit 501(c)7 organization and we are supported entirely
by donations and membership dues.  telnet://sdf.org

[10] SDF Member PHLOGOSPHERE (41 directories)/
[11] SDF Member GOPHERSPACE (1730 directories)/
[12] SDF Frequently Asked Questions (FAQ)/
[13] SDF Accredited University Courses/
[14] Software and Documentation for various computers/
[15] GopherSpace SEARCH Engine <?>
--> [16] Floodgap's GOPHERSPACE/
[17] NetBSD Distribution Mirror/

Press ? for Help, q to Quit, U to go up a menu
```

Page: 1/1



# The Internet in the early 1990s

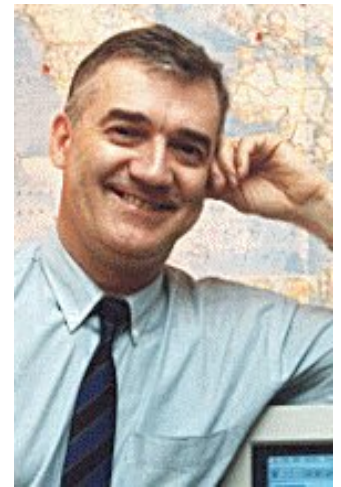
- mainly text based
- non-profit
- for the happy few





Tim Berners Lee

Photo: Guardian



Robert Cailliau

Photo: CERN

