Marco Aiello

The Web Was Done by Amateurs

A Reflection on One of
the Largest Collective Systems
Ever Engineered

"The Internet was done so well that most people think of it as a natural resource like the Pacific Ocean, rather than something that was man-made. When was the last time a technology with a scale like that was so error-free? The Web, in comparison, is a joke. The Web was done by amateurs."

–2012, Alan Kay

Time line

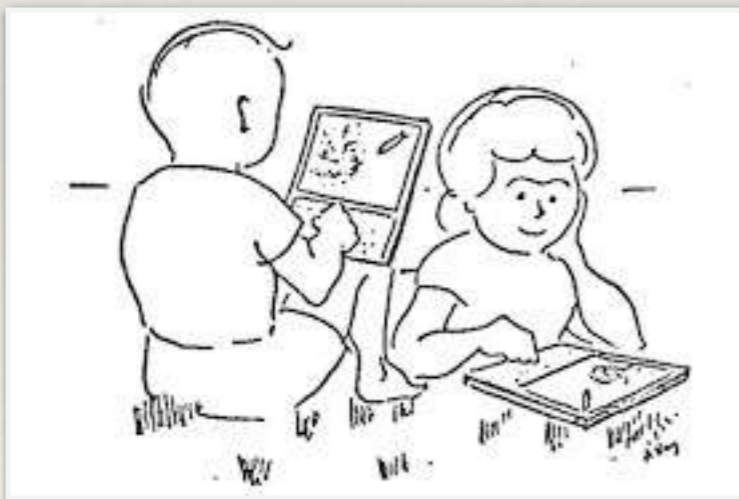# Key Figures

Ted Nelson

Tim Berners-Lee

Alan Kay

Who is Alan Kay

Dynabook, 1968

PDP-1 1960s

Who is Alan Kay

SmallTalk: one of the first object-oriented programming languages (ancestor of C++, Java, Python).

@Xerox Parc, 1971

Kay's notable quotes

"The Web was done by amateurs."

