

Music & the Internet

MUMT301

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Plan

- Review of the last class and assignment
- History of Internet
- The WWW and HTML
- Code editor
- Introduction to HTML
- In-class exercise
- Assignment #2

Review

- Music Technology Computer Lab (MTCL/E-215)
 - OSX account & password (changeit)
 - Backup (e.g., external drive, memory stick, Dropbox, iCloud, etc)
 - Emergency contact: Darryl Cameron (darryl@music.mcgill.ca)
- NIN Ghosts I-IV project as a case study of the New Music Economy
- Transformations in the music industry
 - Shift from physical to virtual in the 2000s
 - Music is in the cloud
- The “Cloud” and Web 2.0 in the music industry
- New music economy
 - Connectivity vs. control
 - Service vs. product
 - Amateur vs. professional

Review

- UNIX/Linux command shell crash course
 - ssh, passwd, man, pwd, ls, cd, mkdir, rmdir, mv, cp, rm, cat, nano

Assignment

		Prog Lang	OS	Mobile Tech	Social Media	Acronyms	Instrument	Music reading	Music collection	Scrobble	MRS	Code	Github
Saul	http://132.206.14.130/backer/assignmen t1.txt	Basic Java, Python 3 in process	OS X Yosemite	iPhone 5s	Facebook, Soundcloud, Twitter, Instagram and Reddit	OK	Trumpet, singing, and rapping	Fairly well!	Not sure, but probably hundreds of GBs and large collection of CDs and vinyls	I don't know but I'll start now!	Pandora or Spotify's "Discover Weekly". I don't like them	OK	bcbrody
Matthew	http://132.206.14.130/student2/assignmen t1.txt	Processing	OS X	iPhone, Xiaomi MiPad	Facebook, Soundcloud, Youtube, and Whatsapp.	OK-ish	Drums. A bit of guitar and piano	Mostly rhythmic scores	Mostly streaming, but 2500 songs, and 30 vinyls	I do not scrobble	Pandora and Spotify	Did not understand	mdavis121
Allison	http://132.206.14.130/hecht/assignmen t1.txt	Rusty Java	OS X	iPhone 5s	Facebook, Instagram, LinkedIn, and Snapchat.	OK. Excellent.	Piano and singing	Yes	I mostly organize playlists on Spotify	I have not scrobbled	Spotify's Discover Weekly	OK	ahecht4
Milana	http://132.206.14.130/hiebert/assignmen t1.txt	No	OS X	iPhone 6s	Facebook, Instagram	OK	Guitar and singing	Slowly	Few thousand songs and extensive CD collection. Started to move towards streaming services for convenience, though.	Not sure what that is! So no, I don't.	No	Did not understand	milanah
Cyrenah	http://132.206.14.130/smith/assignmen t1.txt	Basic HTML	OS X El Capitán	iPhone 6	Facebook, twitter and wordpress (for my job at CKUT 90.3FM)	OK	Mainly electric bass and double bass, but multi-instrumentalist	Extremely well	Large but relying on streaming services. I prefer physical music but I don't have too much space	I don't know what scrobble is.	Youtube	OK	cyrenahsmith

Introduction to Internet

- What is Internet?
- History of Internet
- What is the web?
- The Internet network

What is Internet?

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-

ard

What is Internet?

- It is a network of networks that put together intranets, extranets and networks interconnecting them.
- It is a global system of interconnected computer networks that use the standard TCP/IP protocol suite to link several billion devices worldwide
- Who invented the Internet?
 - March 9, 1999
- In defense of Al Gore: Robert Kahn and Vint Cerf (they coined the term Internet in 1974)
 - <http://web.eecs.umich.edu/~fessler/misc/funny/gore.net.txt>

Pre-history of the Internet

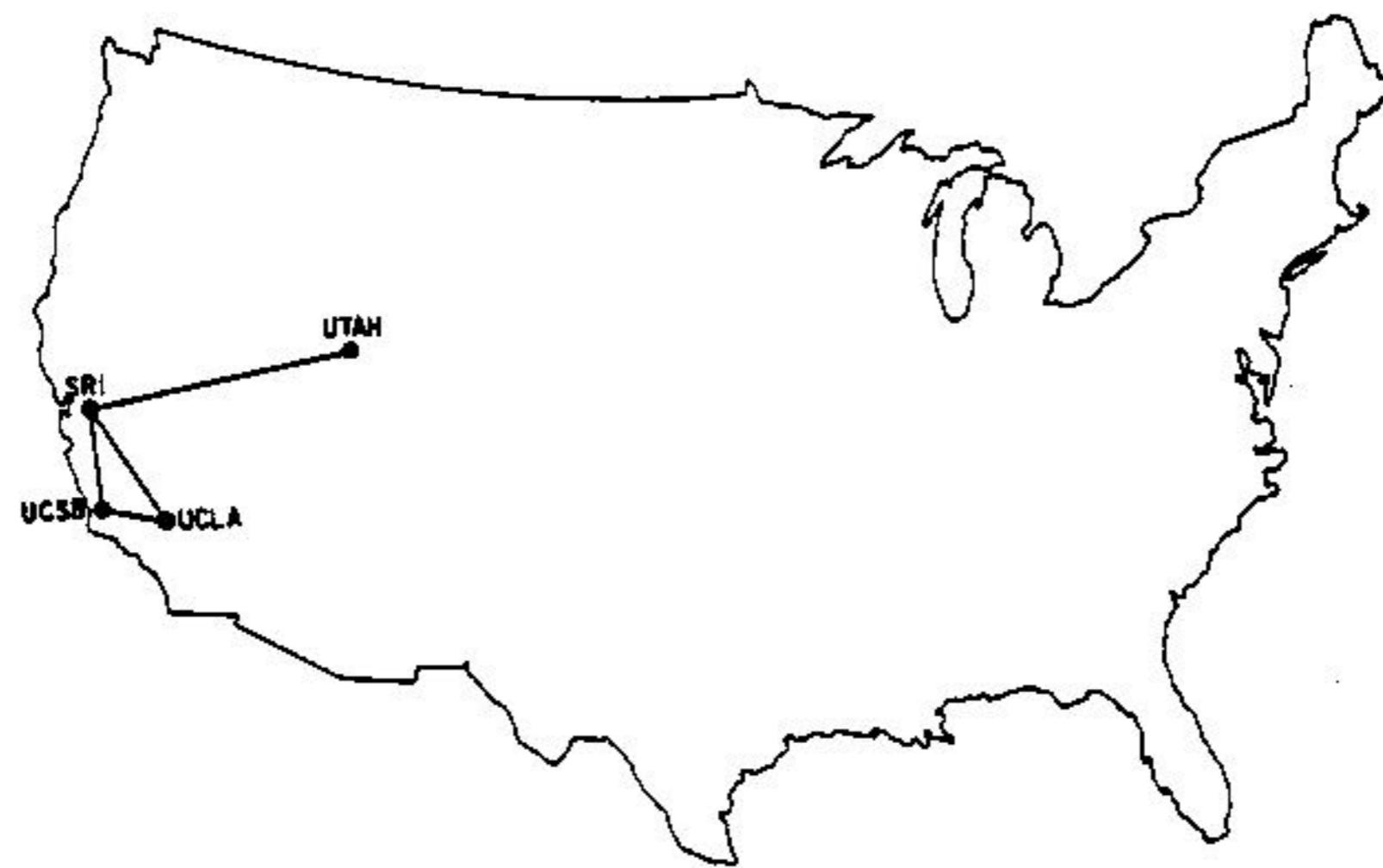
- 1961: Leonard Kleinrock @ MIT publishes the first paper on packet switching theory. First book later on 1965
- 1962: J.C.R. Licklider @ DARPA envisioned a “Intergalactic Computer Network”, a globally interconnected set of computers, through which everyone could quickly access data and programs from any site
- 1964: While working at RAND, Paul Baran publishes seminal paper on IEEE conceptualizing a distributed network. Baran's solution in the aftermath of a nuclear attack
- 1965: Lawrence Roberts and Thomas Merryl connected two computers using circuit switching (TX2 in Mass., and Q32 in California) They realized they needed packet switching
- 1966: Roberts went to DARPA and put together his plan for the computer network ARPANET
- 1967: First ACM symposium on Operating System Principles: publications on packet switching from MIT (Lawrence Roberts), NPL (Davies et al.)

Pre-history of the Internet

- 1968: Overall ARPANET architectural design and network topology developed by community of researchers led by Heart, Kahn, Roberts, and Frank
- 1969: UCLA selected to be the first node on the ARPANET, second node at Stanford. First host-to-host message! *lo...*
- 1969, Dec: four-node network established
- Computers were added quickly to the ARPANET after 1969, and there was a large amount of work in developing host-to-host protocols and network software. This allowed the network users to develop applications.
- 1972: First public demonstration of the ARPANET at the International Computer Communication Conference (ICCC). The electronic mail was introduced.