# Foundations: *The Internet*

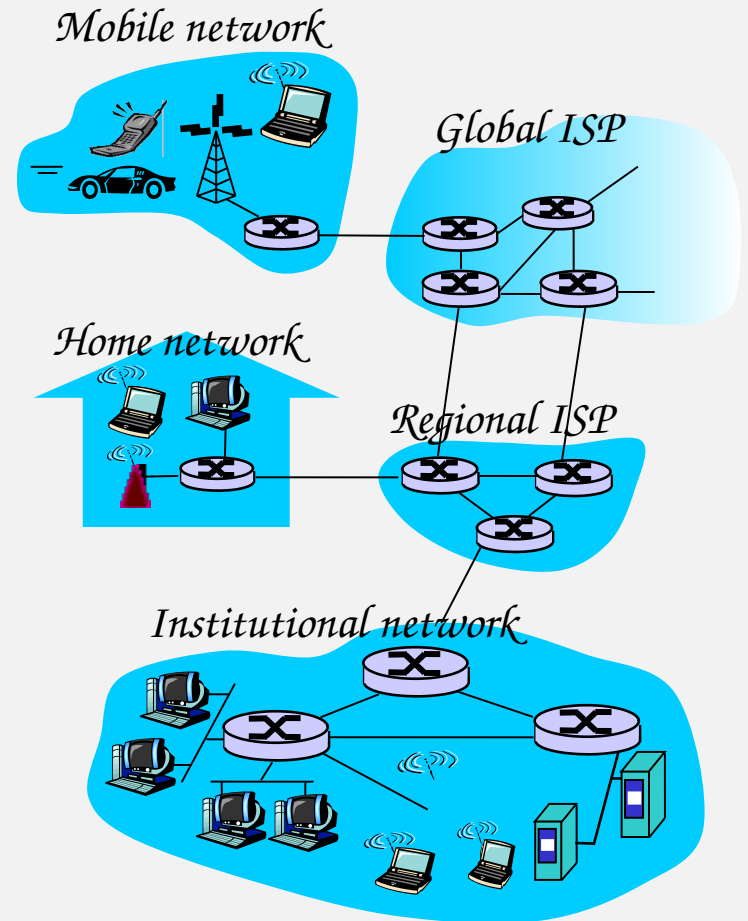
Packet Switching

TCP/IP

Telnet

FTP

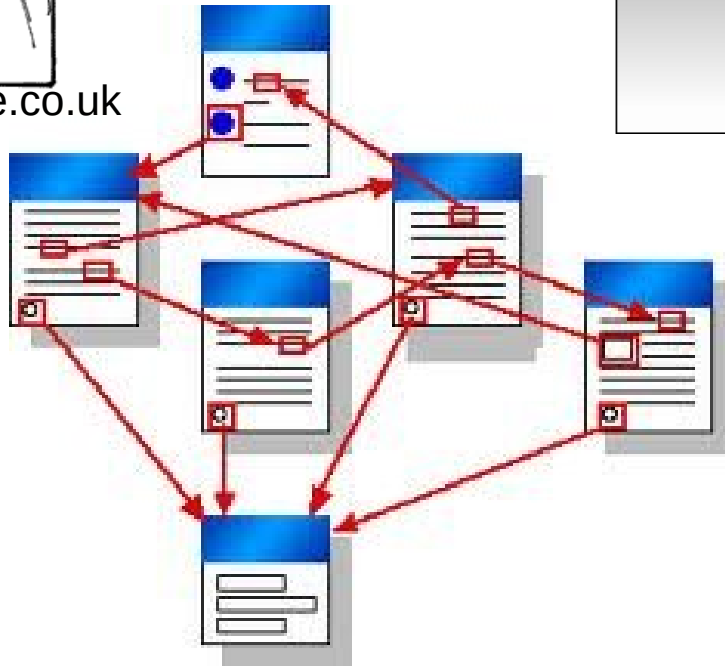
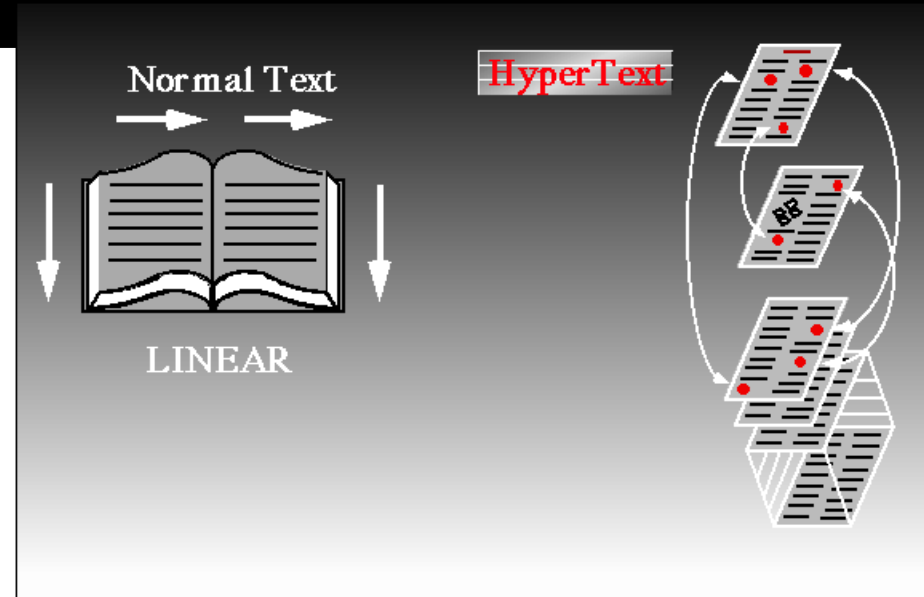
SMTP



# Foundations: *Hypertext*



<http://www.bitfonline.co.uk>



<http://www.timothyjwelsh.com>

Ted Nelson 1968: says  
"Non-sequential writing  
text that branches and  
allows choices to the  
reader..... A series of  
text chunks connected  
by links which offer the  
user different pathways"

# Building Blocks of the Web

HTML/CSS

HTTP

Web Server

Browser

# HTML

## Hypertext Markup Language

An application of **SGML**

(*Standard Generalized  
Markup Language*)

```
<!DOCTYPE html>
<html>
<head>
  <title> Hello There </title>