–2012, Alan Kay

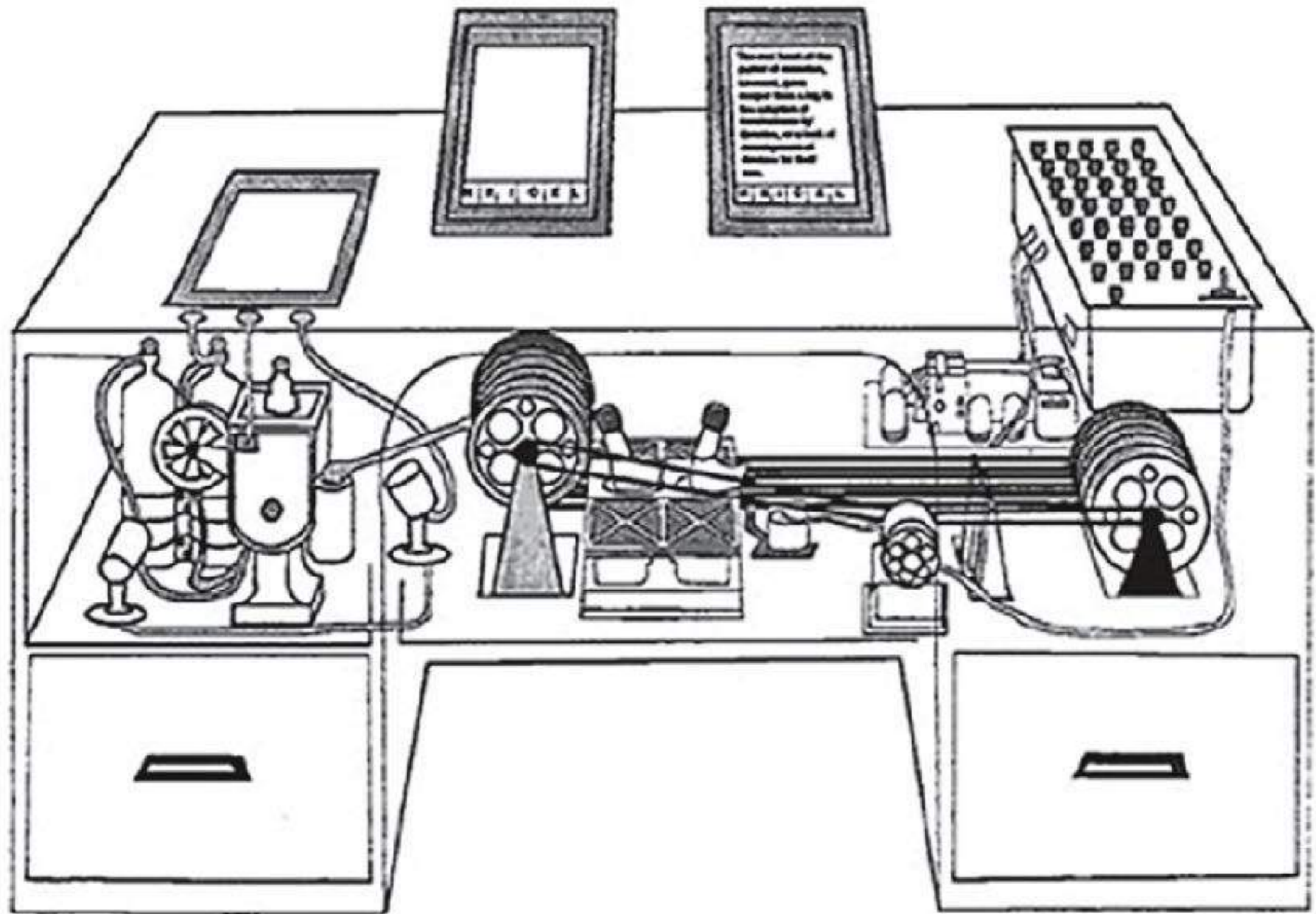# Hypermedia before the Web

Bush's - Memex: As we may think, 1945

Nelson's - Xanadu, 1960

Egelbarts' - NLS, 1968

Atkinson's - Hypercard, 1987

Memex – 1945

Key Figures
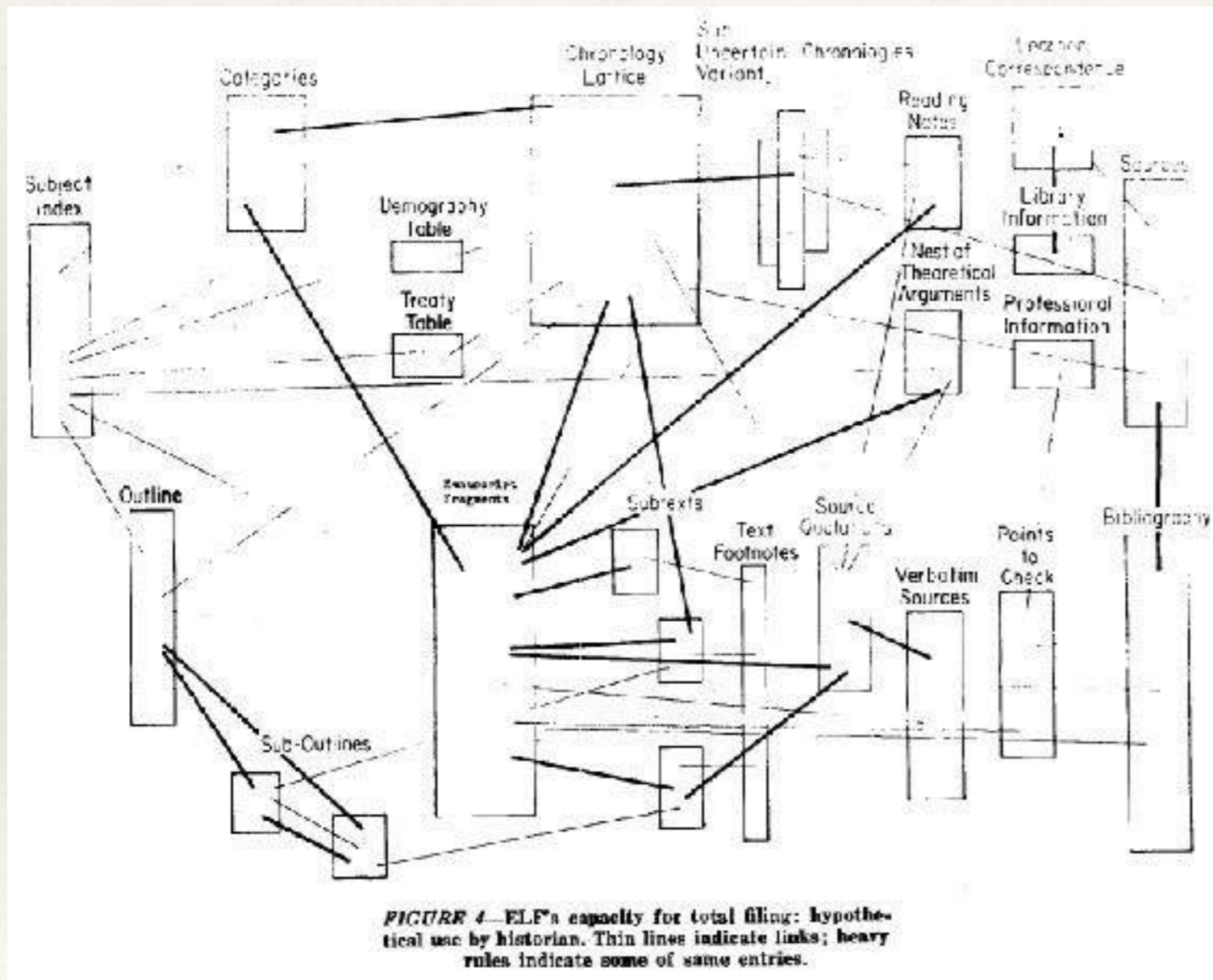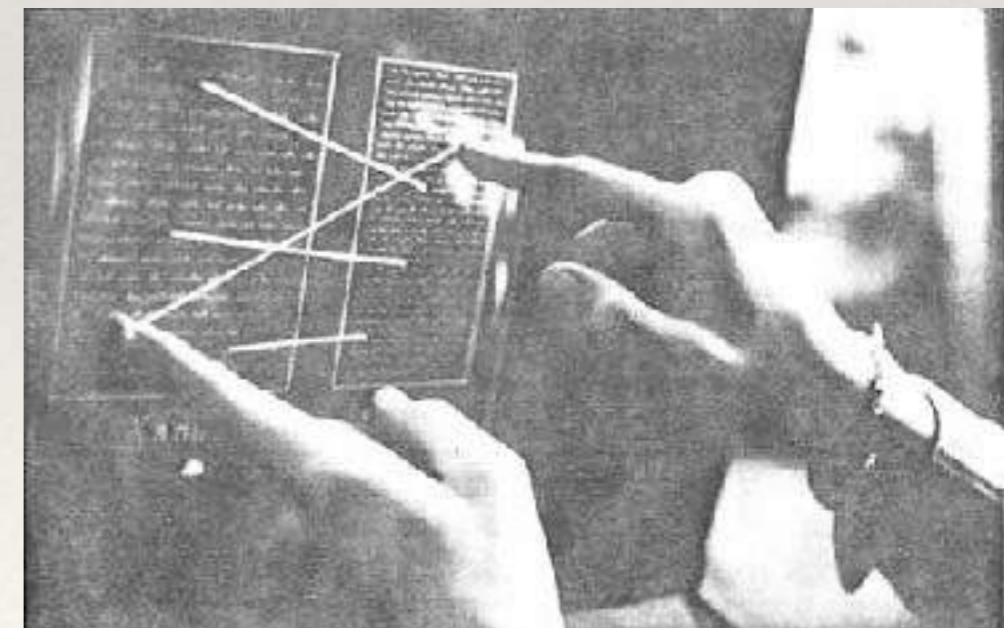
Ted Nelson

Tim Berners-Lee

Alan Kay

Xanadu – 1960

FIGURE 4—ELF's capacity for total filing: hypothetical use by historian. Thin lines indicate links; heavy rules indicate some of same entries.

Ted Nelson Xanadu 1960

Hypertext: 1963

🏠   Education ▾   Research ▾   Society/Business ▾   Alumni ▾   Magazine ▾   About us ▾   Q Search

Error 404 : Page not found

Possible causes

You requested a page that (temporarily) does not exist, has been moved, or does not exist anymore.

You could try the following:

* Go to the University of Groningen homepage and try to find what you are looking for from there;
* Try to find the information using the search page;
* Check the web address for any typing mistakes.

Looking for a staff member?

If you are looking for a staff member, you can use the search page for staff. If you are not sure how his/her name is spelled, you may want to contact the switchboard, 050 - 363 9111.

You can also search for names by department if you know where the staff member you are looking for works.
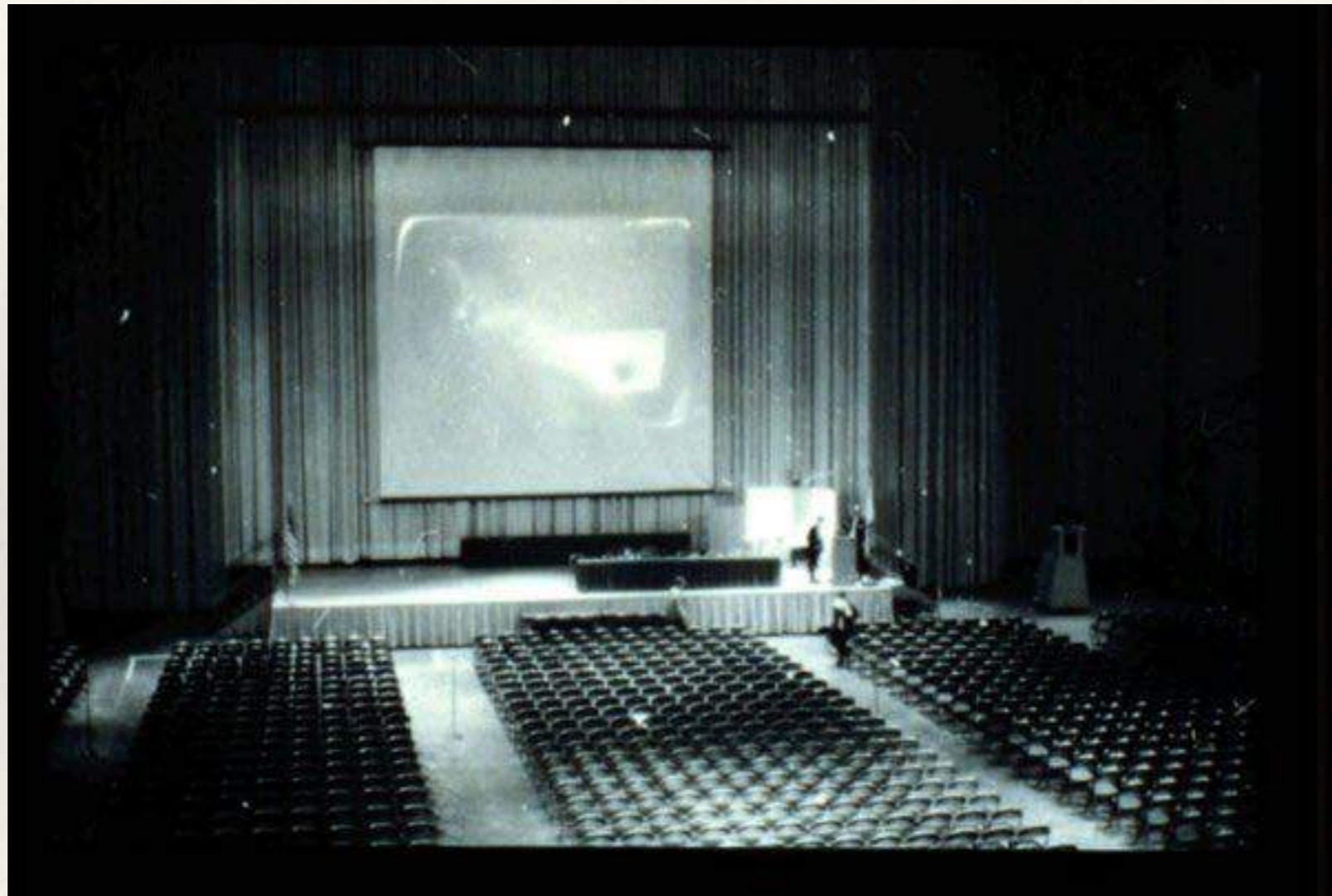
Help us improve this website