Pre-history of the Internet

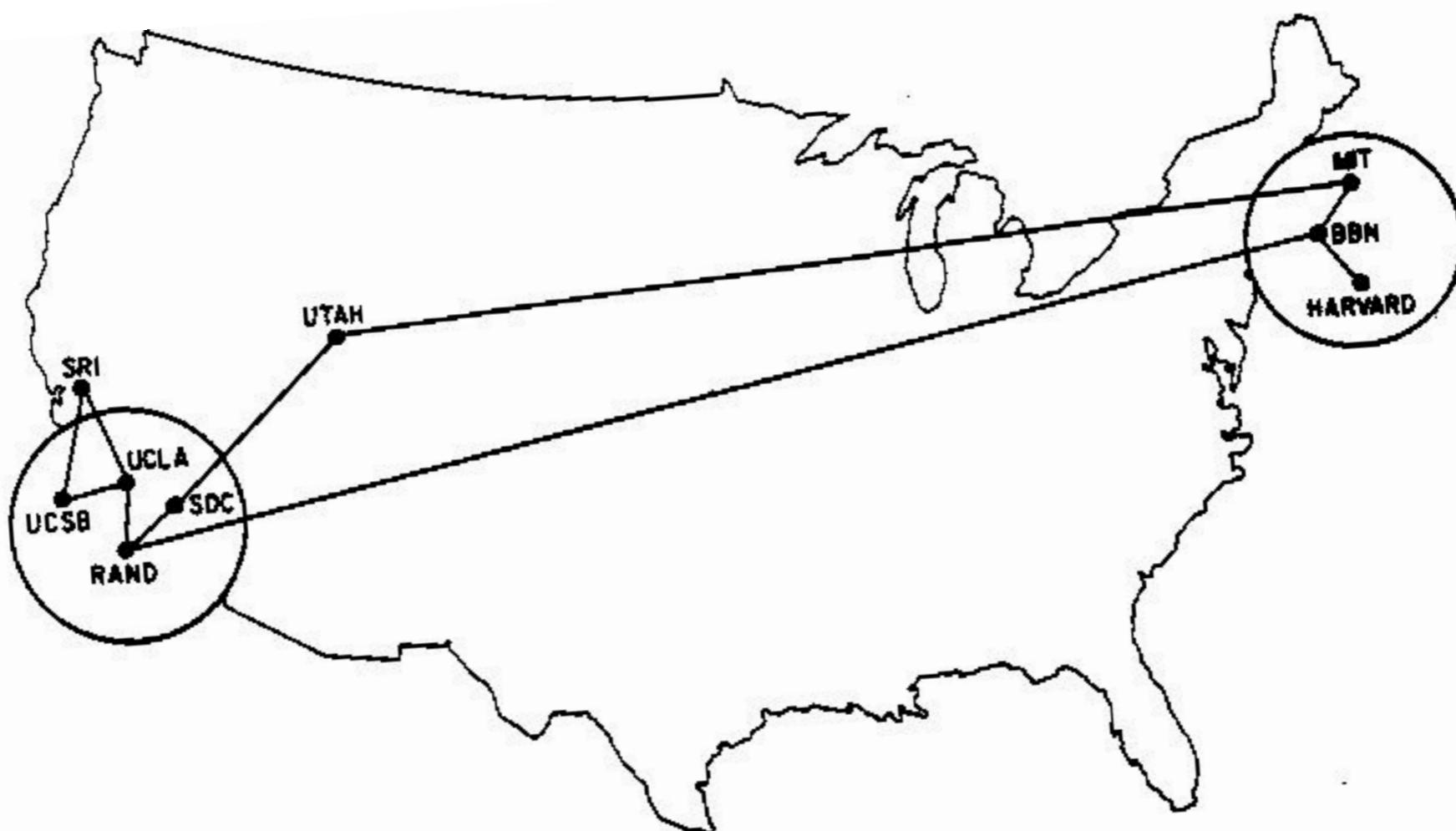
Dec. 1969



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

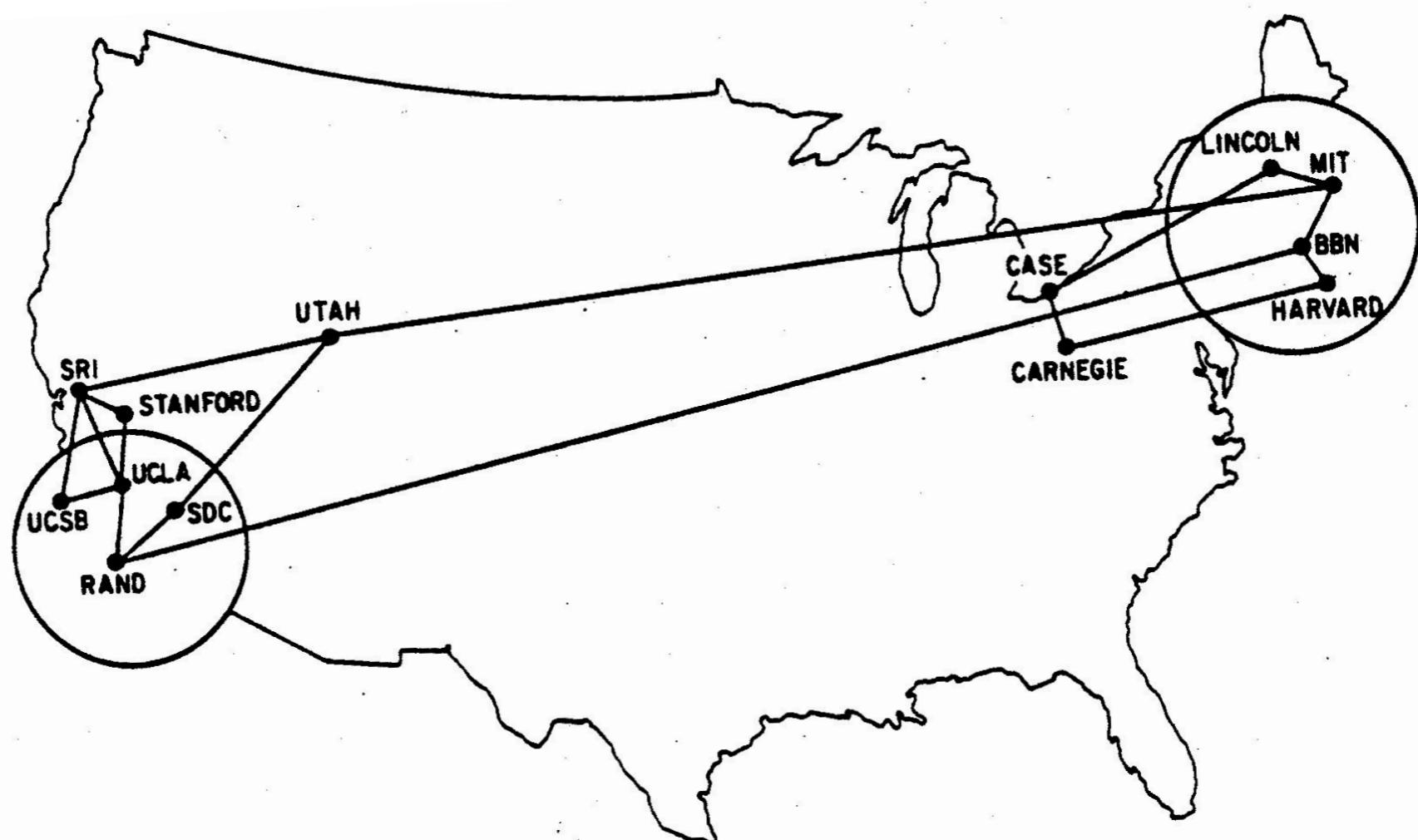
Jun. 1970



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

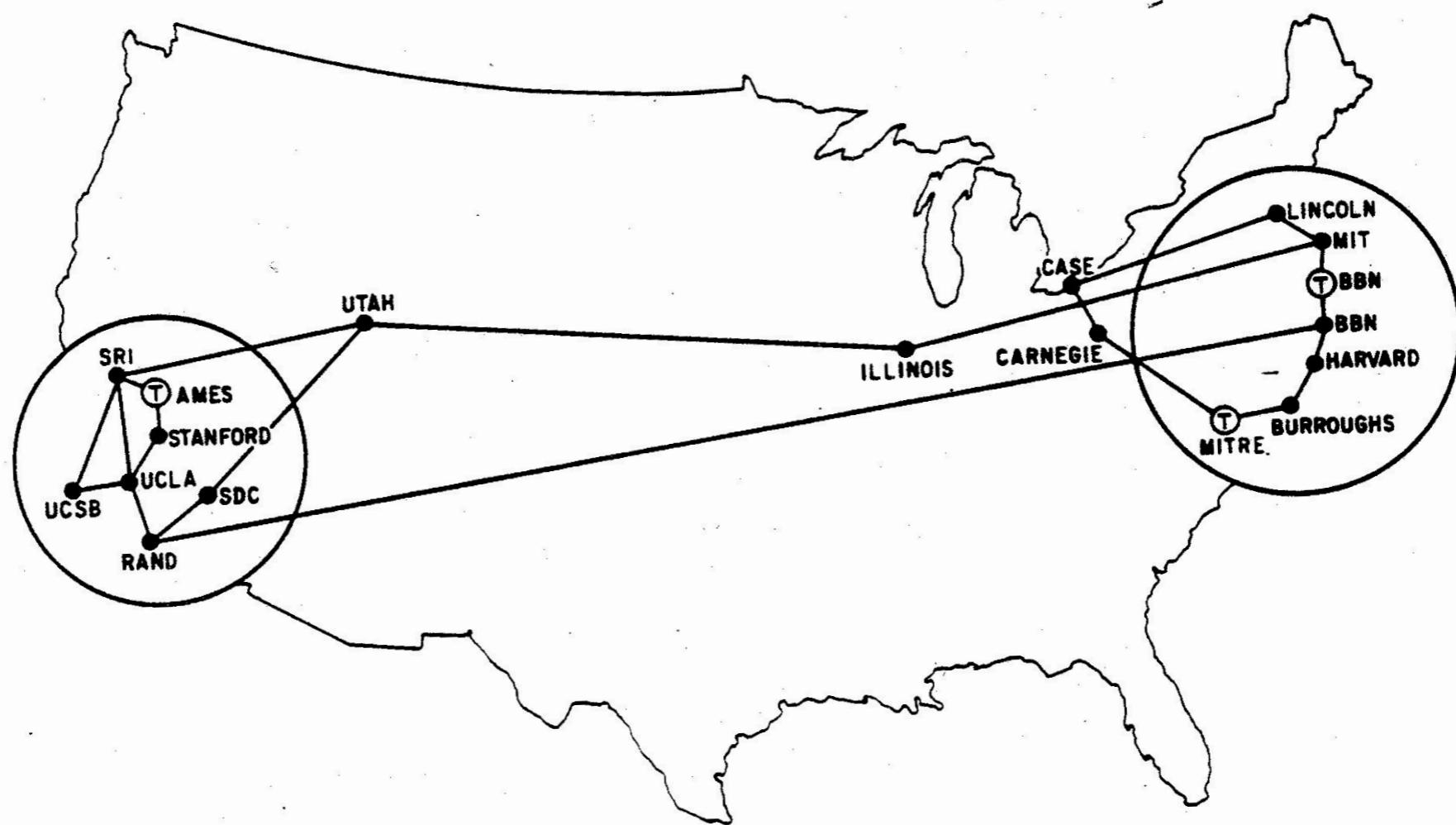
Dec. 1970



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

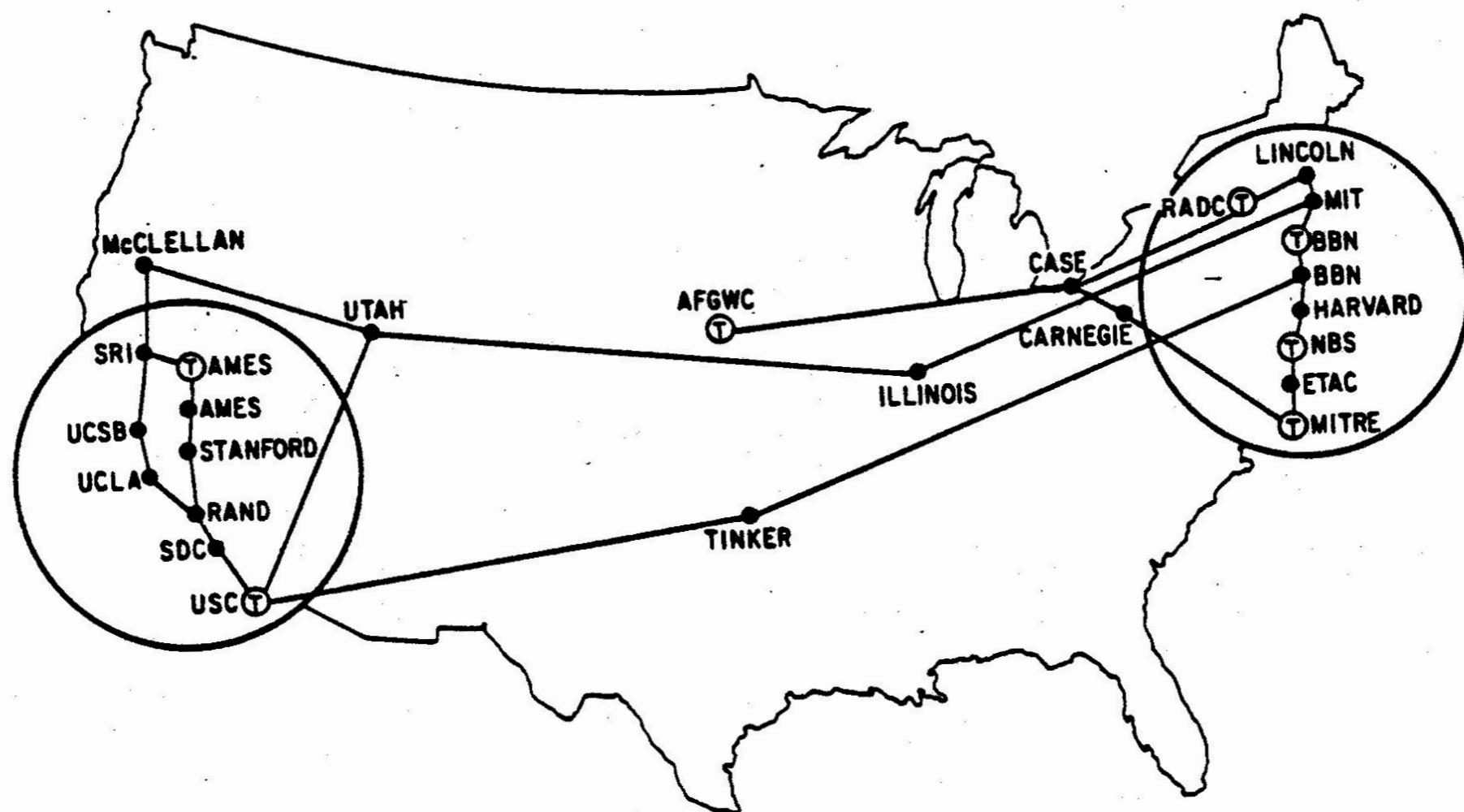
Sept. 1971



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

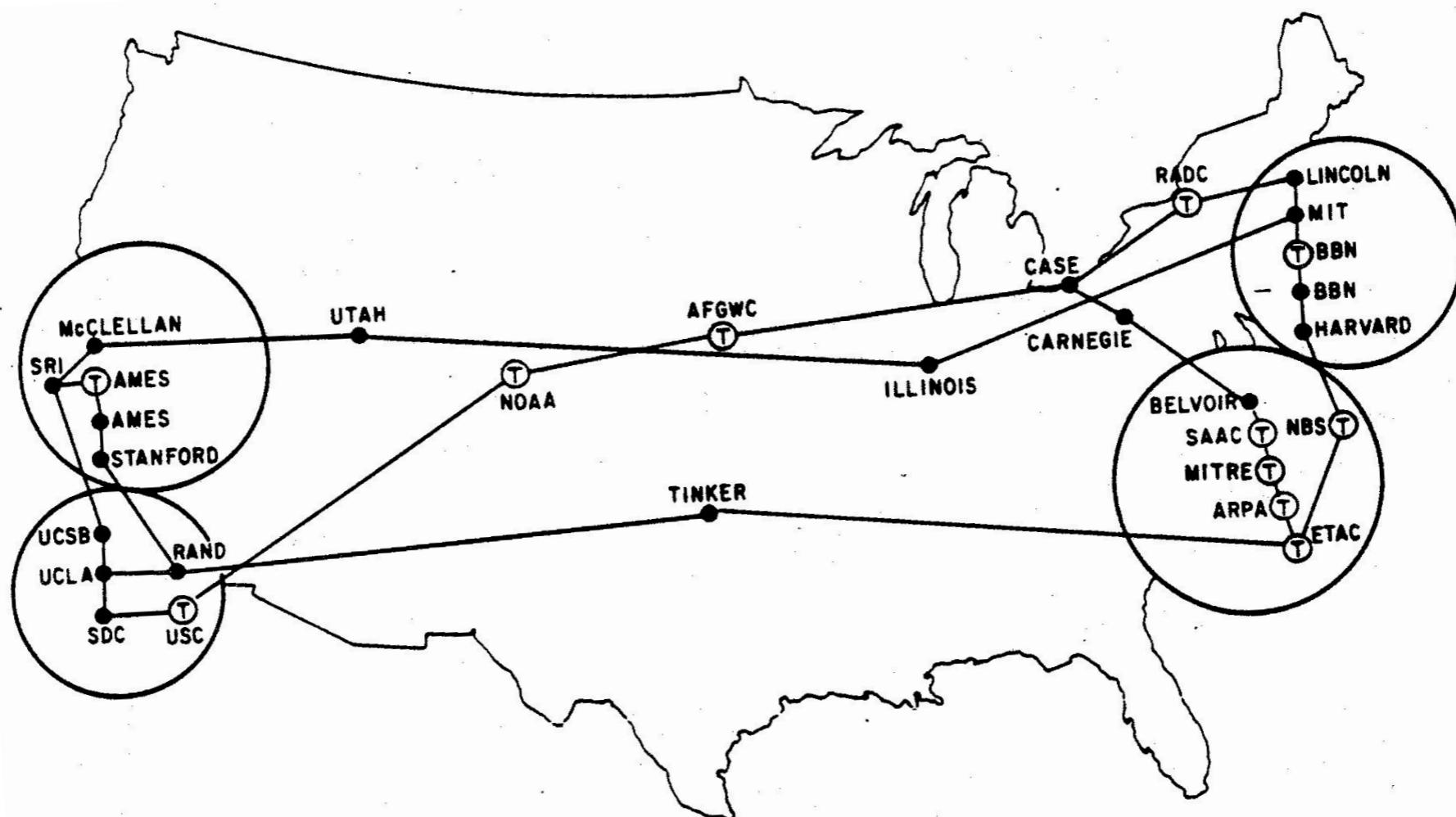
Mar. 1972



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