</head>
<body>
  <h1>Hello There</h1>
  <p> Welcome to the <a
href="http://www.w3.org">
Web</a>. Some protocols:</p>
  <ul>
    <li> HTTP </li>
    <li> FTP </li>
    <li> SMTP </li>
  </ul>
</body>
</html>
```

# HTTP

## Hypertext Transfer Protocol

### Request

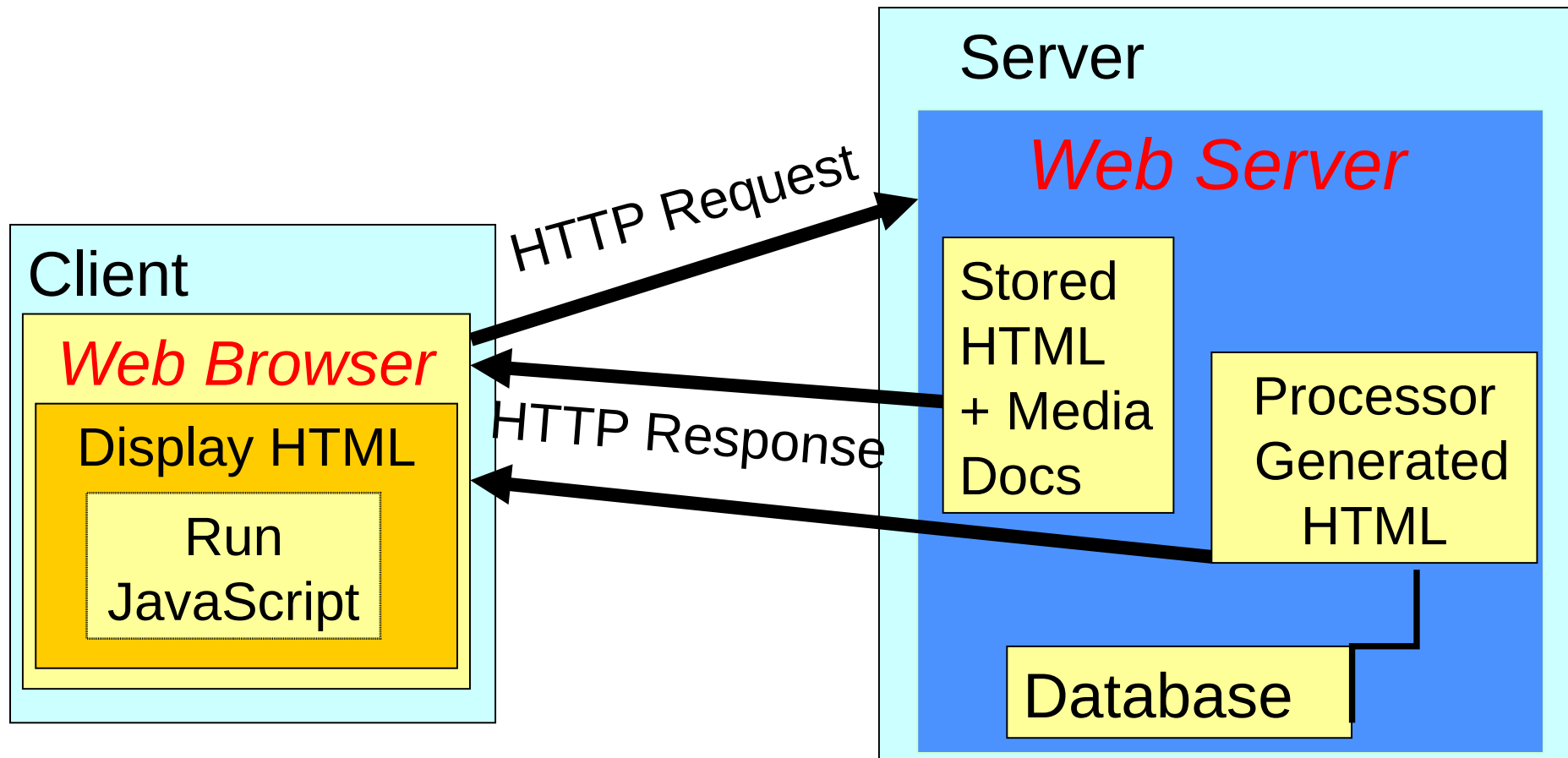
```
GET /somedir/page.html
HTTP/1.1
Host: www.someschool.edu
User-agent: Mozilla/5.0
(Macintosh; Intel Mac OS
X 10.7; rv:14.0)
Gecko/20100101
Firefox/14.0.1
Connection: close
Accept-language: en
.....
[body]
```

### Response

```
HTTP/1.1 200 OK
Connection: close
Date: Thu, 06 Aug 2010
12:00:15 GMT
Server: Apache/1.3.0(Un.
Last-Modified: Mon, 22 J
Content-Length: 6821
Content-Type: text/html
.....