If you have reached this page via another website, please let us know where you found this incorrect address so that we can fix the error. Our e-mail address is cit-servicedesk@rug.nl. Thank you for your cooperation.
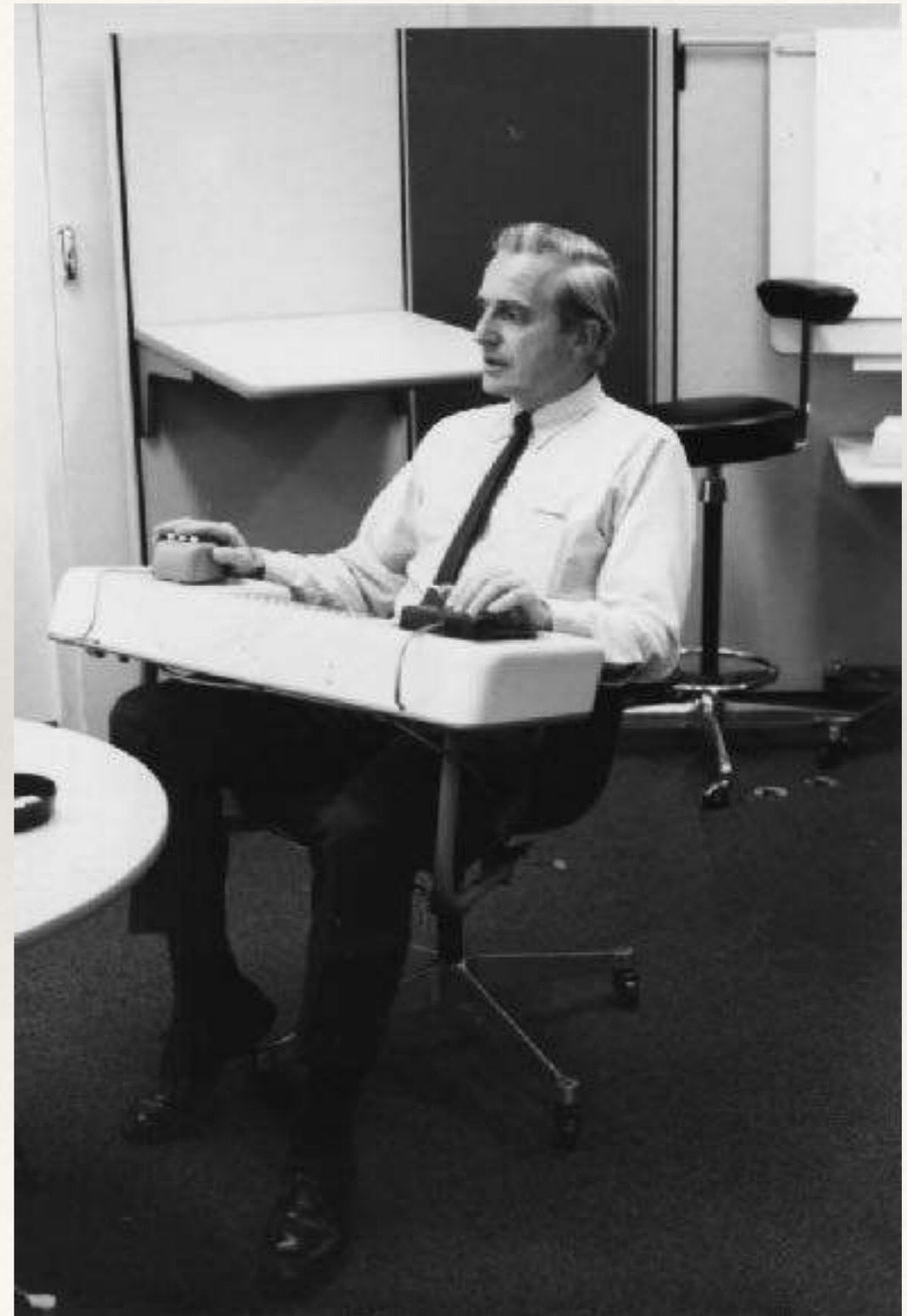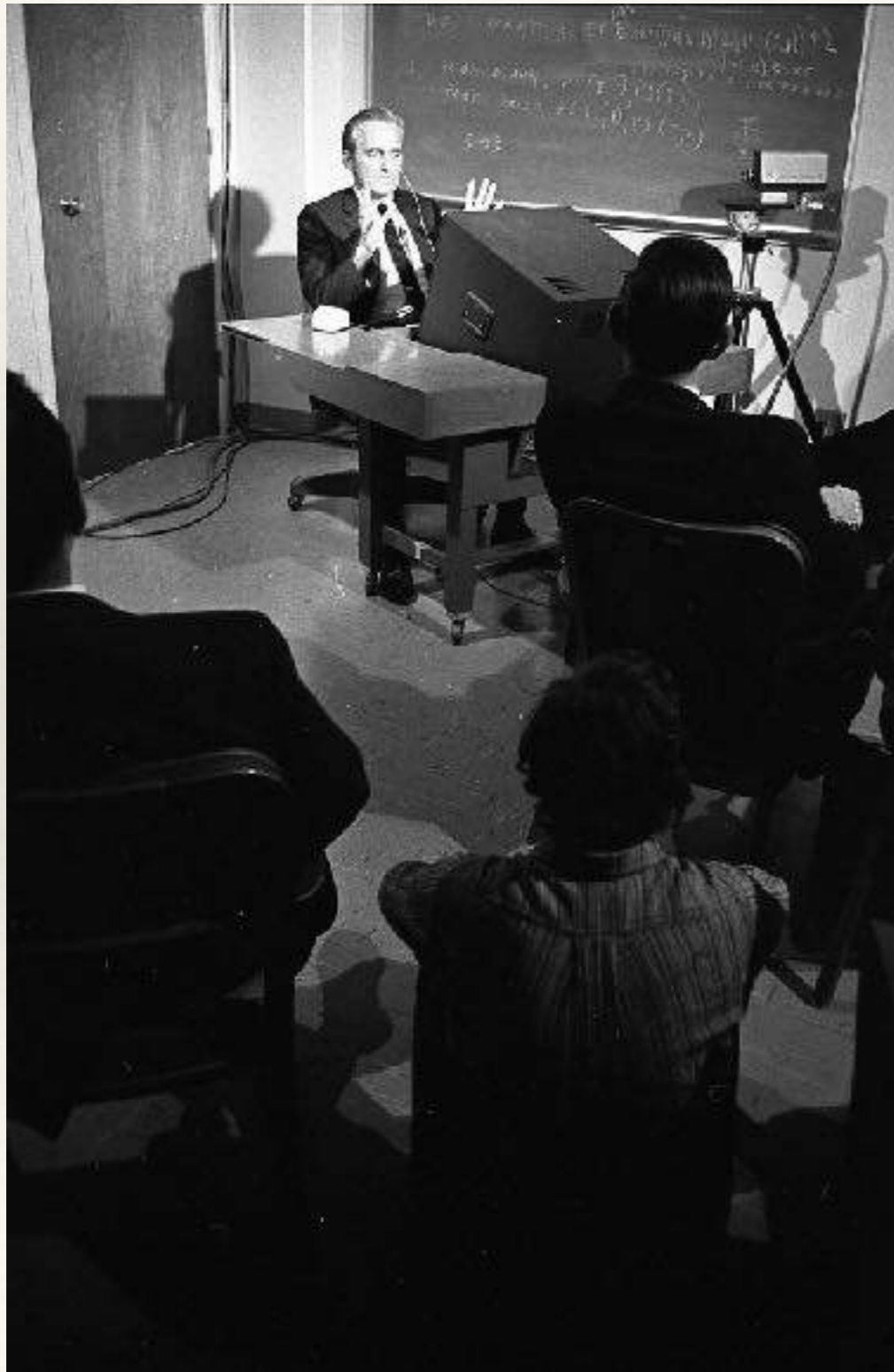
RUG CMS v11.4

"After all, dumbing down Xanadu sure worked well for Tim Berners-Lee!"
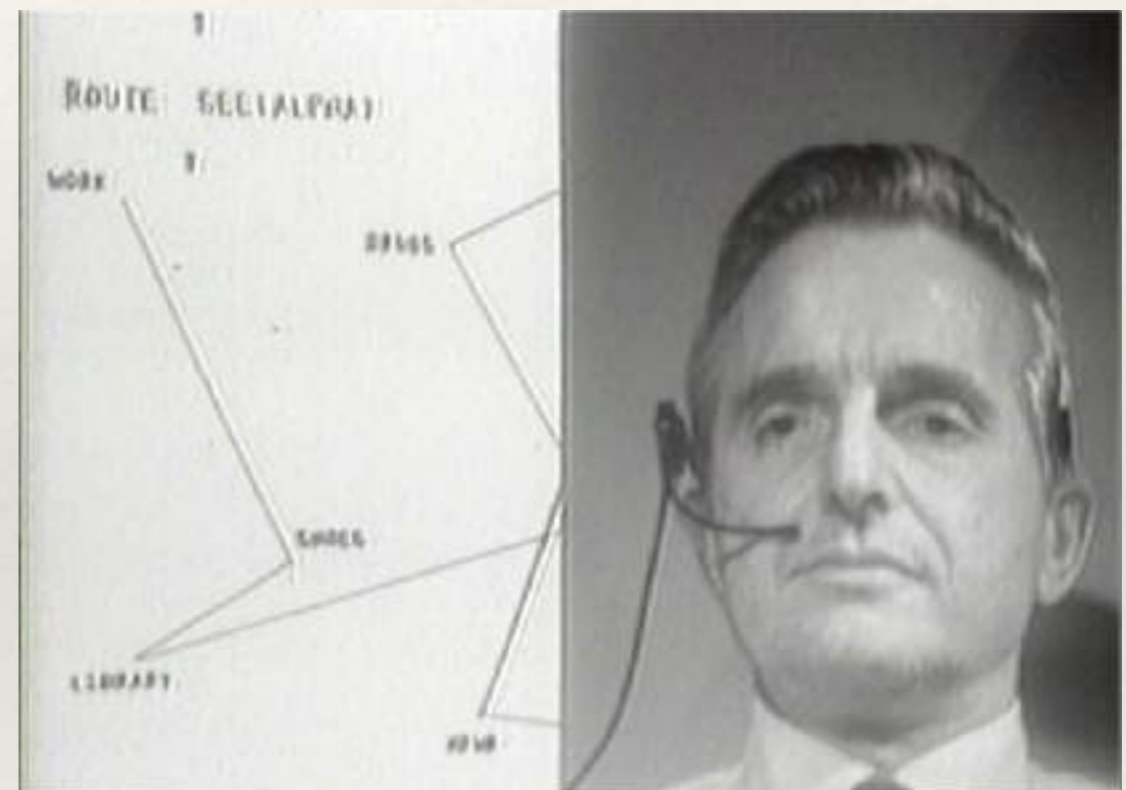
–Ted Nelson