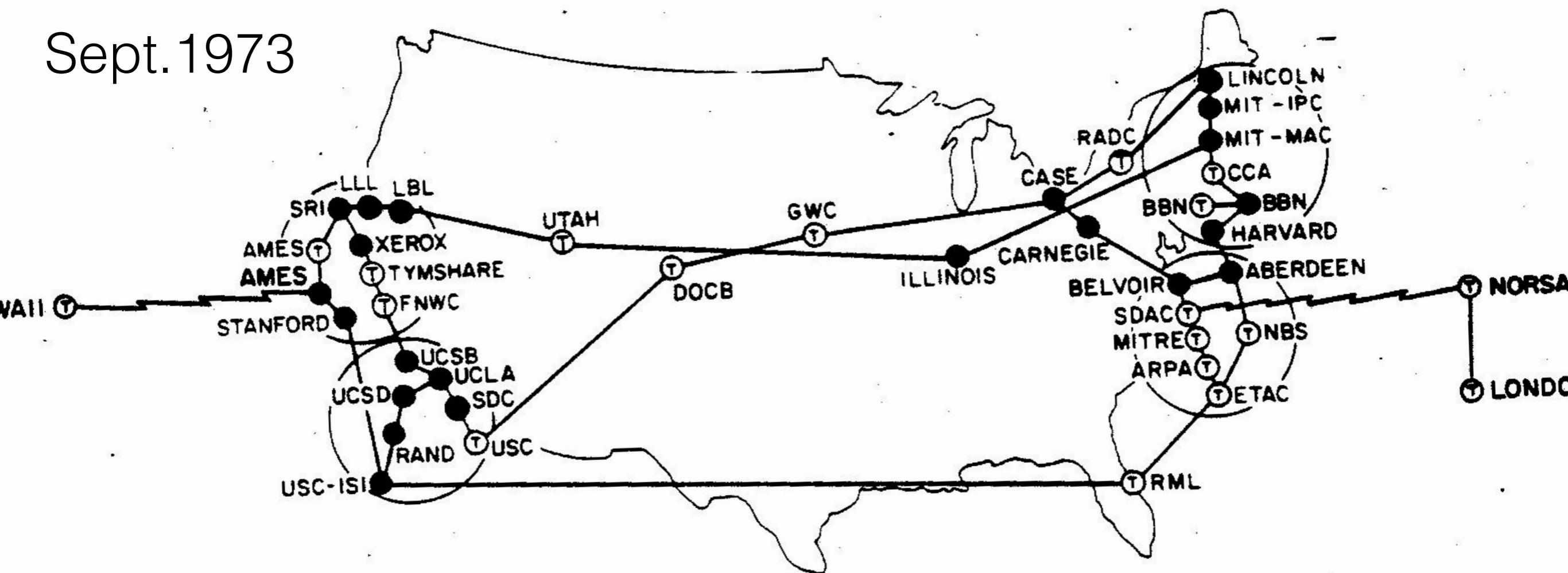
Aug. 1972



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

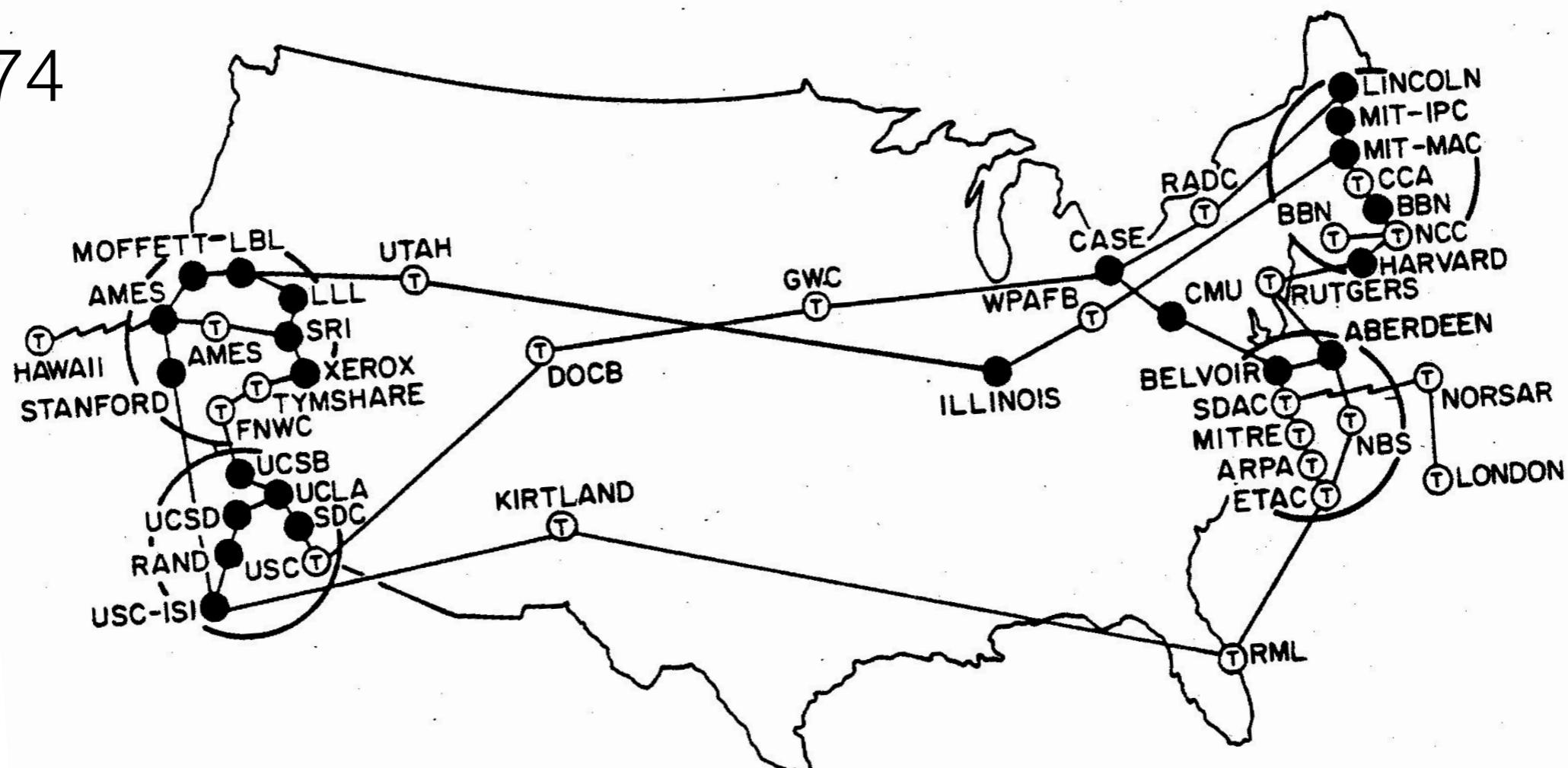
Sept. 1973



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

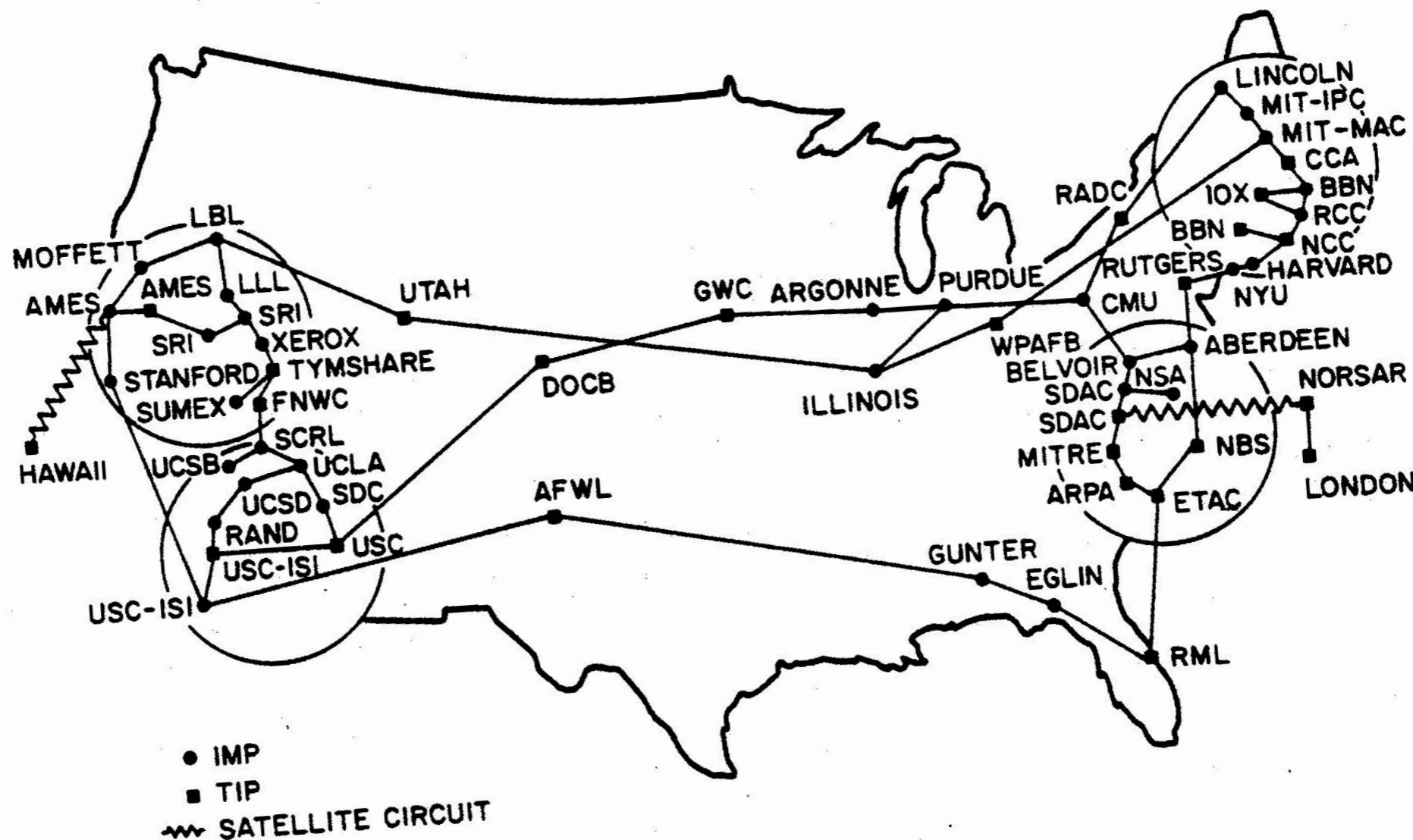
Jun. 1974



Taken from Heart, F., et al. 1978: ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

Pre-history of the Internet

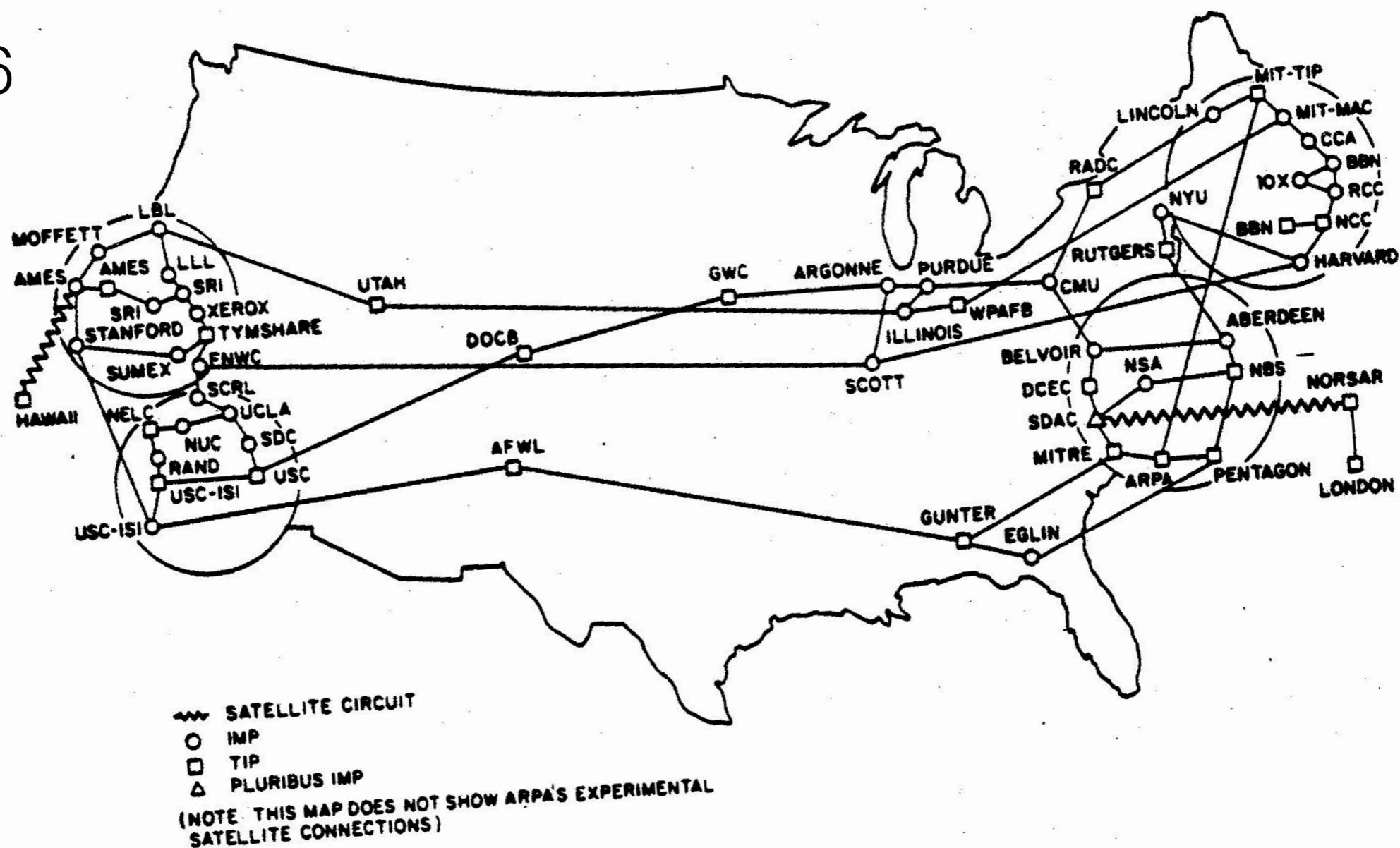
Jul. 1975



Taken from Heart, F., et al. 1978. ARPANET Completion Report. Bolt, Beranek, and Newman. Burlington, MA.