[body]
```



# Web Server



# Browsers and layout engines



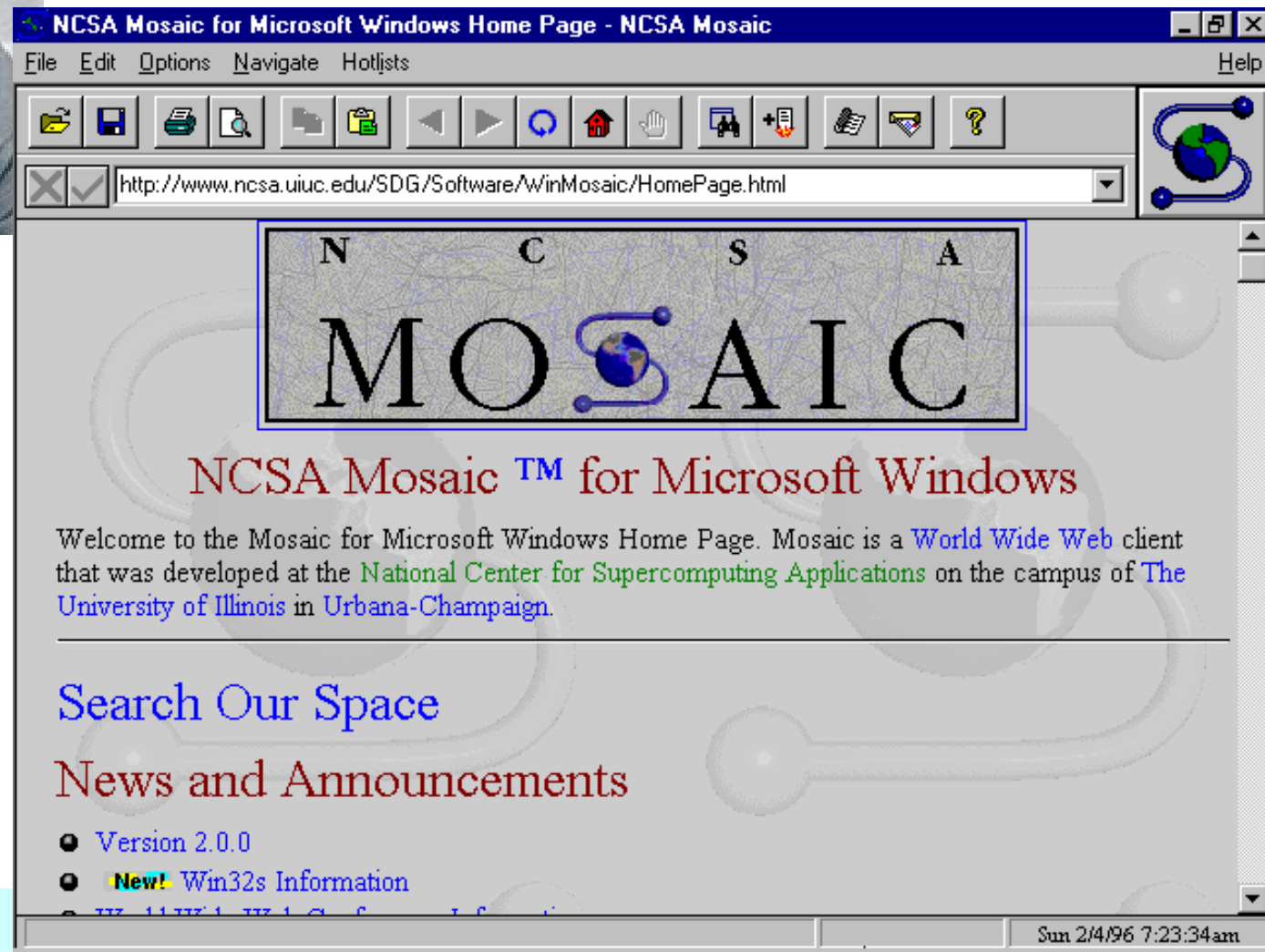


# Marc Andreessen

## NCSA Mosaic / Netscape

*Browser Wars*

**Best viewed with**





# Marc Andreessen NCSA Mosaic / Netscape

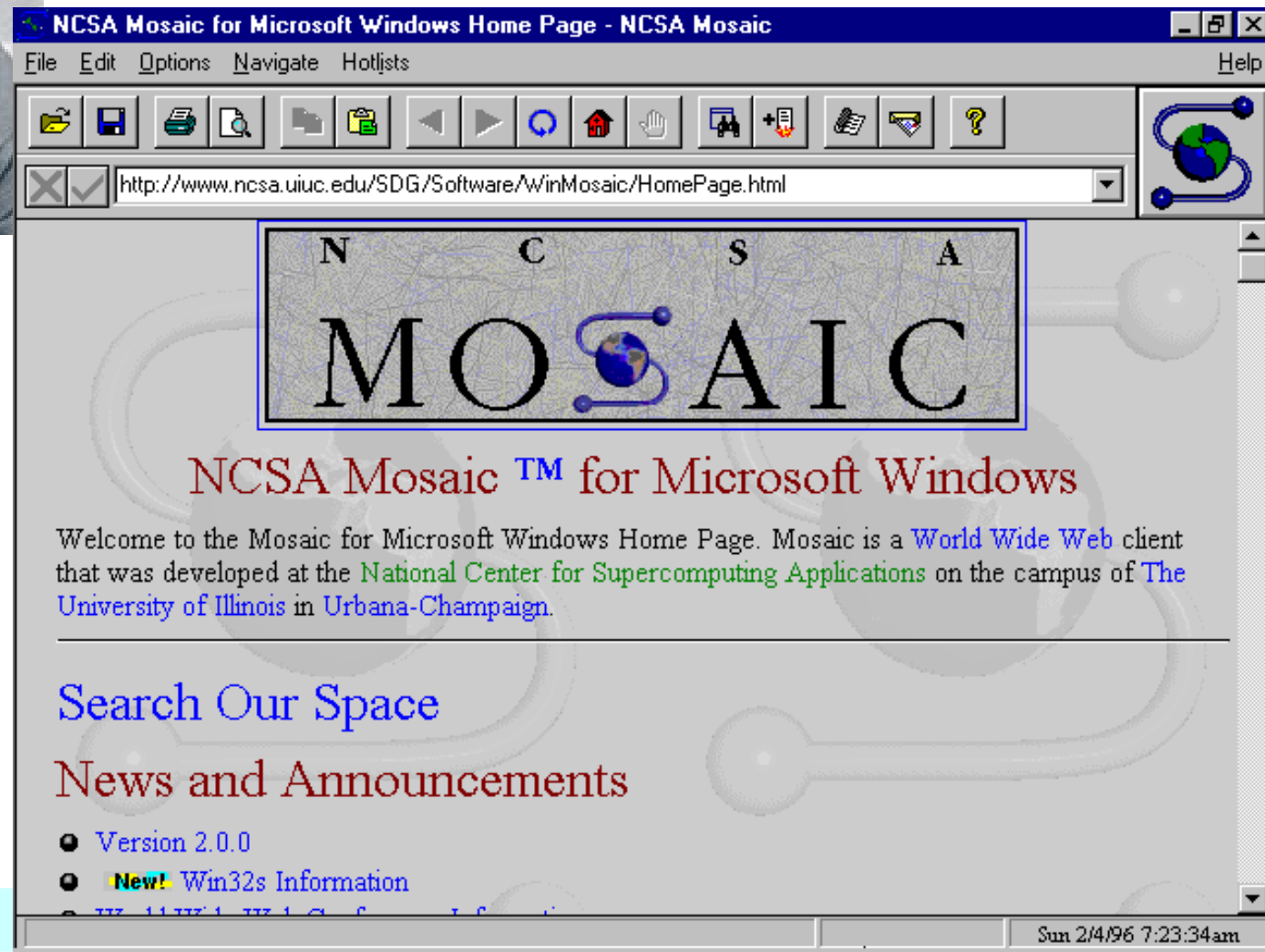
*NCSA Mosaic*



*Netscape*



*Mozilla*



# Current Standards (used in this module)

**HTML**



for specifying  
the structure  
of a page

**CSS**



for specifying  
the layout  
of a page

# The module

## Autumn Semester

HTML

CSS

forms/CGI

design issues

UNIX/Linux

search engines

## Spring Semester (tentative)

databases (MySQL)

Frameworks (e.g. Flask, Django)

networks / security

Javascript

e-commerce and innovation

# optional lecture

*how to run your own webserver  
with your own domain name  
using home broadband  
for less than £55 one-off  
(all equipment included!)*



# optional lecture