The mother of all demos – 1968

The mother of all demos – 1968

The mother of all demos – 1968

The mother of all demos – 1968

1968 Technology

FORTRAN STATEMENT

IEEE MILESTONE IN ELECTRICAL ENGINEERING AND COMPUTING

Public Demonstration of Online Systems and Personal Computing, 1968

Commonly termed the "Mother of All Demos," Douglas Engelbart and his team demonstrated their oNLine System (NLS) at Brooks Hall in San Francisco on 9 December 1968. Connected via microwave link to the host computer and other remote users at SRI in Menlo Park, the demonstration showcased many fundamental technologies that would become ubiquitous, including collaborative online editing, hypertext, video conferencing, word processing, spell checking, revision control, and the mouse.
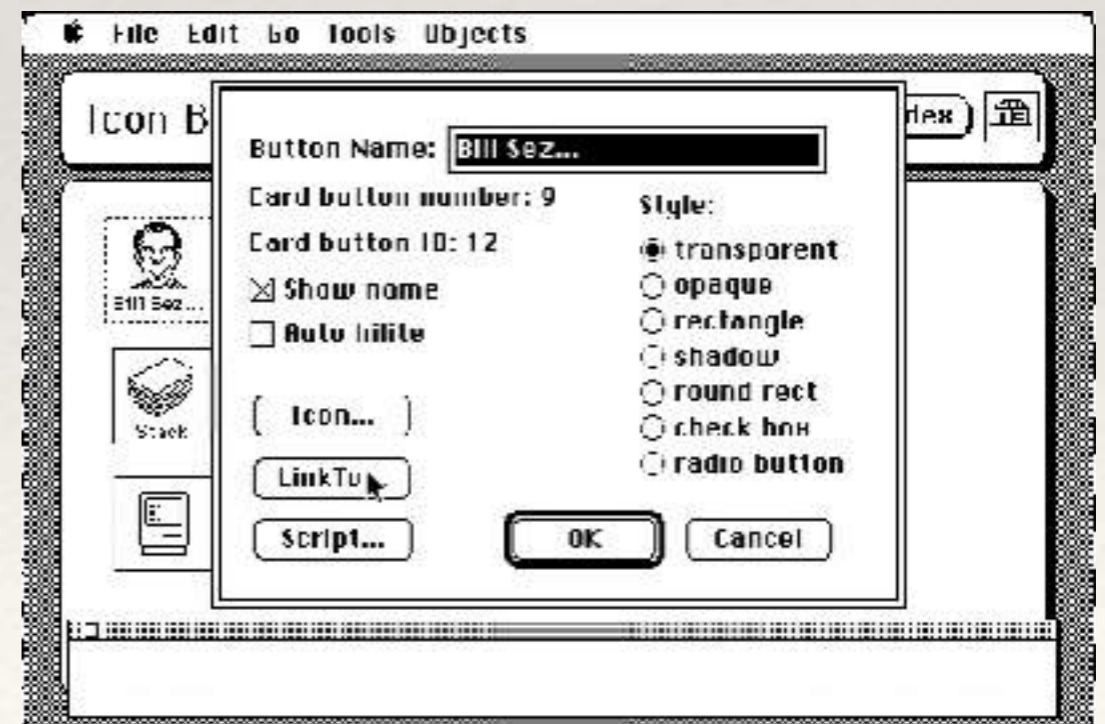
March 2017

◆IEEE

HyperCard 1987

Time line

Memex

Xanadu

NLS

Hypercard

Web

1945   1950   1955   1960   1965   1970   1975   1980   1985   1990   1995   2000   2005   2010   2015   2020

End of WWII

Man on the moon

Fall of Berlin Wall

Turn of the Century

Transistor

Integrated circuit

Microprocessor

Personal Computer

Laptop

Smartphones

Quantum computers
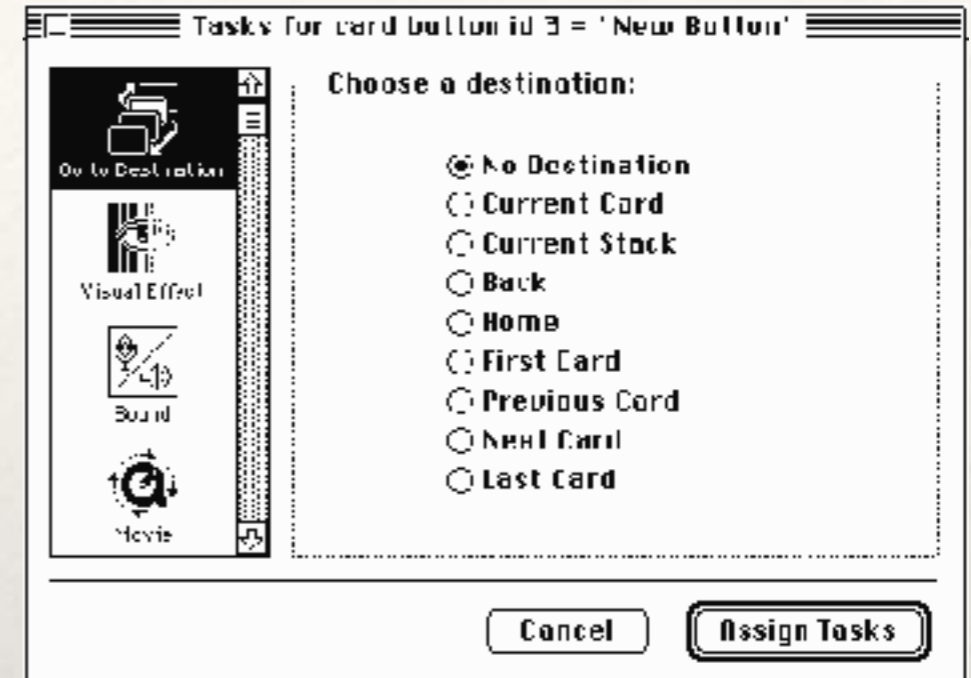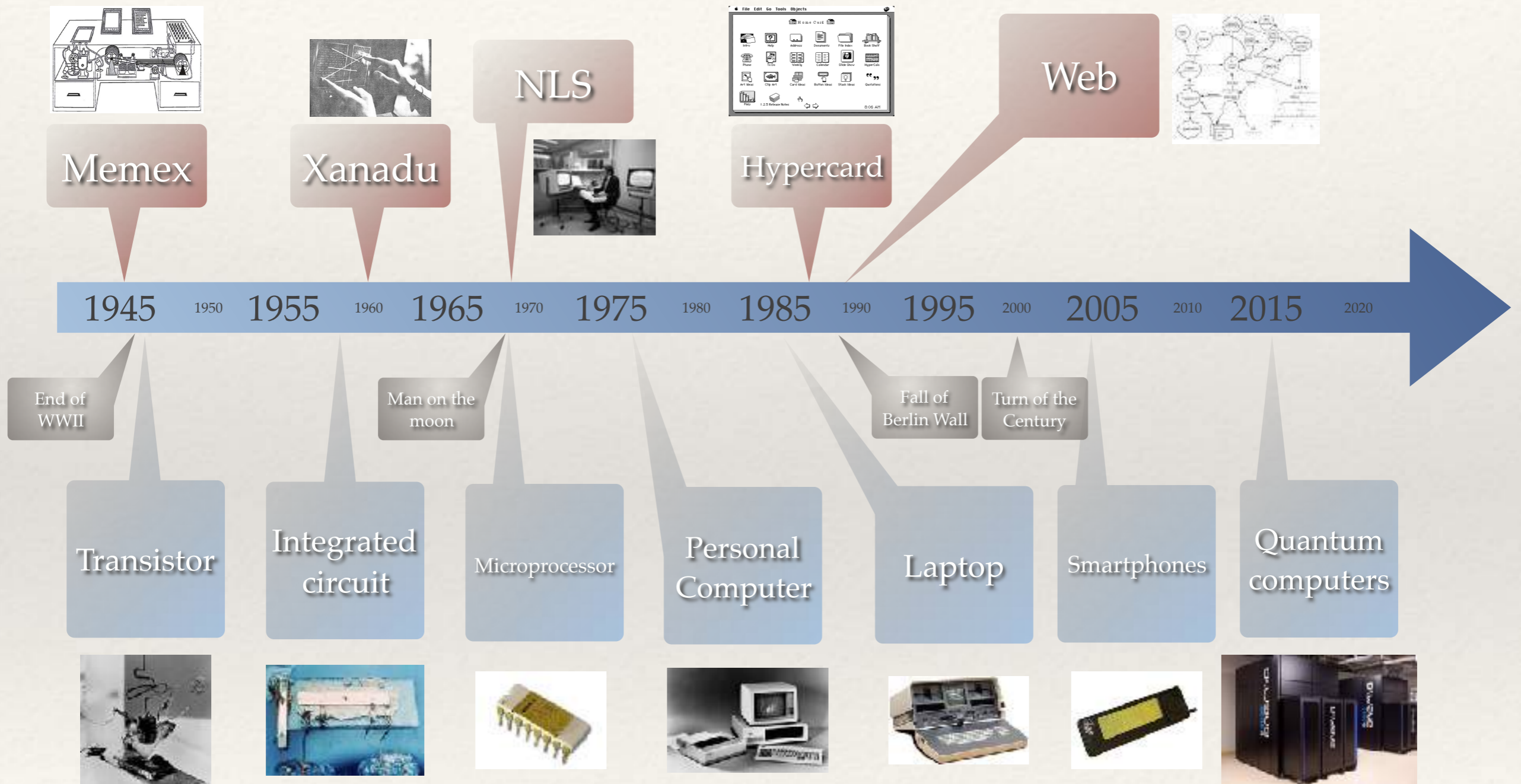
Key Figures