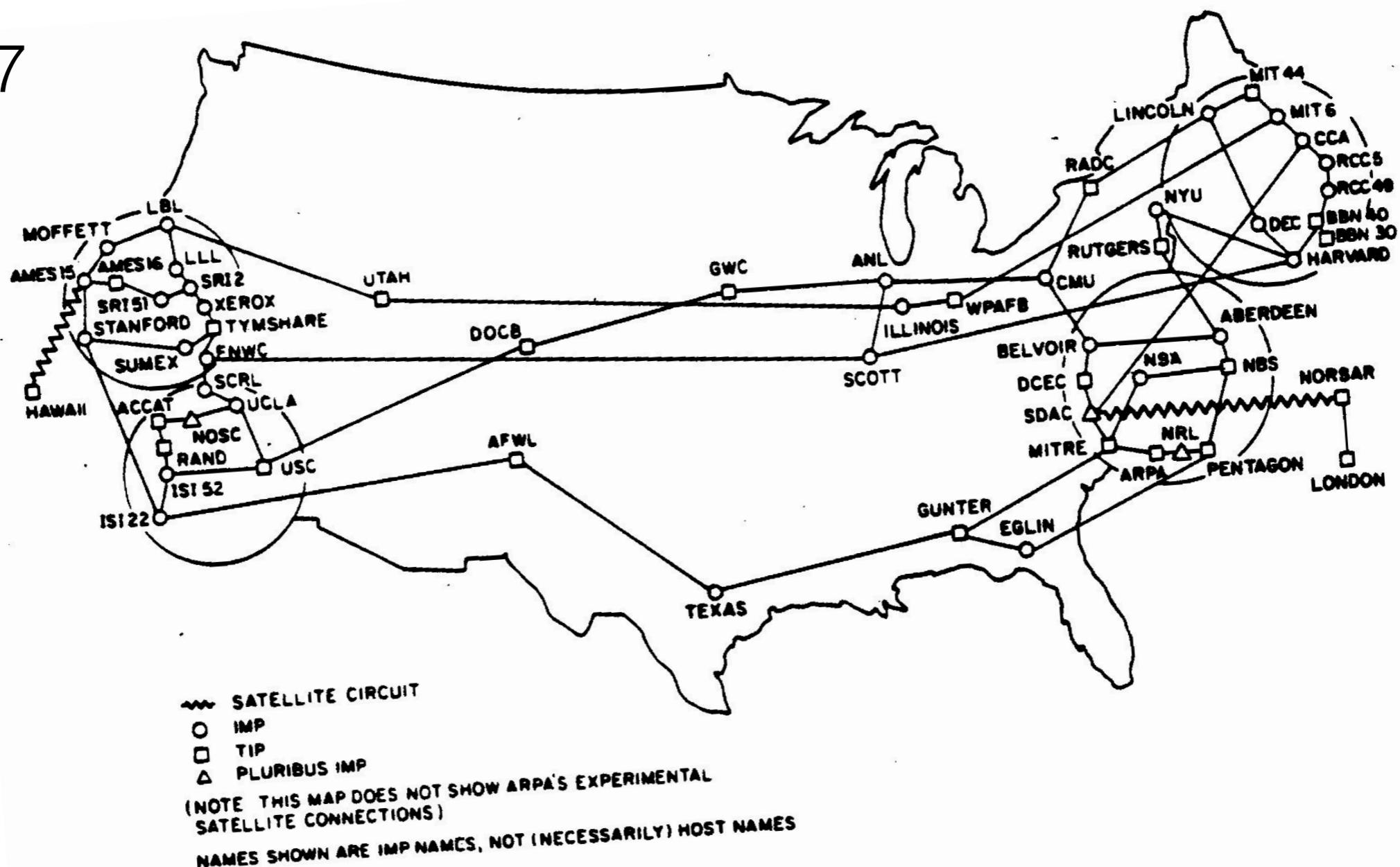
Pre-history of the Internet

Jul. 1976



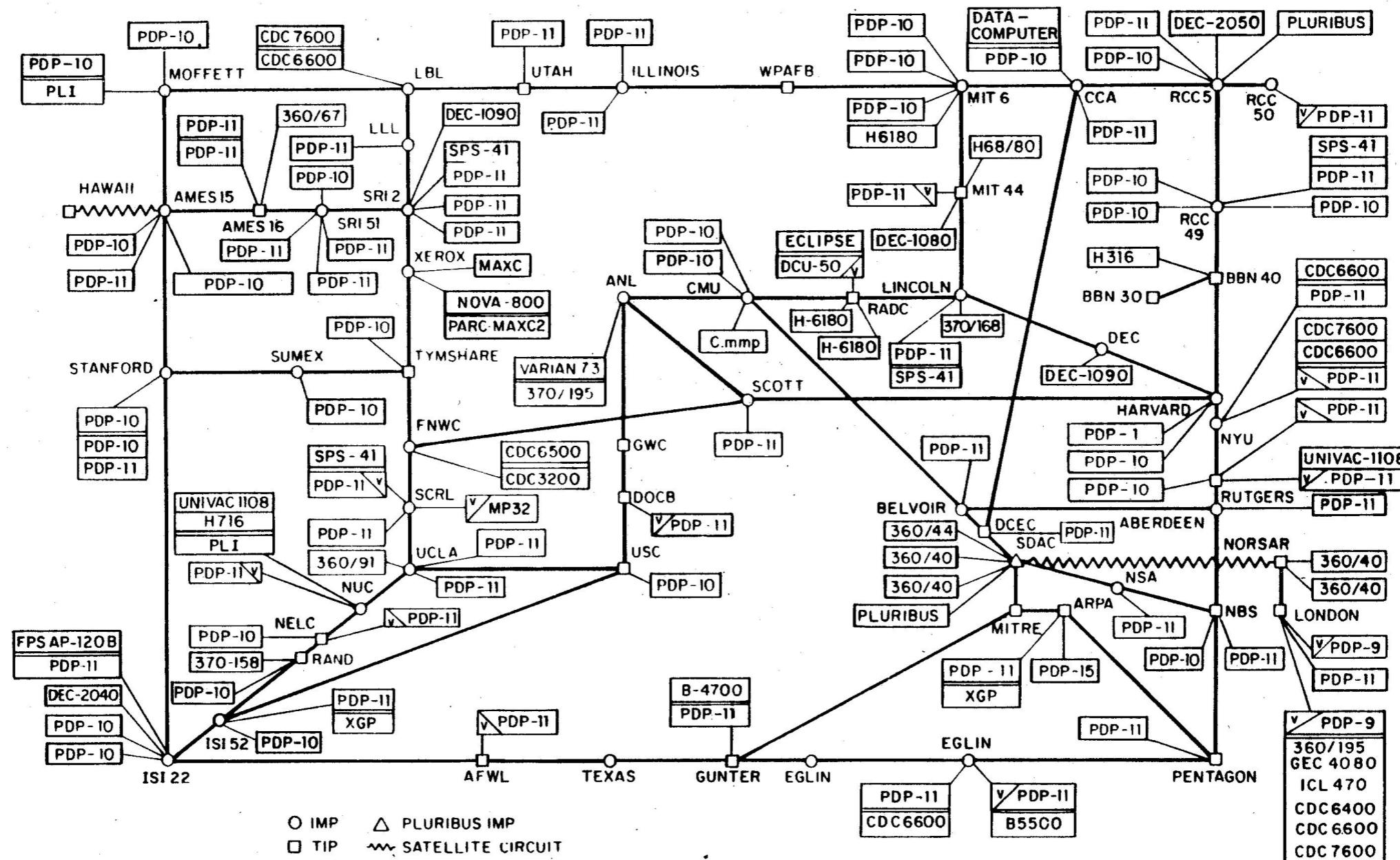
Pre-history of the Internet

Jul. 1977



Pre-history of the Internet

ARPANET LOGICAL MAP, MARCH 1977



(PLEASE NOTE THAT WHILE THIS MAP SHOWS THE HOST POPULATION OF THE NETWORK ACCORDING TO THE BEST INFORMATION OBTAINABLE, NO CLAIM CAN BE MADE FOR ITS ACCURACY)

NAMES SHOWN ARE IMP NAMES, NOT (NECESSARILY) HOST NAMES

Initial Internetting Concepts

- The original ARPANET grew into the Internet
- 1972: Robert Kahn introduced the key technical idea of an open-architecture network, and developed with Vint Cerf a new protocol that eventually would be called TCP/IP (Cerf and Kahn, 1974)
- Key concept of the Internet: it wasn't designed for a specific application, but as a general infrastructure for conceiving any application.
- First applications:
 - email
 - resource sharing
 - file transfer
 - remote login
 - packet-based voice communication
 - file and disk sharing

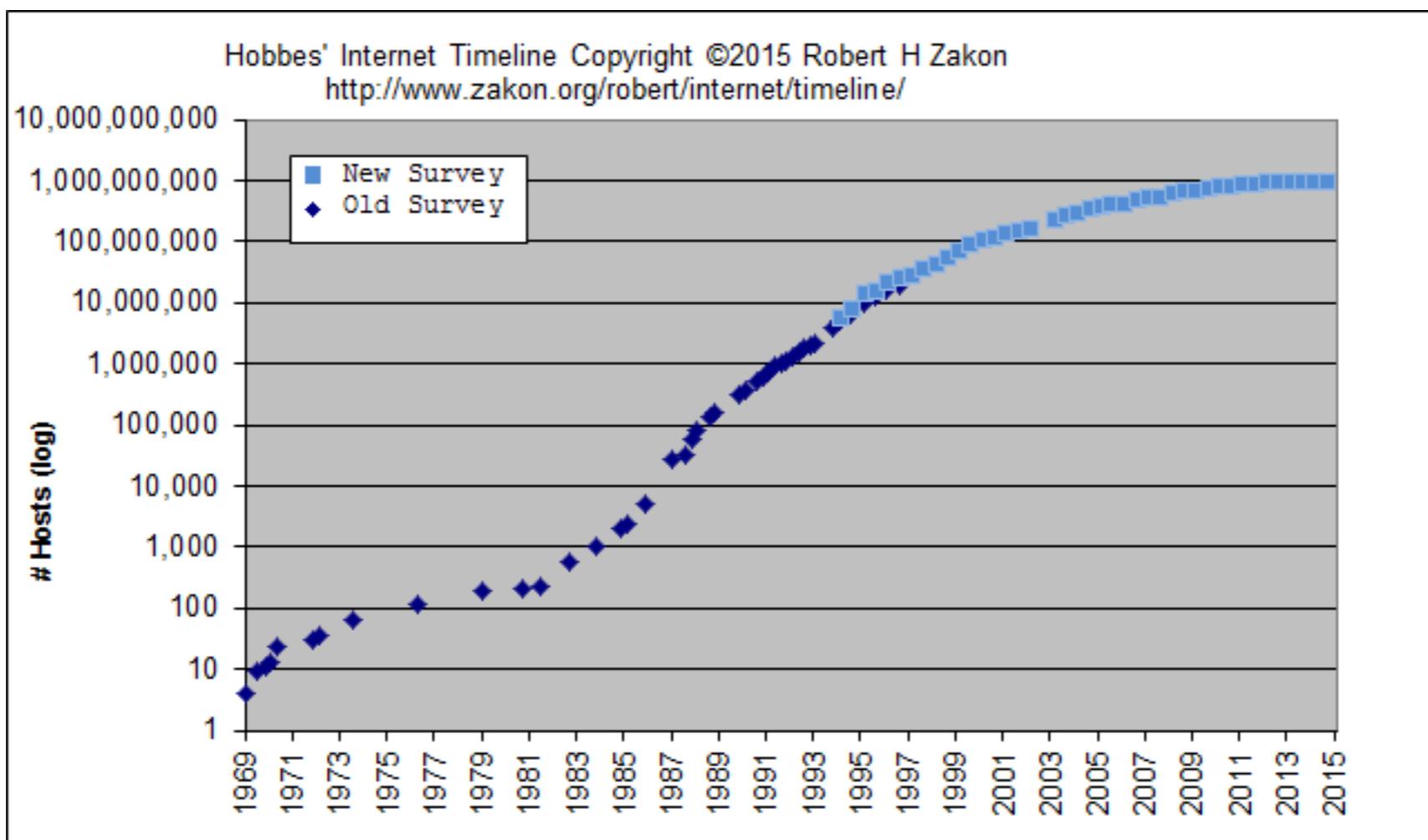
Protocols

- 1973: Bob Metcalfe@Xerox PARC developed the Ethernet technology
- 1976: compact and simple TCP implementation was designed for first personal computers
- 1980s: widespread creation of LANs and use of PCs lead to some management issues:
 - hosts were assigned names, and so it was not necessary to remember the numeric addresses anymore
 - a single table of hosts and names was no longer feasible because there were many
- 1983 was an important year for the Internet:
 - Paul Mockapetris invented the DNS, allowing to resolve hierarchical host names into an Internet address
 - Internet protocols were incorporated natively into the UNIX OS at UC Berkeley, which led to a widespread adoption of the Internet into the research community
 - ARPANET moved from its own host protocol to TCP/IP