Ted Nelson
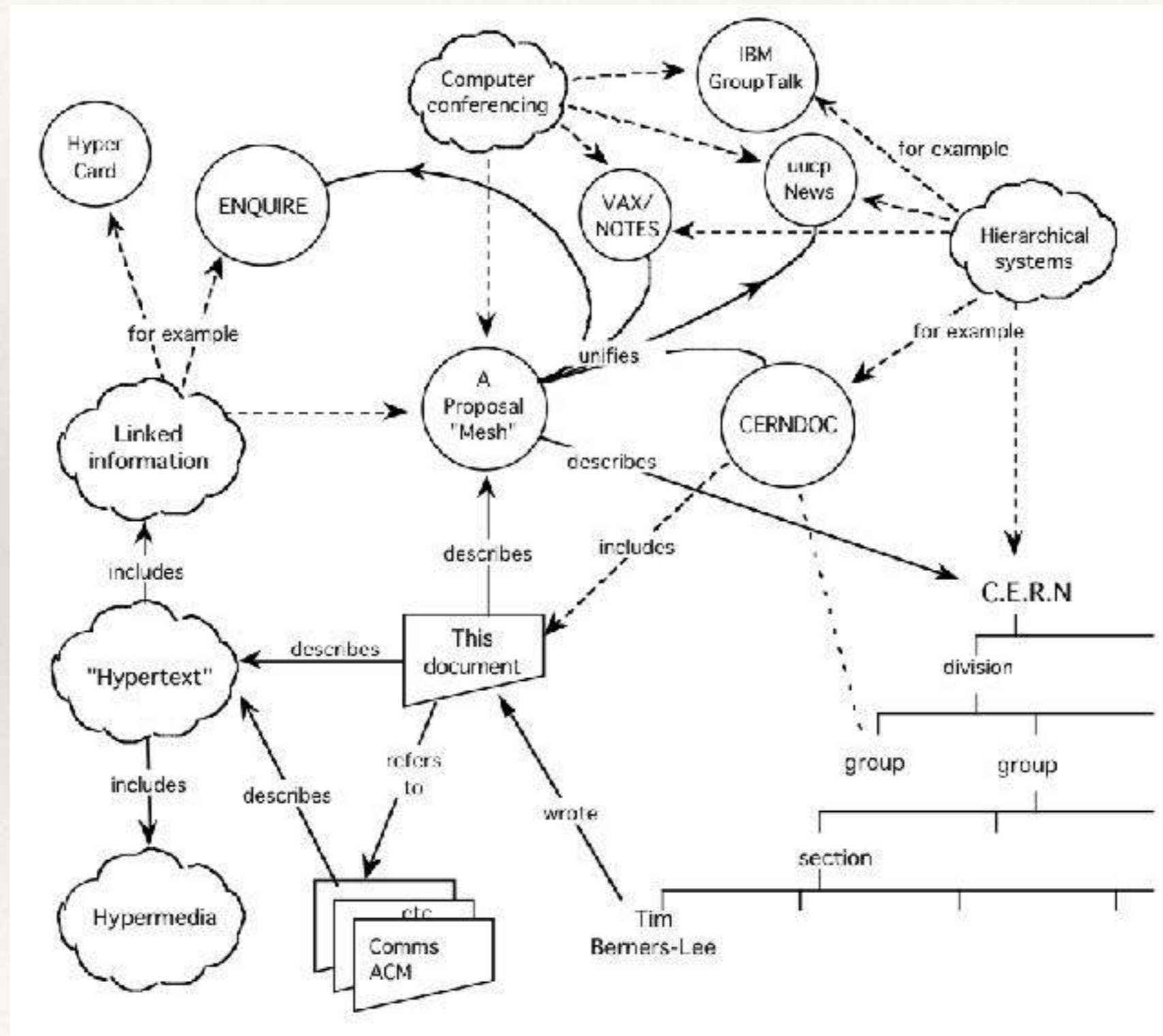
Tim Berners-Lee

Alan Kay

The Web – 1989

Original Web Technologies

- **URL**:   Uniform Resource Locator

- **HTTP**:   HyperText Transfer Protocol

- **HTML**:   HyperText Markup Language

Original Web Pattern

Repeat:

*Find a resource using an **URL**,*

*interact with **HTTP**,*

*obtain **HTML** documents, and*

display them to the user.

Amateur definition

"One lacking in experience and competence in an art or science. One who engages in a pursuit, study, science, or sport as a pastime rather than as a profession."

Tim Berners-Lee in 1999

- ❖ "I wrote it in my spare time and for my personal use, and for no loftier reason than to help me remember the connections among the various people, computers, and projects at the lab."

- ❖ Tim Berners-Lee says that he saw the video about the "Mother of all Demos" only in 1994.

The Evolution of the Web

The web today is a growing universe of interlinked web pages and web apps, teeming with videos, photos, and interactive content. What the average user doesn't see is the interplay of web technologies and browsers that makes all this possible.

Over time web technologies have evolved to give web developers the ability to create new generations of useful and immersive web experiences. Today's web is a result of the ongoing efforts of an open web community that helps define these web technologies, like HTML5, CSS3 and WebGL and ensure that they're supported in all web browsers.

The color bands in this visualization represent the interaction between web technologies and browsers, which brings to life the many powerful web apps that we use daily.
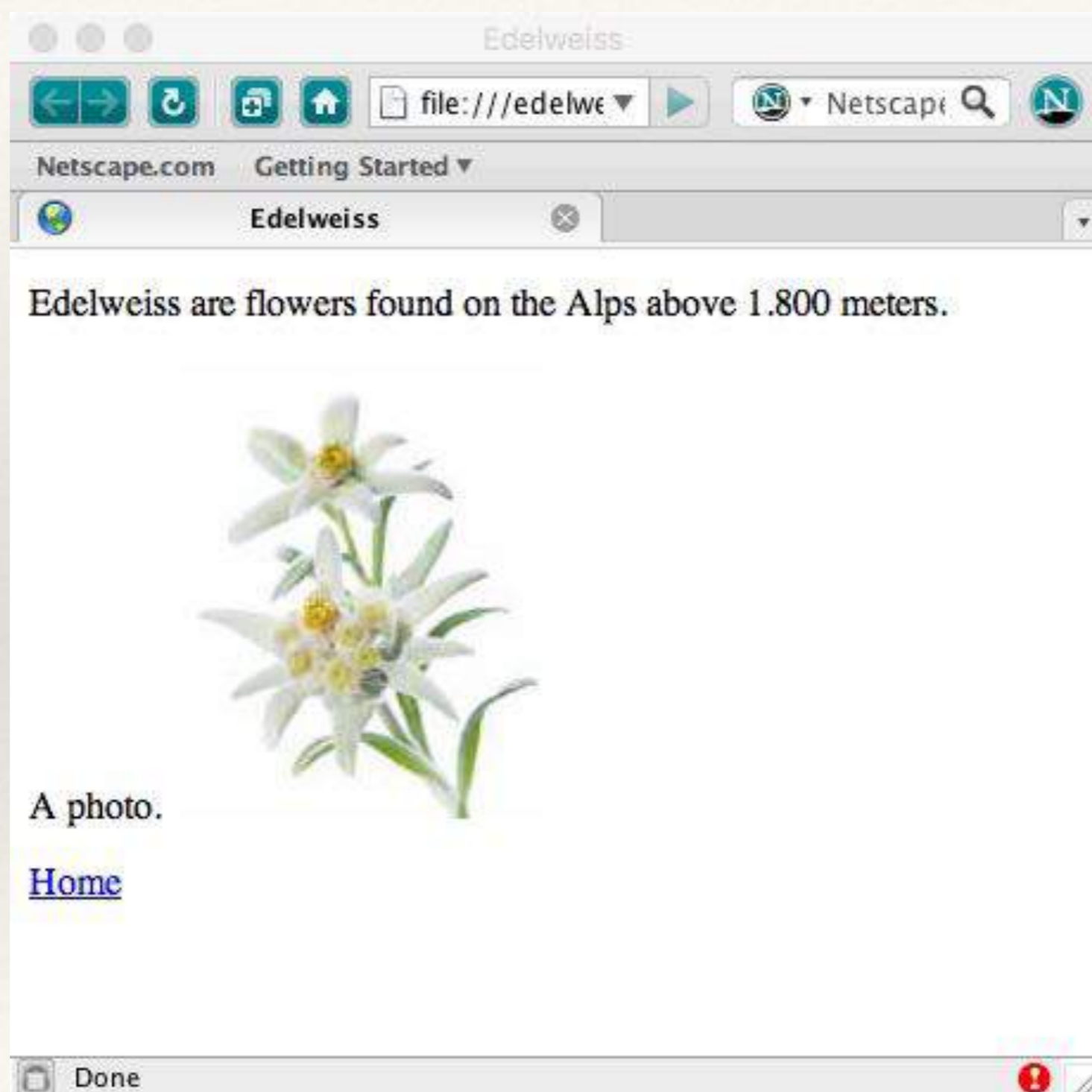
Explore >

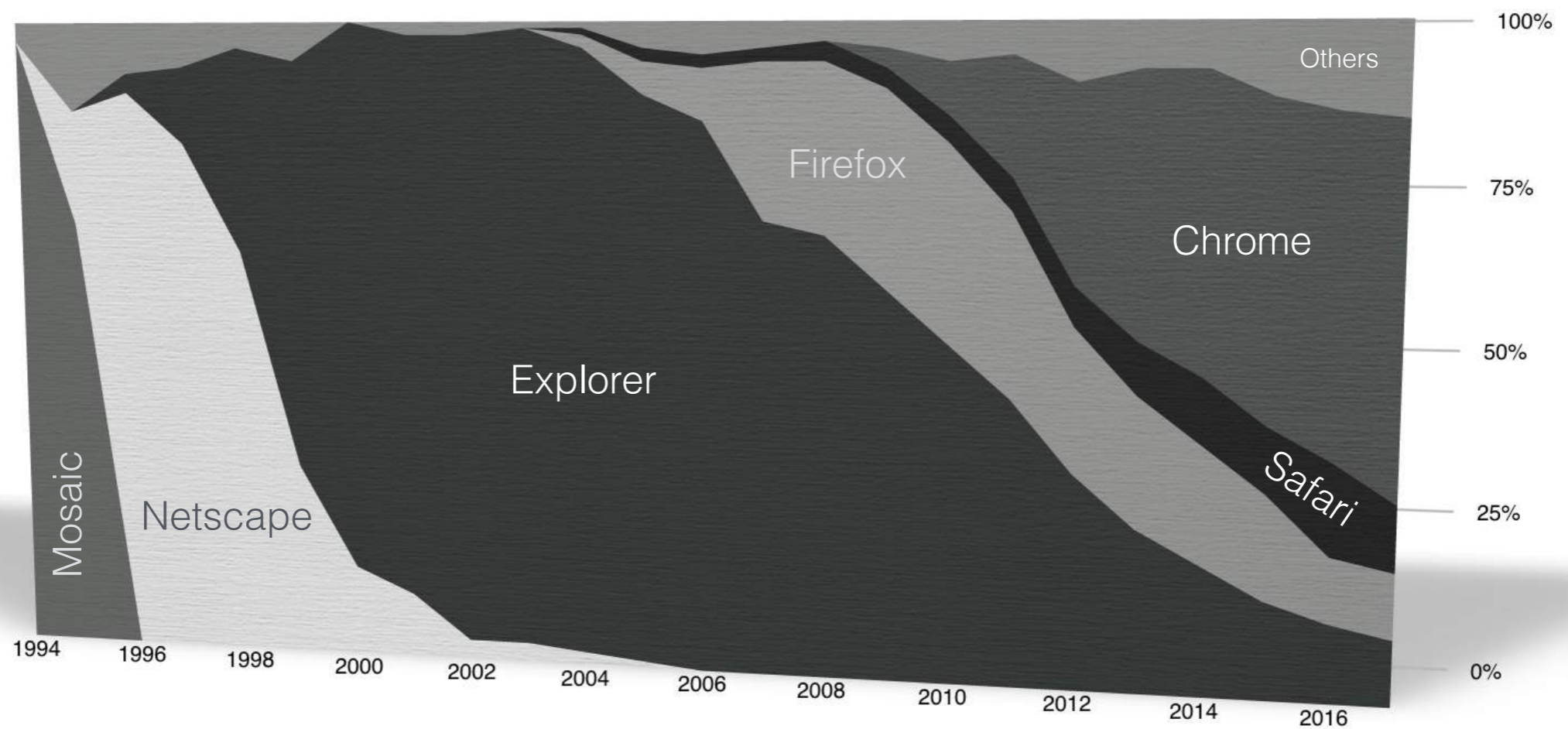# Browsers Wars

WWW
Lynx and Viola
Mosaic
Netscape
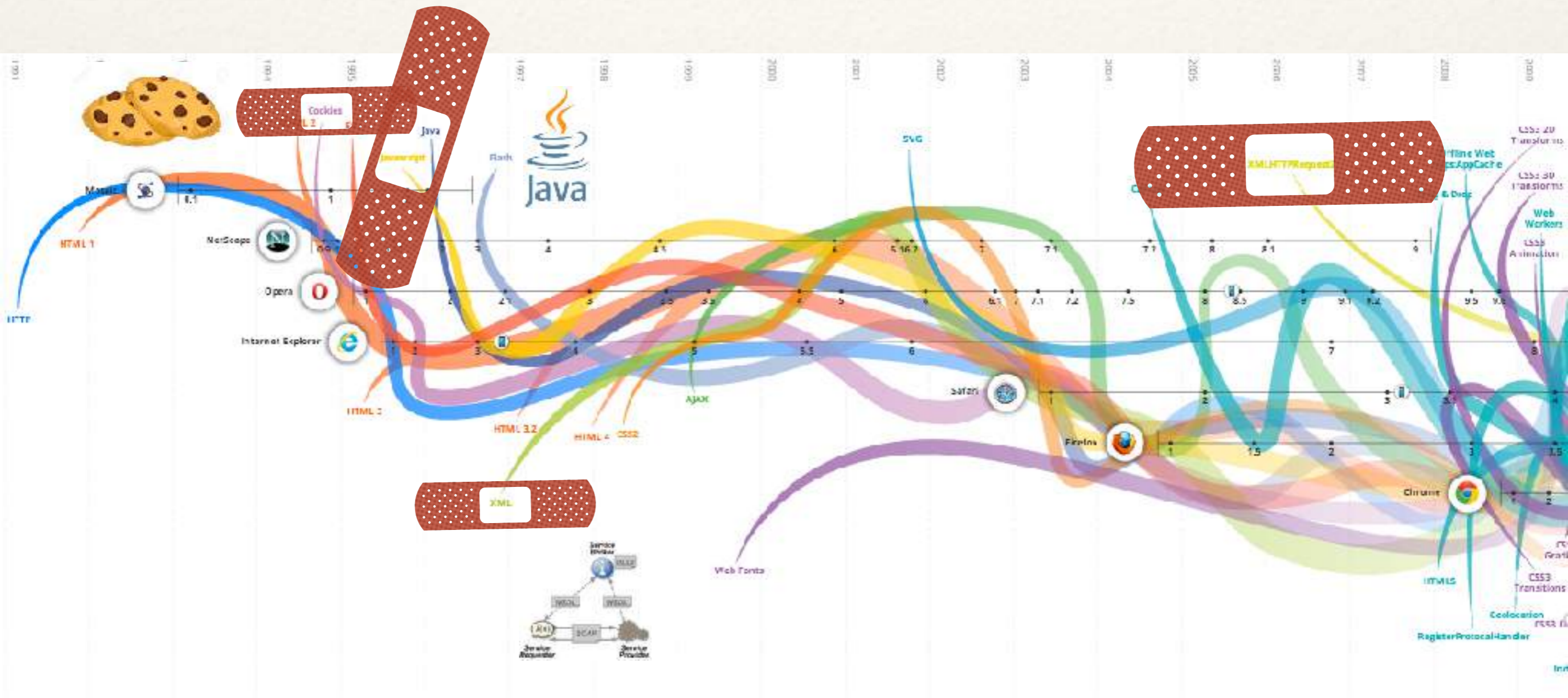Explorer
Chrome