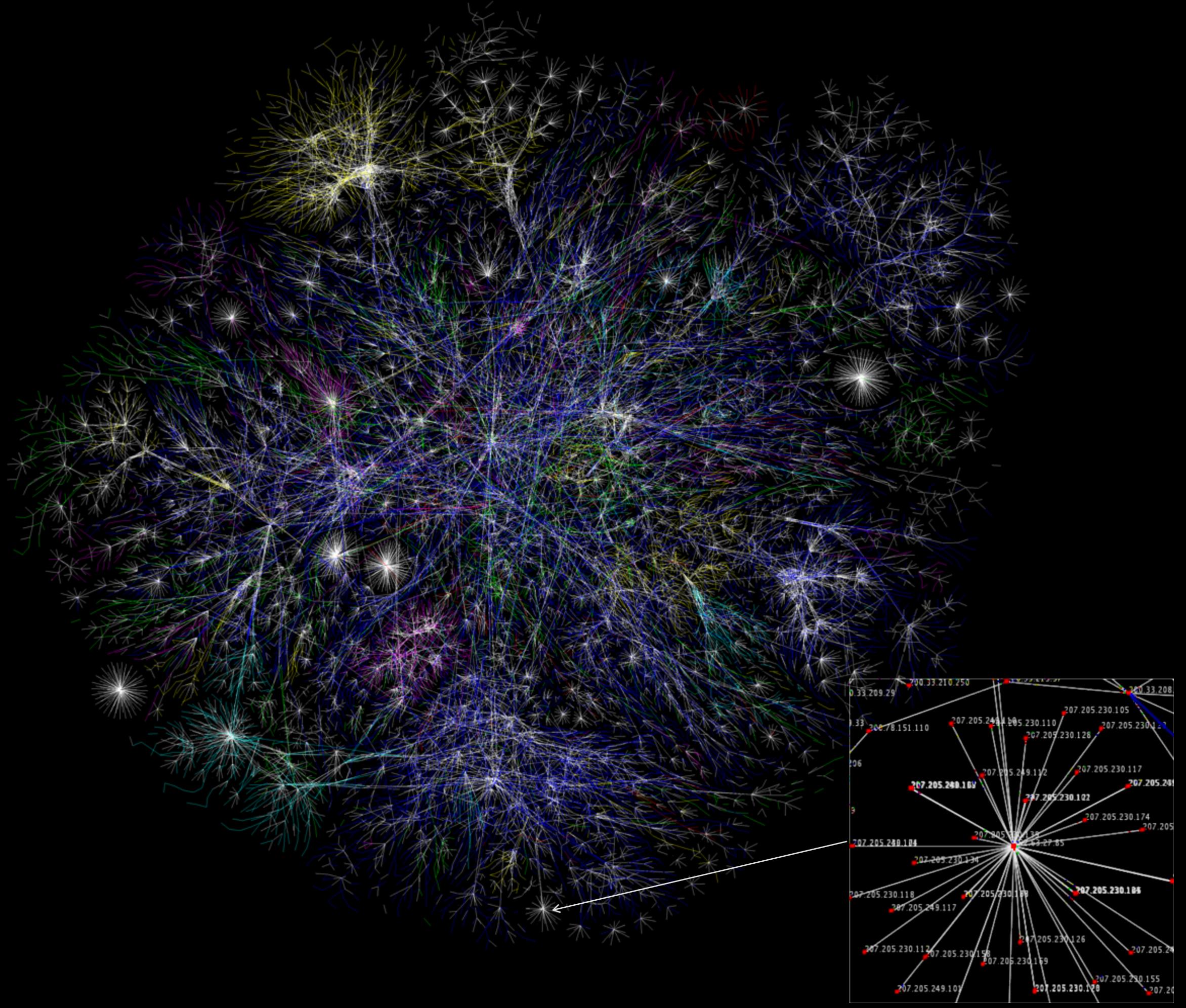
Widespread infrastructure

- US Federal agencies made and implemented policy decisions that shaped Internet by the late 80s
 - Federal agencies shared the cost of common infrastructure (e.g., trans-oceanic circuits)
 - NSF encouraged regional networks to look for non-academic customers to lower subscription costs for all
 - However, NSF prohibited the use of its national network for non-academic or research purposes with the intention of stimulate the growth of private networks
 - 1995: The NSF national network was defunded in 1995, but its policies led the Internet to grow to around 30,000 networks just in the US
- 1995: FNC passed a resolution defining the term Internet:
 - **“Internet” refers to the global information system that:**
 - is linked together by a globally unique address space based on the IP
 - is able to support communications using TCP/IP
 - provides high level services layered on the communications and infrastructure previously described

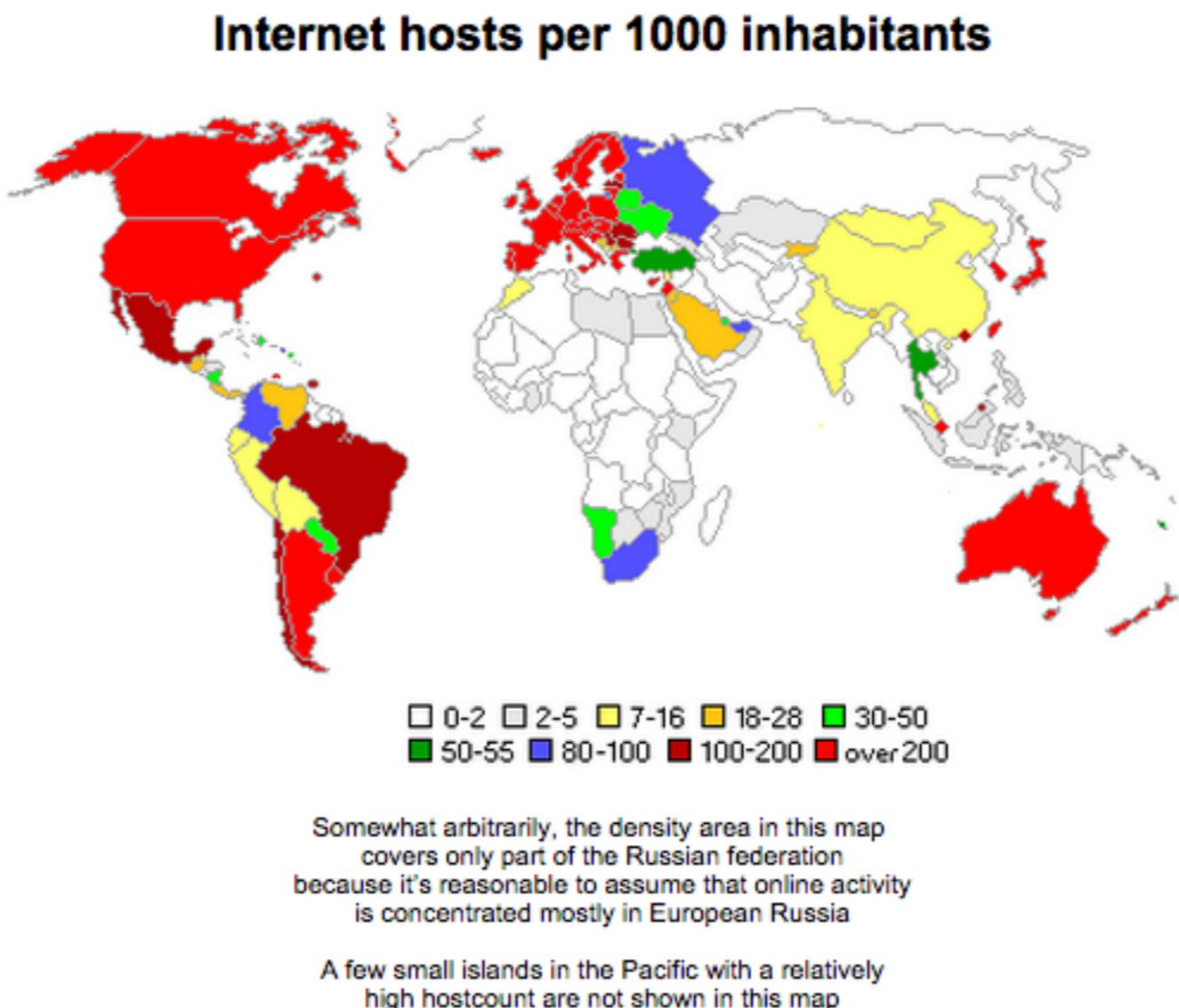
Growth of number of Internet Web servers



Taken from Hobbes' [Internet Timeline](#)



Internet penetration by country



Taken from <http://www.gandalf.it/data/data1.htm>,
data up to December 2012

Internet stats

- Internet usage and population in the world
 - <http://www.internetworldstats.com/stats.htm>
- Internet traffic
 - <http://www.internetlivestats.com/>

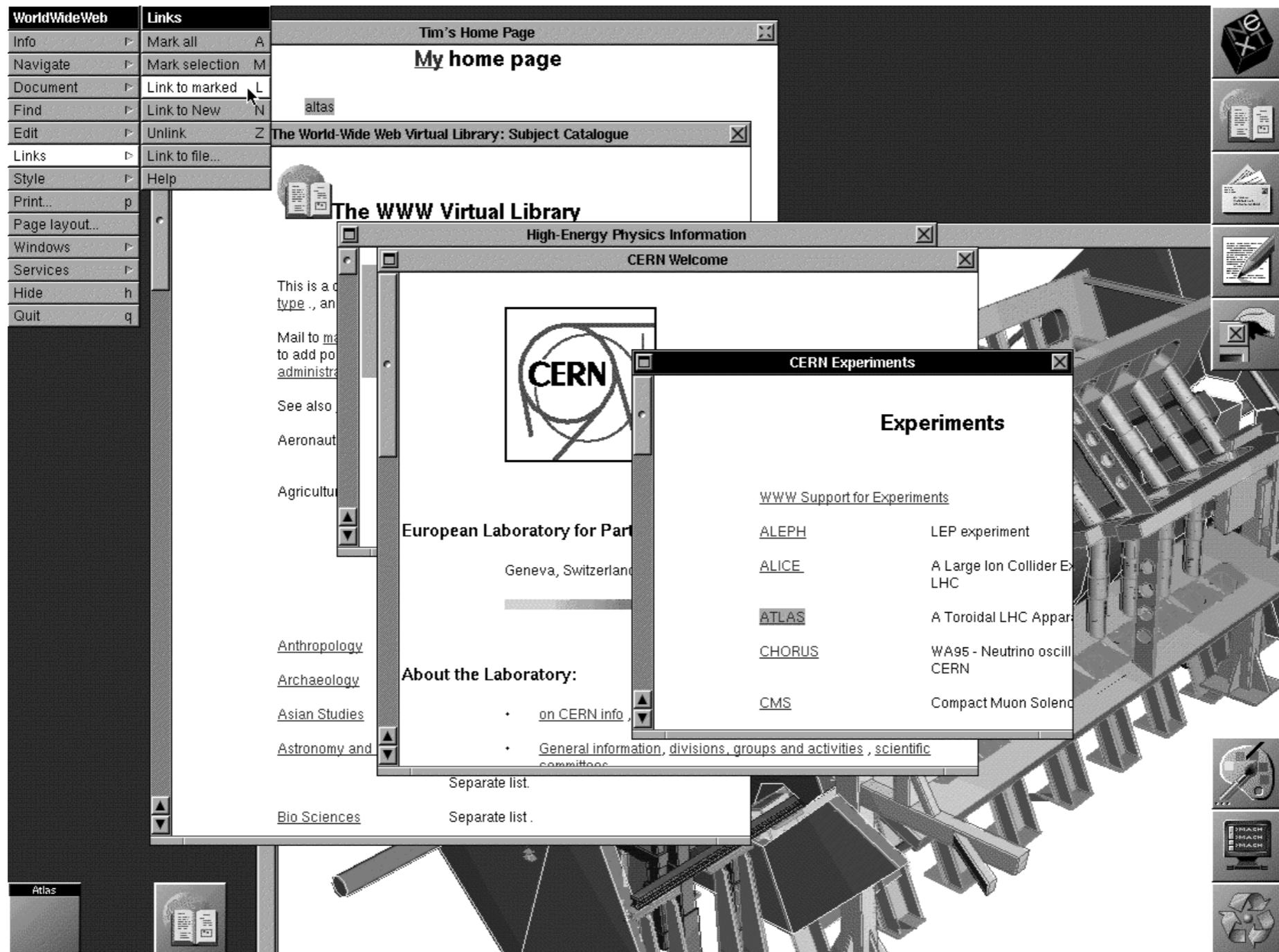
The Web (WWW)

- W3C (World Wide Web Consortium) appeared as the new organization for the coordination and evolution of the various protocols. Initially led by Tim Berners-Lee @ CERN
- He designed the Web as a system of interlinked hypertext documents that are accessed via the Internet
- With a web browser, people can view web pages that may contain text and media, and can be navigated between them by hyperlinks
- The first website in the world was dedicated to the WWW project itself and was hosted on Berners-Lee's computer
- The site was restored in its original address and can be accessed at <http://info.cern.ch/hypertext/WWW/TheProject.html>

HTML

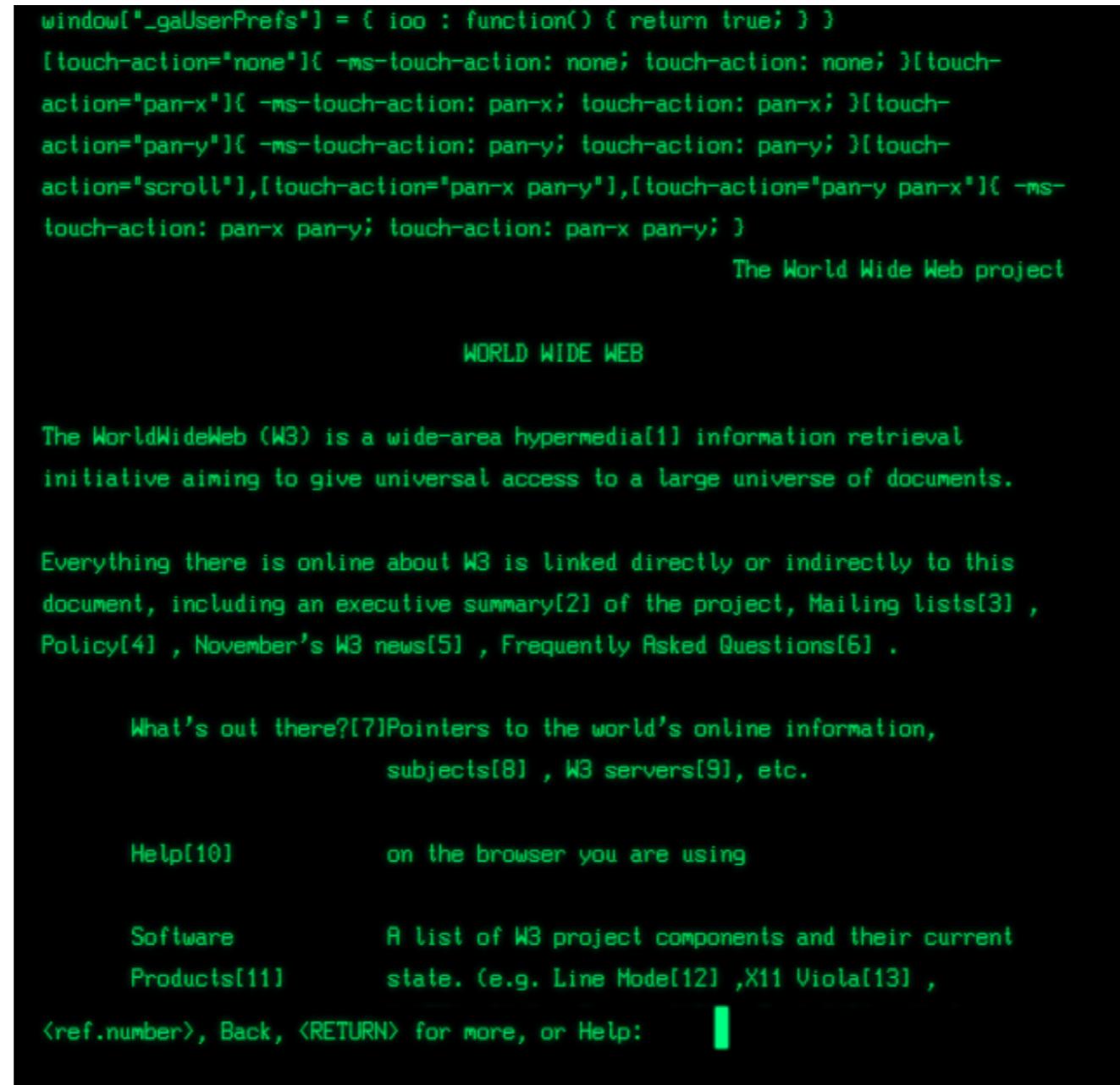
- The WWW system uses marked-up text to represent a hypertext document for transmission over the network
- WWW parsers should ignore tags which they do not understand, and ignore attributes which they do not understand of tags which they do understand
- Backwards compatible by design:
 - even the first webpage still work in a modern browser
 - modern webpages should be readable in old browsers