Browsers

Browser market share 1996-2017

"You want [the browser] to be a mini-operating system, and the people who did the browser mistook it as an application. They flunked Operating Systems 101."

–2012 Alan Kay

Computational Patches

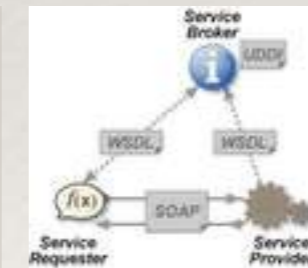# Major Computational Patches

Five Computational Patches

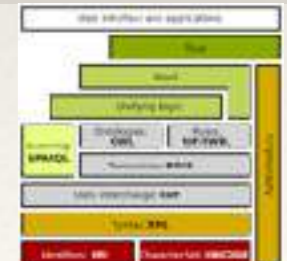I Cookies 1994

II Java 1995

III JavaScript 1995

IV Web Services 1998

V Semantic Web 1999

The Success of the Web

One Web, an Infinity of Spiders
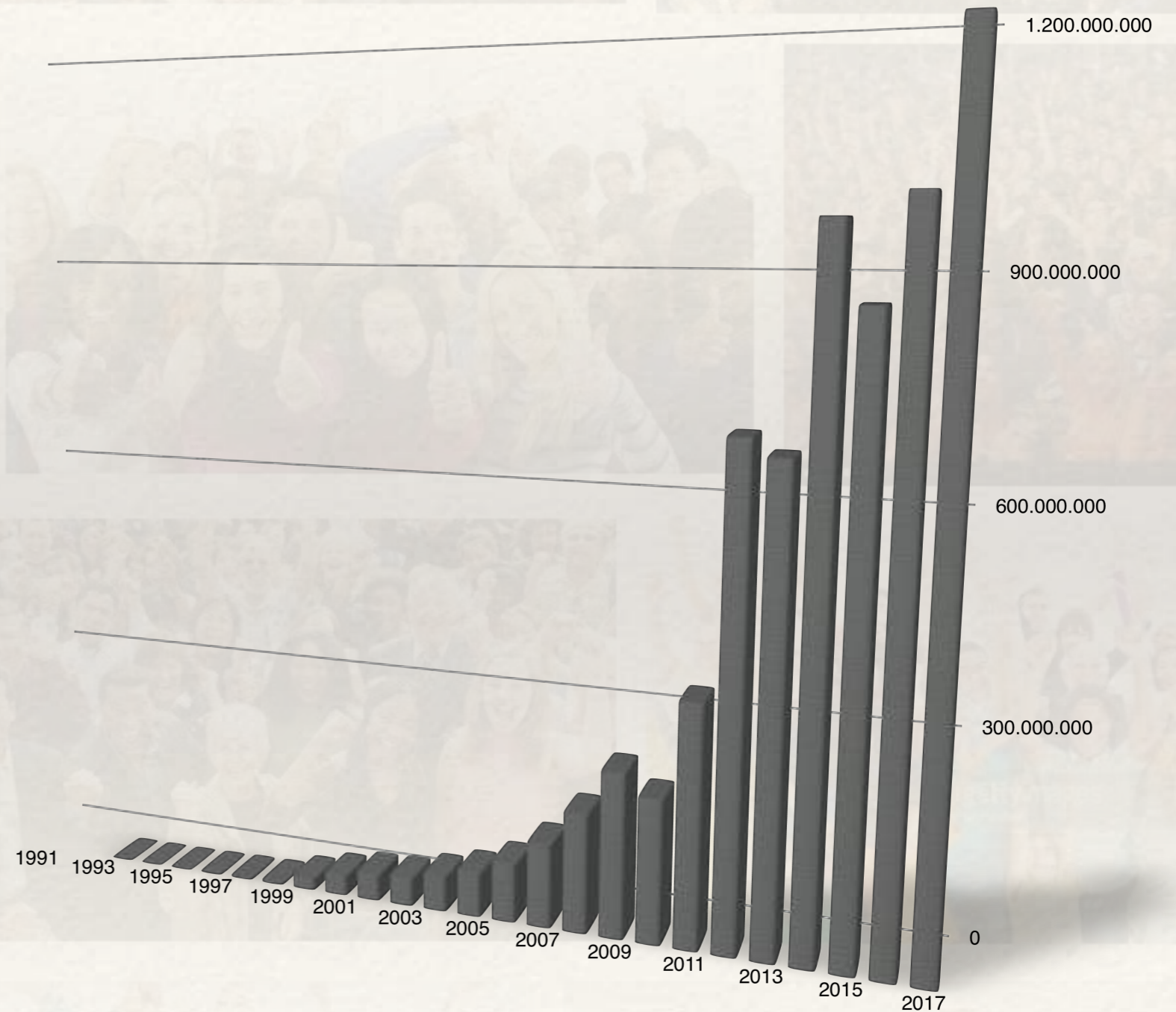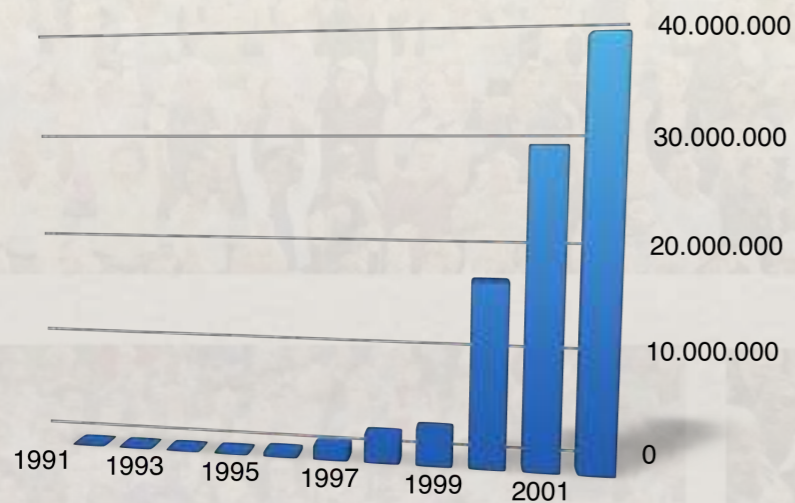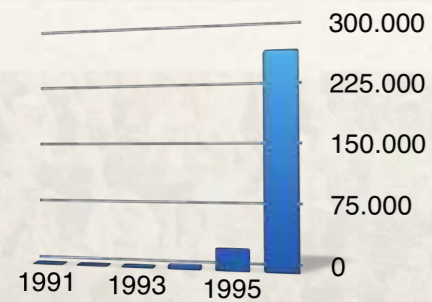
A truly open platform

- 1993 TBL asks CERN to open source the Web

- 1994 W3C founded

- Open committees to drive standardised upgrades

- Patches from multiple sources *(browser wars)*

formality vs. liberality

- Objects precisely defined and traveling across containers

- Well-specified semantics

- Unique behavior

- HTML is interpreted in a relaxed way

- No semantics, just standard encoding

- Postel's law

Be liberal in what you accept,
    and conservative in what you send.