History of WWW: Browsers



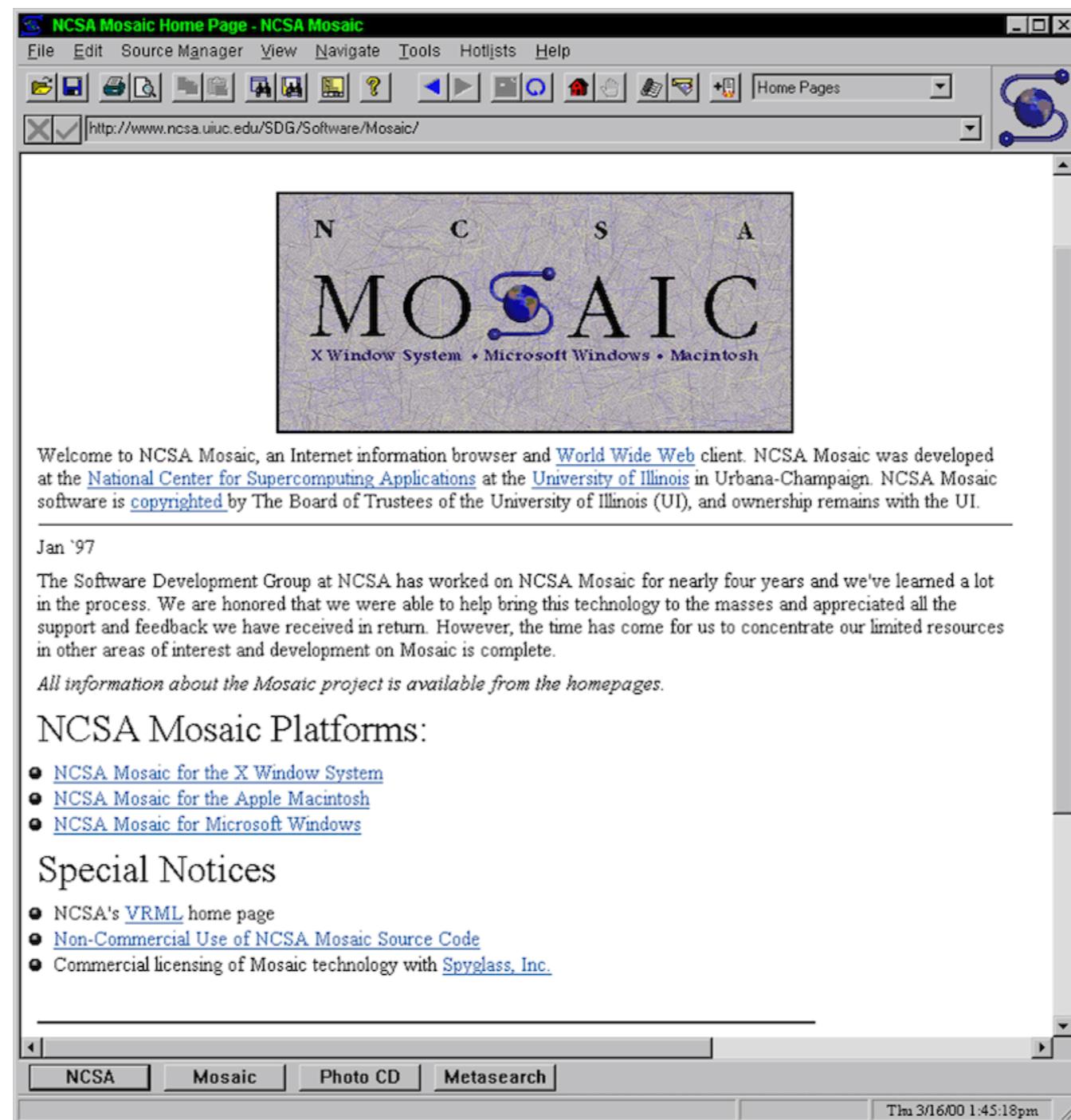
1990: WorldWideWeb by Tim Berners-Lee

History of WWW: Browsers



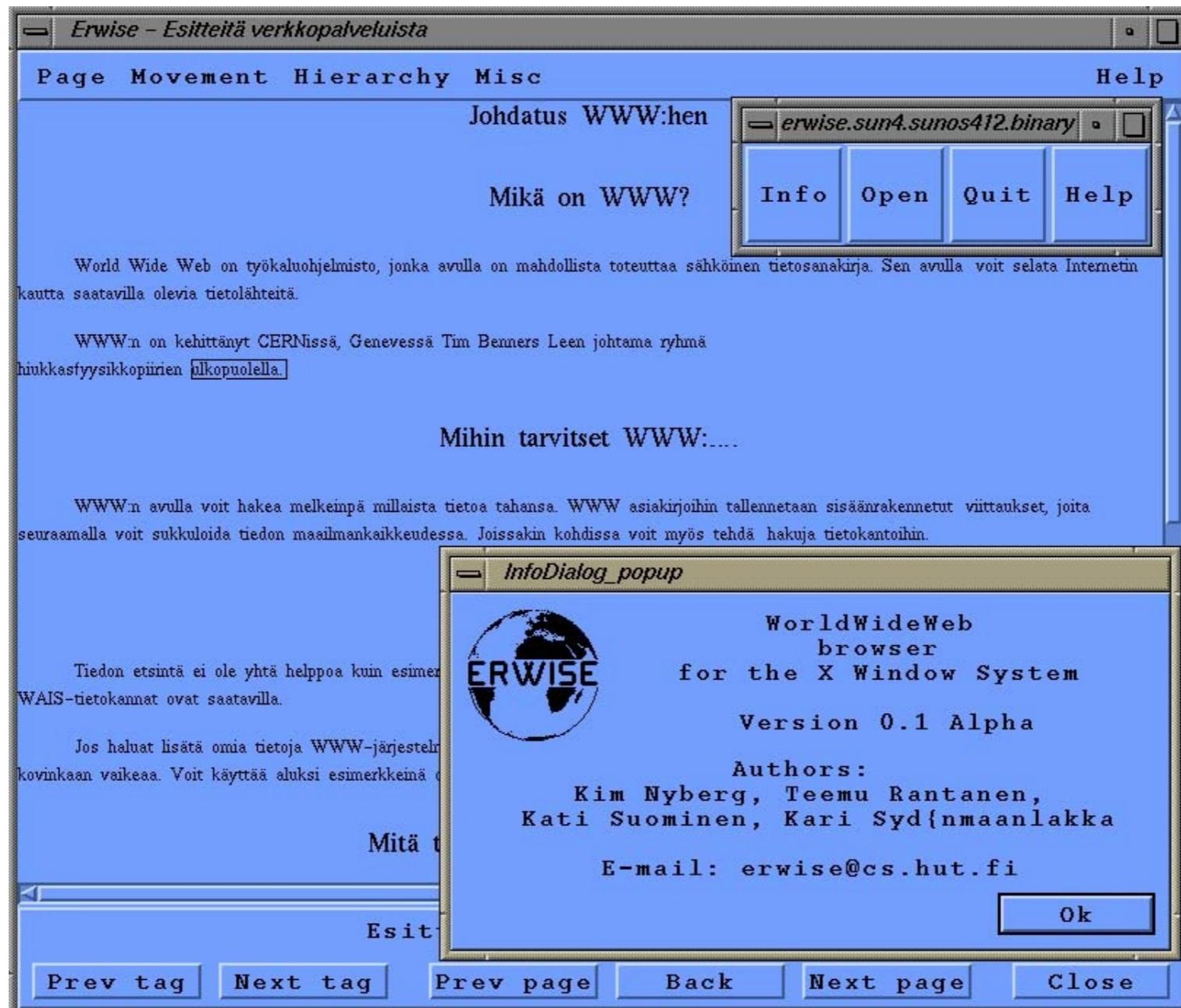
1992: WorldWideWeb Line Mode browser by Tim Berners-Lee

History of WWW: Browsers



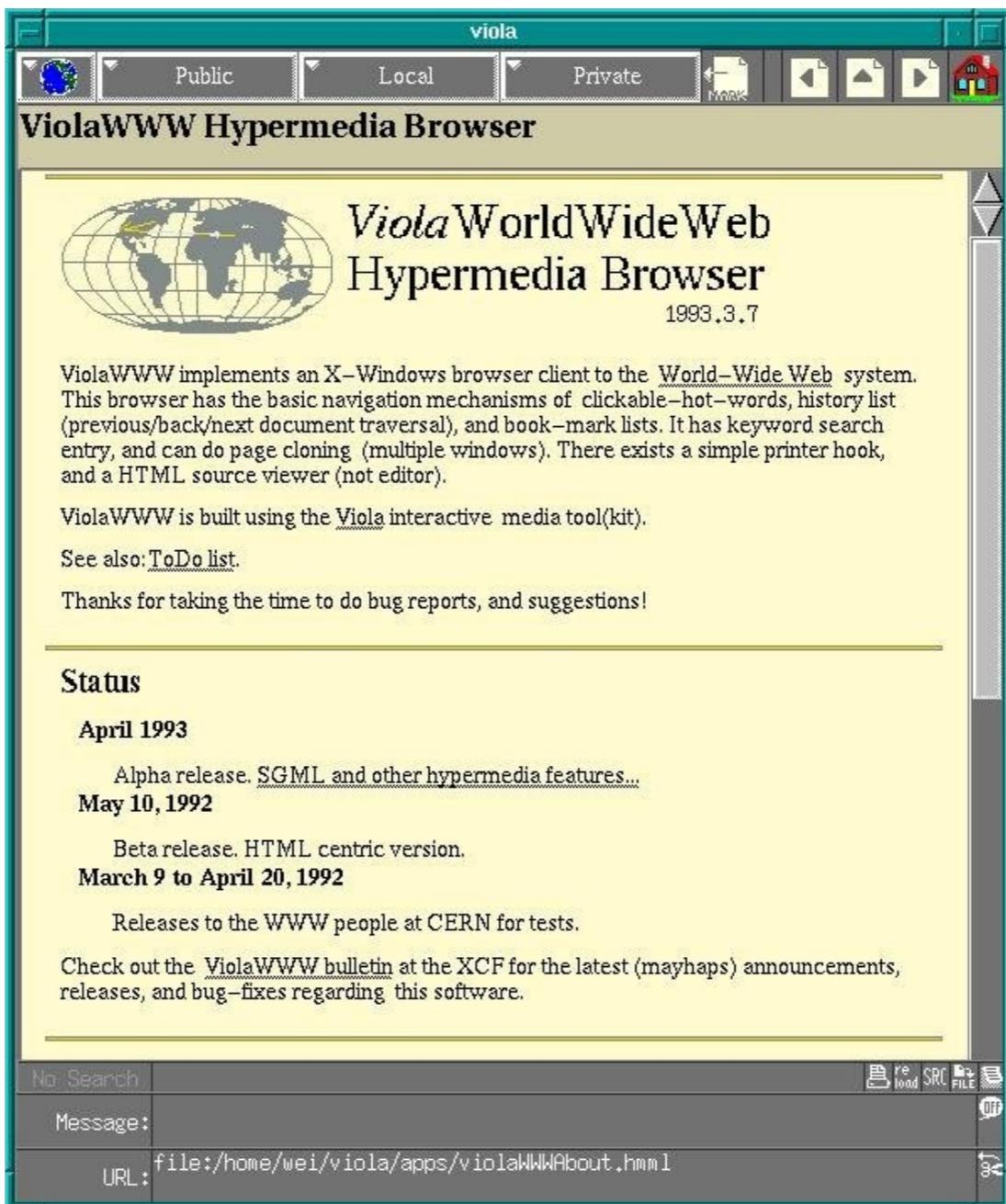
1992: Mosaic@NCSA

History of WWW: Browsers



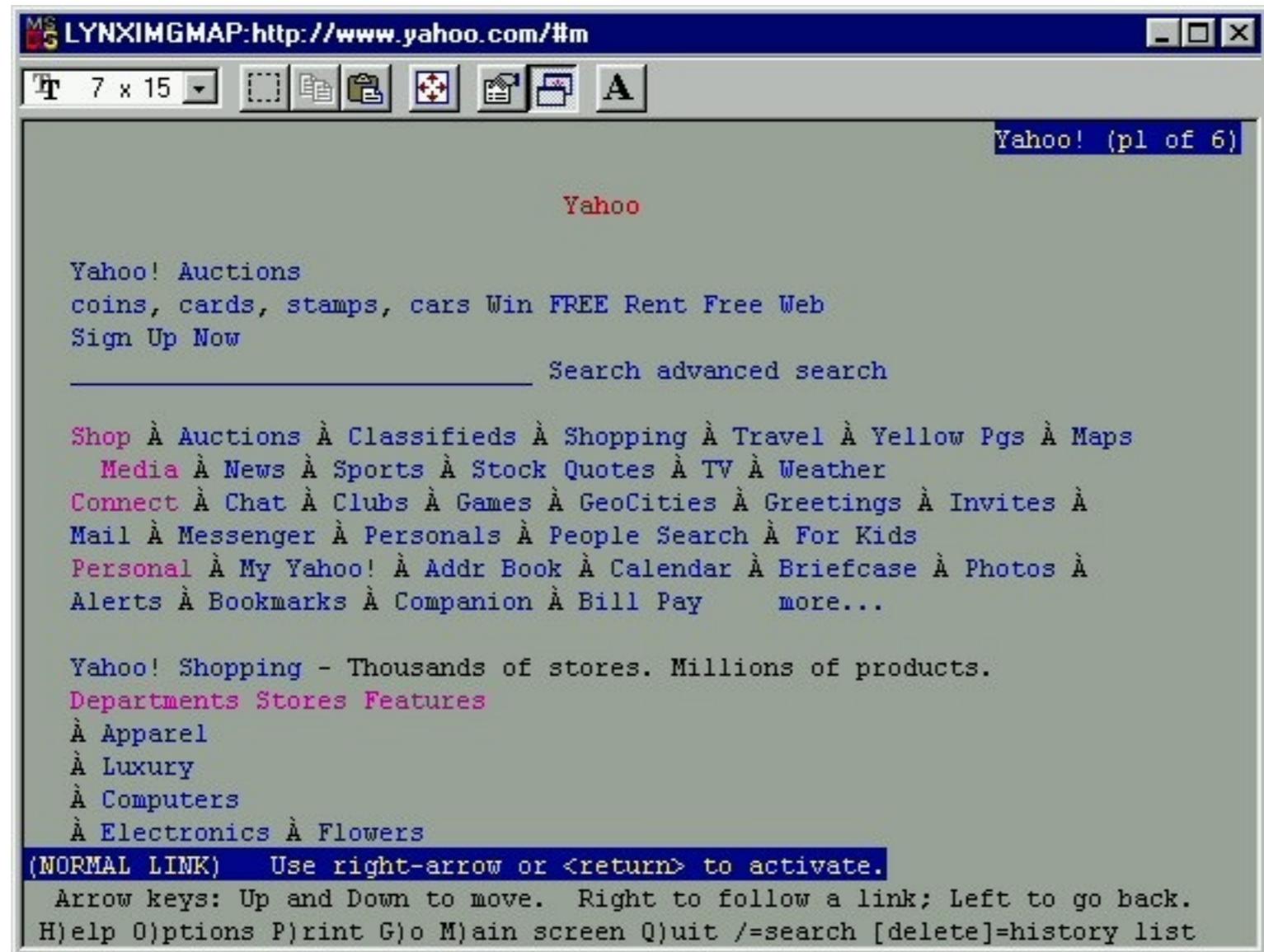
1992: Erwise @ Helsinki University of Technology

History of WWW: Browsers



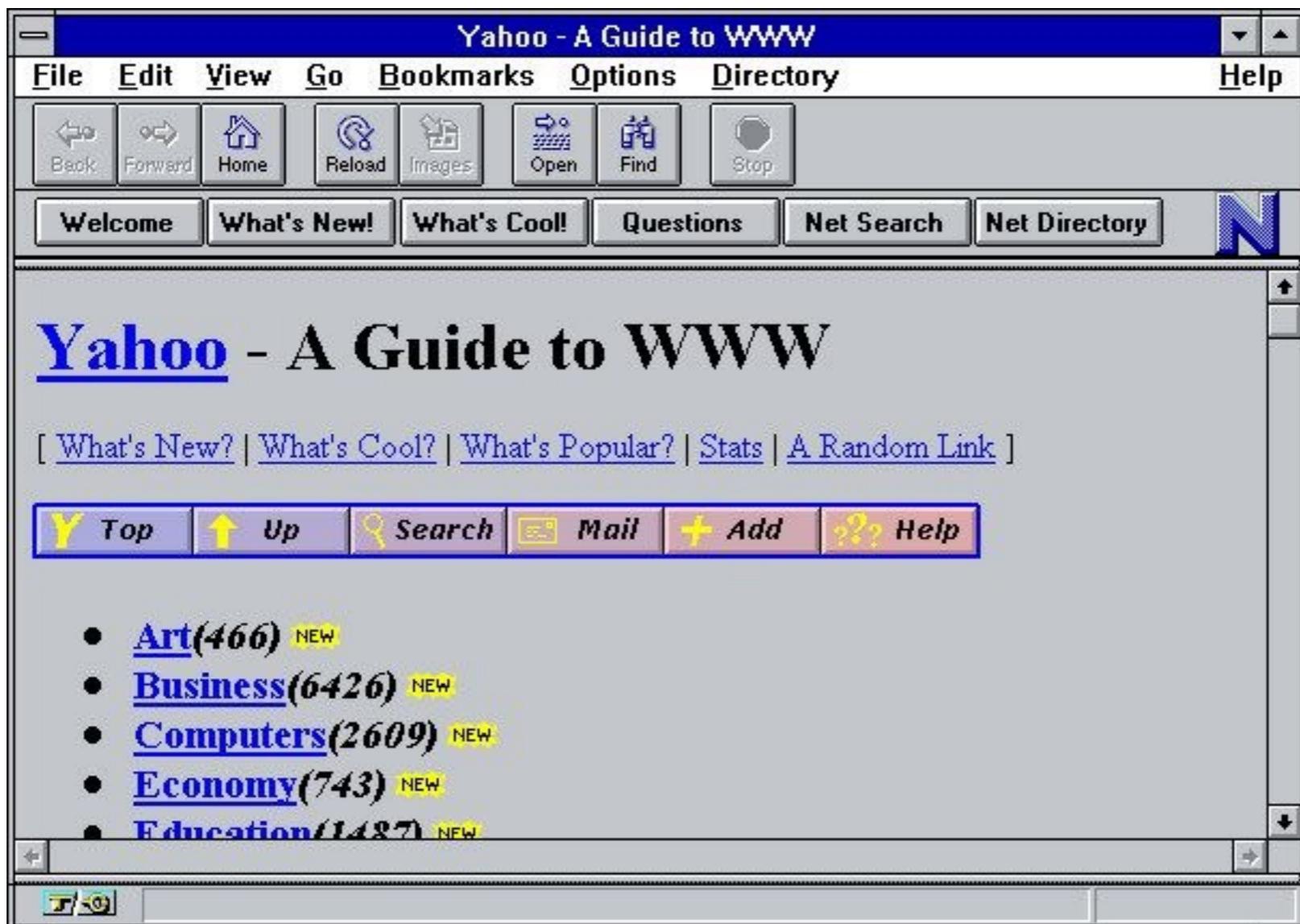
1992: ViolaWWW by Pei-Yuan Wei

History of WWW: Browsers



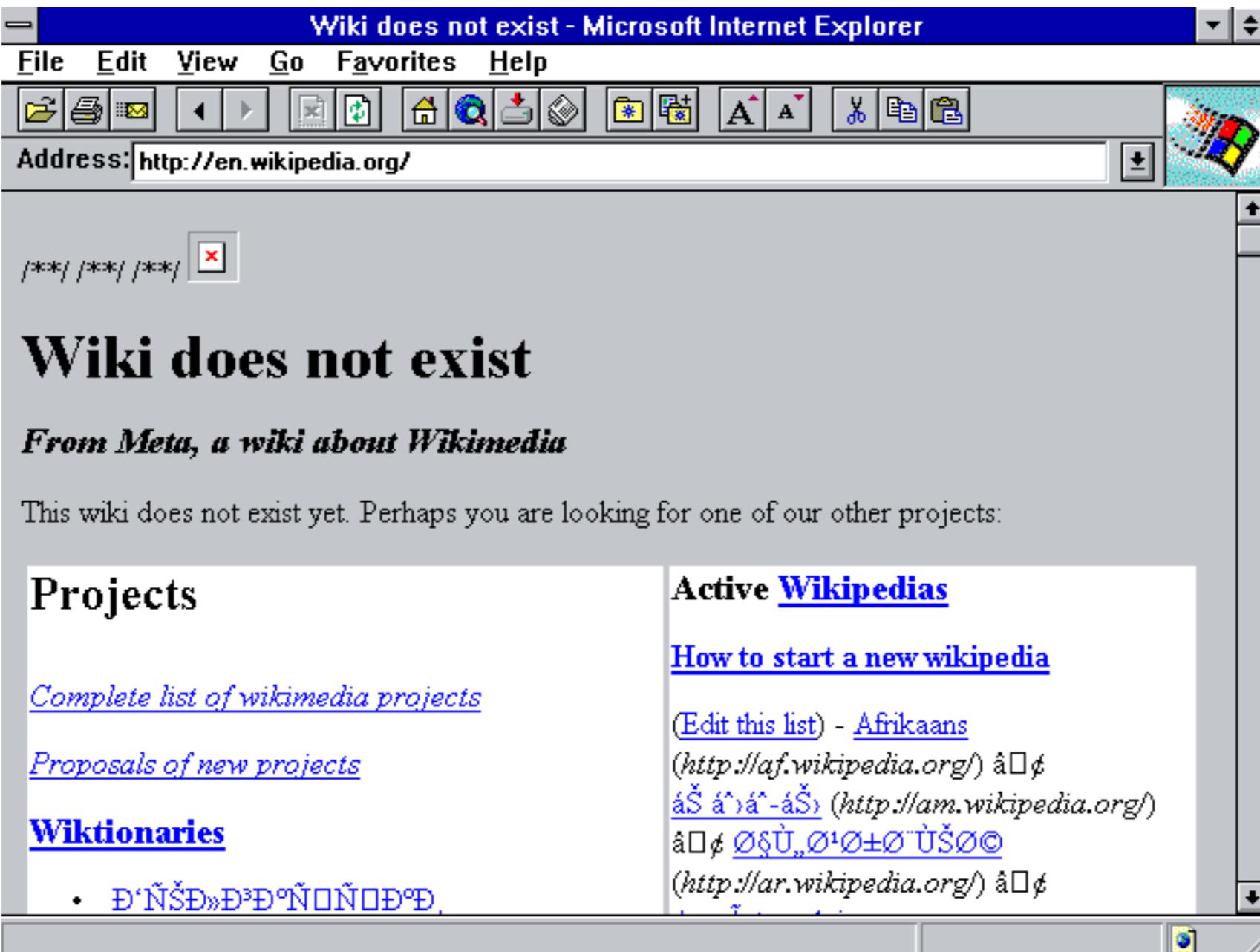
1992: Lynx@University of Kansas

History of WWW: Browsers



1994: Netscape (M. Anderseen from Mosaic@NCSA)

History of WWW: Browsers



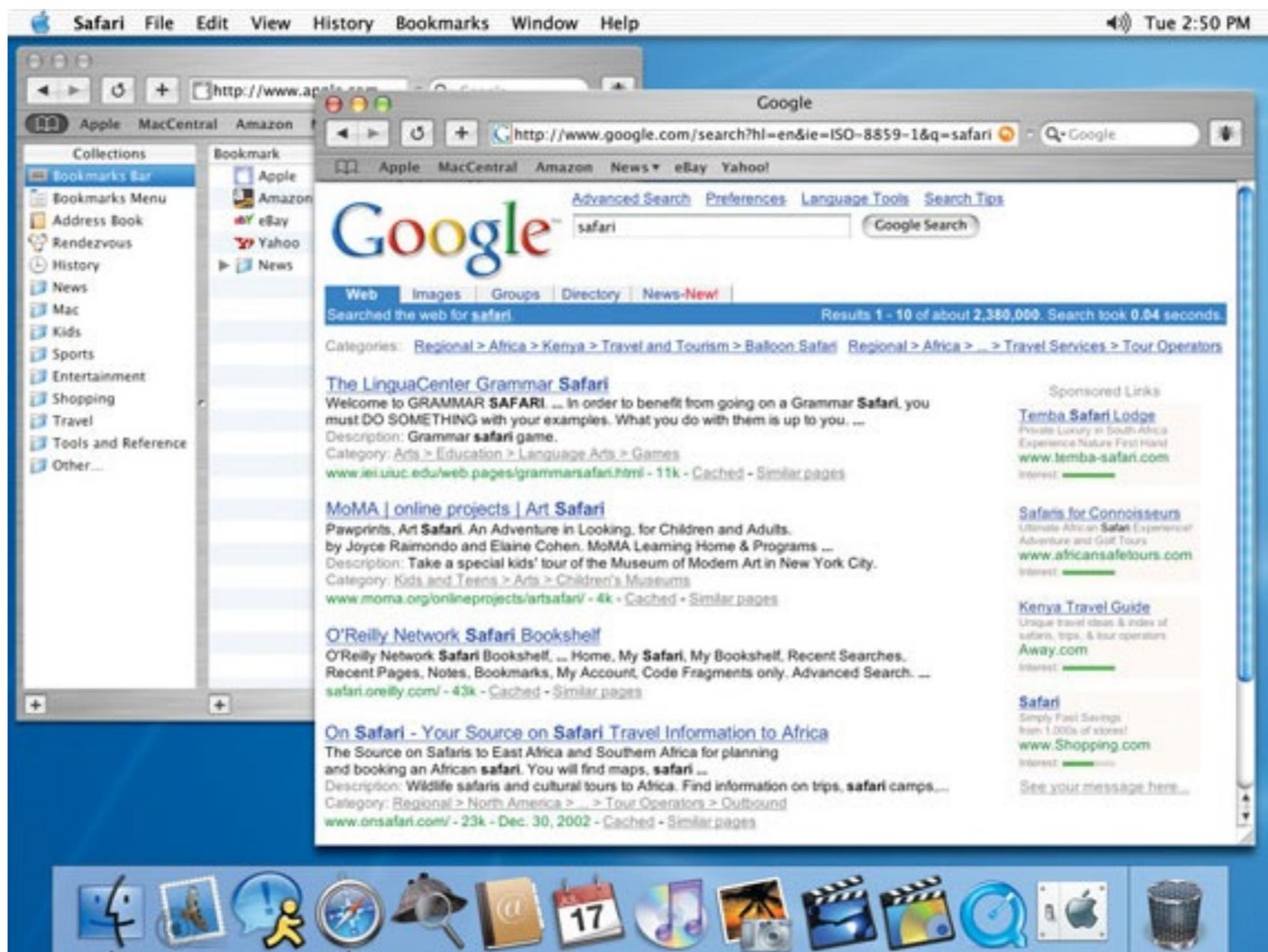
1995: Internet Explorer (Microsoft)