-- RFC 760

I ♥
IETF GREY BEARDS
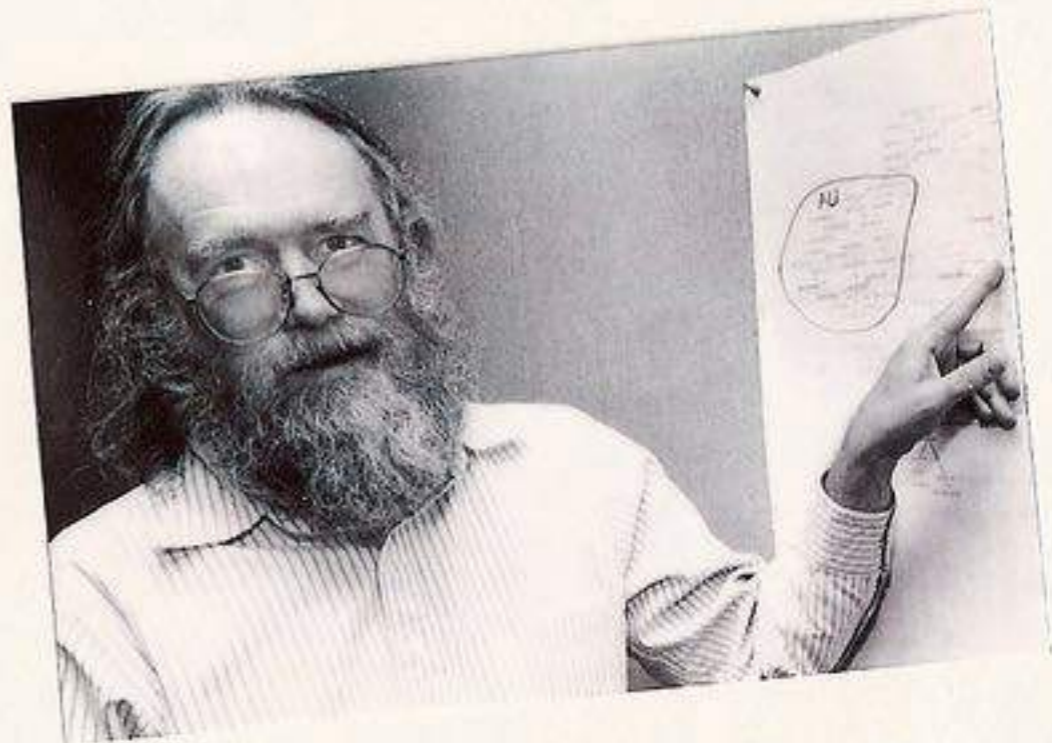
Jon Postel

What makes a successful system?

❖ *openness and mass engagement*

❖ *end-to-end argument*

❖ *timing*

    ❖ Xanadu, Trigg's Textnet, Brown University's Intermedia, Gopher, HyperCard, and . . . the Web.

"The lack of interest, the disdain for history is what makes computing not-quite-a-field."

–*2012, Alan Kay*

"Thank you."

–2018, Marco Aiello

Out July 14th, 2018
Available for pre-order on amazon!

Marco Aiello

The Web Was Done by Amateurs

A Reflection on One of the Largest Collective Systems Ever Engineered

This book stems from the desire to systematize and put down on paper essential historical facts about the Web, a system that has undoubtedly changed our lives in just a few decades. But how did it manage to become such a central pillar of modern society, such an indispensable component of our economic and social interactions? How did it evolve from its roots to today? Which competitors, if any, did it have to beat out? Who are the heroes behind its success?

These are the sort of questions that the book addresses. Divided into four parts, it follows and critically reflects on the Web's historical path. "Part I: The Origins" covers the prehistory of the Web. It examines the technology that predated the Web and fostered its birth. In turn, "Part II: The Web" describes the original Web proposal as defined in 1989 by Tim Berners-Lee and the most relevant technologies associated with it. "Part III: The Patches" combines a historical reconstruction of the Web's evolution with a more critical analysis of its original definition and the necessary changes made to the initial design. In closing, "Part IV: System Engineering" approaches the Web as an engineered infrastructure and reflects on its technical and societal success.

The book is unique in its approach, combining historical facts with the technological evolution of the Web. It was written with a technologically engaged and knowledge-thirsty readership in mind, ranging from curious daily Web users to undergraduate computer science and engineering students.

The son of two computer scientists, **Marco Aiello** was exposed early to computers. At the age of three he met Turing Award winner Alan Kay; at eight he wrote his first computer program in Logo on a TI-99/4A. In the early days of the Web, while an intern at Apple Computer in Cupertino, he wrote his first set of Web Common Gateway Interfaces. He then pursued an academic career in Europe. Currently he is Professor of Service Computing at the University of Stuttgart, Germany. He is a prolific author in Computer Science and Artificial Intelligence having written over 150 scientific papers and books.

Computer Science
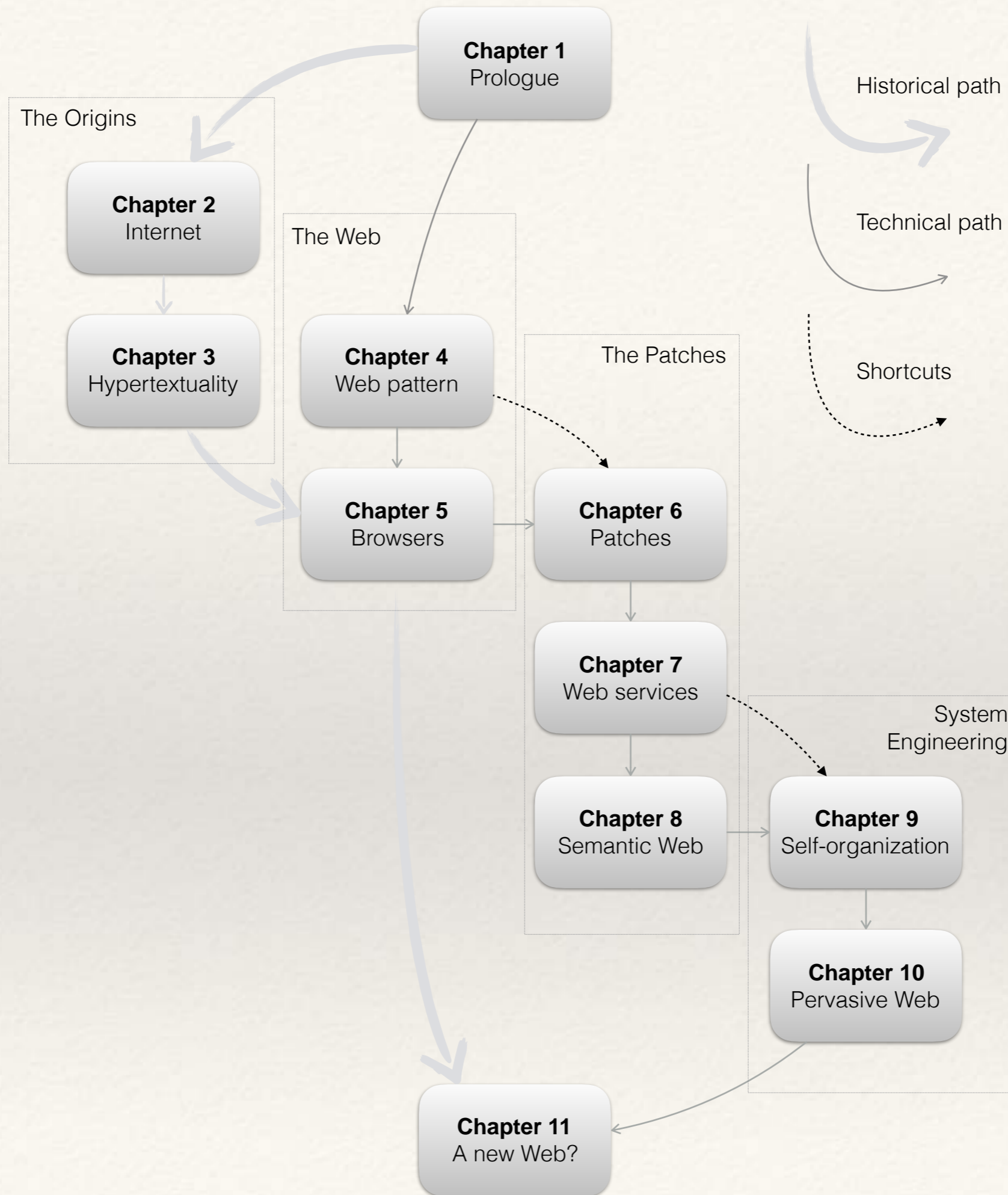
▶ springer.com

Aiello

The Web Was Done by Amateurs

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The Web Was Done by Amateurs

A Reflection on One of the Largest Collective Systems Ever Engineered

Springer

Chapter 1
Prologue

The Origins

Chapter 2
Internet

Chapter 3
Hypertextuality

The Web

Chapter 4
Web pattern

Chapter 5
Browsers

The Patches

Chapter 6
Patches

Chapter 7
Web services

Chapter 8
Semantic Web

System
Engineering

Chapter 9
Self-organization

Chapter 10
Pervasive Web

Chapter 11
A new Web?

Historical path

Technical path

Shortcuts

Full Interview of Kay by Binstock

Available as an
appendix of the book

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