History of WWW: Browsers



1996: MultiTorg Opera

History of WWW: Browsers



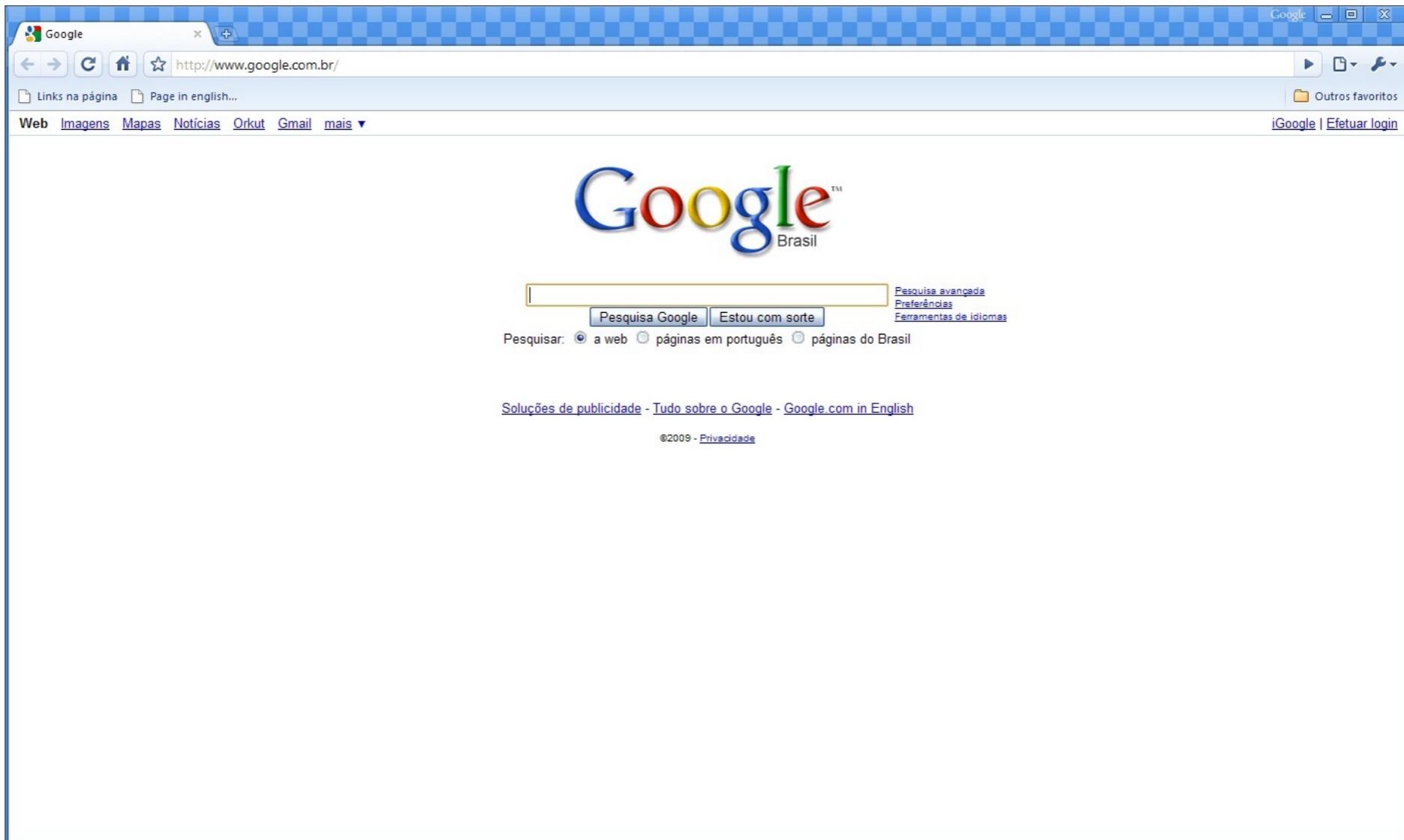
2003: Safari (Apple)

History of WWW: Browsers



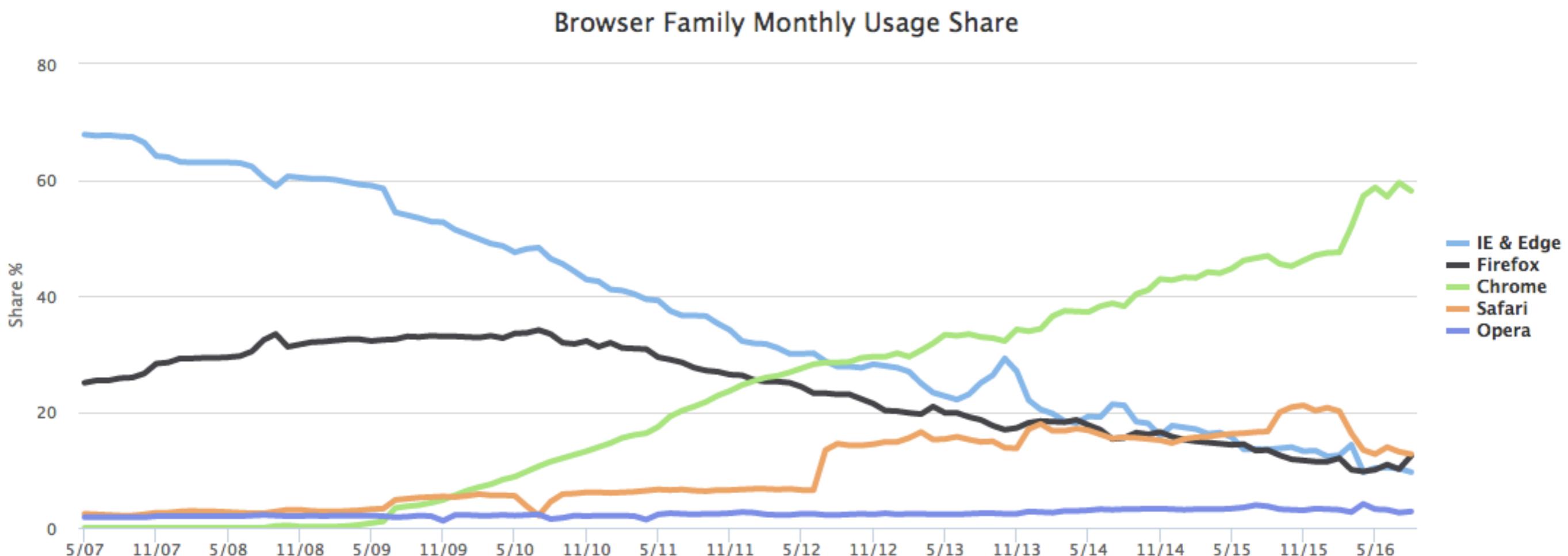
2004: Firefox (Mozilla project)

History of WWW: Browsers



2008: Chrome (Google)

History of WWW: Browsers



Taken from <http://www.w3counter.com/trends>

BREAK

Intro to HTML

(from [w3schools.com](https://www.w3schools.com))

- **What is HTML?**
 - Hyper Text Markup Language
 - **Language for describing web pages.**
 - A markup language is a **set of markup tags**
 - The **tags describe document content**
 - HTML documents contain **HTML tags** and **plain text**
 - HTML documents are also called **web pages**

Intro to HTML

(from [w3schools.com](https://www.w3schools.com))

HTML Tags

- Are **keywords surrounded by angle brackets** (e.g., <html>)
- **Normally come in pairs** (e.g., <p> and </p>)
- The end tag is written like the start tag, with a slash before the tag name
`<tagname>content</tagname>`

HTML Elements

- An **individual component** of an HTML document
- Most elements are written with the **text content between tags**:

```
<title>This is the title</title>  
<p>This is a paragraph</p>
```

- Some elements **can have attributes**

```
<a href="www.vigliensi.com">Link to my webpage</a>
```

- [HTML5 list of elements](#), [HTML W3 schools](#)

Intro to HTML

(from [w3schools.com](https://www.w3schools.com))

Visualization of an simple HTML page structure:

```
<html>

    <head>
        <title>Page title</title>
    </head>

    <body>
        <h1>This is a heading</h1>
        <p>This is a paragraph.</p>
        <p>This is another paragraph.</p>
    </body>

</html>
```

Code editors

- Text editor program designed specifically for editing source code
- Syntax highlighting, indentation, autocomplete features, and bracket matching, among other features
- May be Standalone, built into an IDE, or web-based
- Free options (fully functional with some restrictions)
 - Sublime Text
 - TextMate
 - Komodo Edit (with integrated SFTP)
 - codeanywhere.com (integrated SFTP)

Code editors

- NOW! Open Sublime Text

Intro to HTML

([w3schools.com/html](http://www.w3schools.com/html))

Simple in-class assignment

- In your local machine
 - Create a folder for your website development
 - Open your code editor (e.g., Sublime Text)
 - Create new file, and save it as `index.html` within the folder you just created
- Within that file write HTML code for:
 - giving the page a title
 - giving a welcome message (e.g., “This is my homepage...”)
 - displaying a picture of you (check http://www.w3schools.com/html/html_images.asp)
 - creating hyperlinks to all your classmates’ homepages
 - creating a second HTML page (e.g., “bio.html”)
 - linking the two HTML pages together

Files in Web server

Now we have to upload the files to its final destination in the Web server

We can make use of any FTP software, but the MTCL has CyberDuck

Open CyberDuck and create a connection with SFTP

server: 132.206.14.130

username: yourusername

password: yourpassword

Drag your local folder to www, which is your publicly available folder on the server

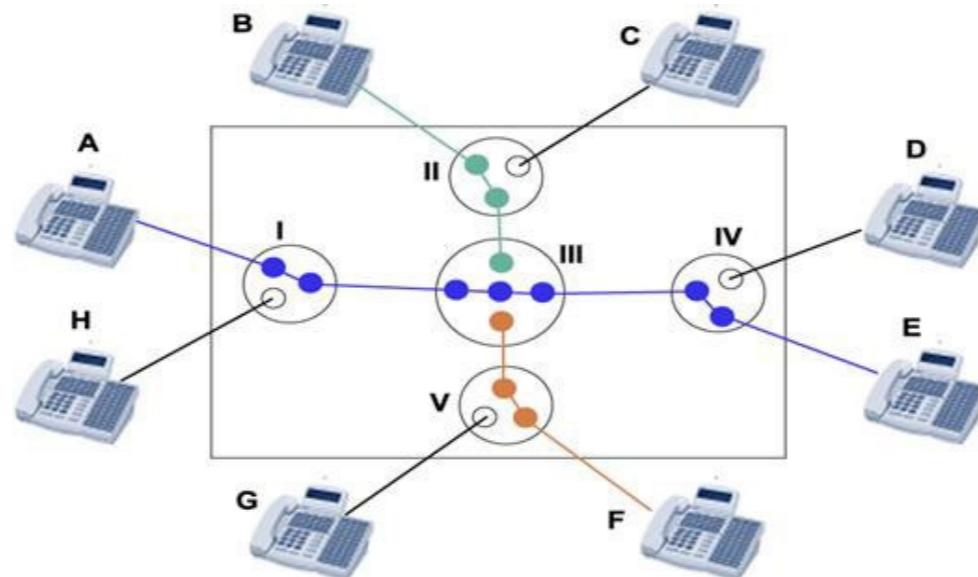
If everything went well, you should be able to see your site now online

Review

- Summary last class
- History of Internet
- The WWW and HTML
- Introduction to HTML
- Sublime Text editor
- Assignment 2

Switching

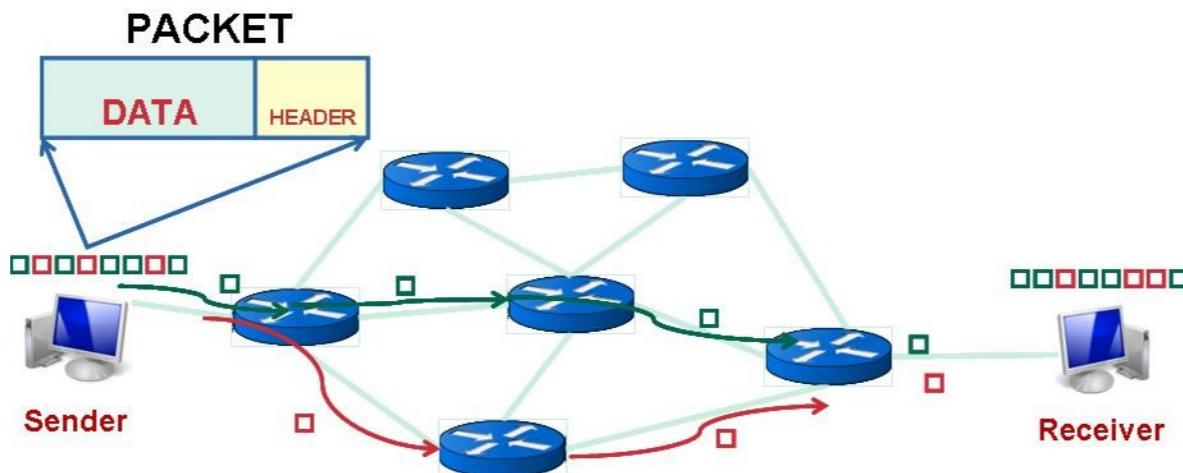
- Switching is the method by which data is transferred from an input port to an output port
- In **circuit switching**:
 - a path is first reserved
 - data is transferred after the connection has been established
 - all data passes through the same circuit
 - no other user can use the circuit until the session is completed
 - the circuit is released after the data is transferred



Taken from <http://cyberlawsolutions.blogspot.ca/2011/12/packet-switching.html>

Packet switching

- In **packet switching**
 - Divides the data to be transmitted into small units (packets) transmitted independently through the network
 - Each packet may be routed via a different path
 - The original message is reassembled in the correct order at the destination based on the packet number
- A **packet consists of:**
 - Source: the IP address of the computer sending the packet
 - Destination: the IP address of the destination computer
 - Length: the length of the packet in bytes
 - Number: the total number of packets in the complete message
 - Sequence: the number of this packet in the whole list of packets making up this communication



Taken from <http://computernetworkingsimplified.com/physical-layer/overview-circuit-switching-packet-switching/>

