

A brief history of the Web

...and how one architectural choice got us into a very big mess

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A screenshot of the Beaker browser window against a dark blue starry background. The window has a white header bar with a red, yellow, and green close button, a "New Tab" button, and a search bar containing "beaker://start/". To the right of the search bar are icons for star, rocket, and menu. Below the header is a search bar with a magnifying glass icon and placeholder text "Search the Web, your Library, bookmarks, and more", followed by a blue search button with a white arrow. A "Pinned Bookmarks" section follows, featuring a grid of 14 bookmark cards arranged in two rows of seven. The first row includes: "Ms. SaSHA-2...", "Beaker API D...", "Dat", "DevDocs — D...", "p2p web day ...", "All of the Doc...", and "Font Awesom...". The second row includes: "Beaker | Peer...", "Austin Public ...", "Paul Frazee", "Tara Vancil", "beaker-0.8", "beaker-profile...", and "Twitter". At the bottom of the window are links for "NETWORK SETTINGS", "HISTORY", "BOOKMARKS", and "LIBRARY".

New Tab

beaker://start/

Search the Web, your Library, bookmarks, and more

PINNED BOOKMARKS

Ms. SaSHA-2...

Beaker API D...

Dat

DevDocs — D...

p2p web day ...

All of the Doc...

Font Awesom...

Beaker | Peer...

Austin Public ...

Paul Frazee

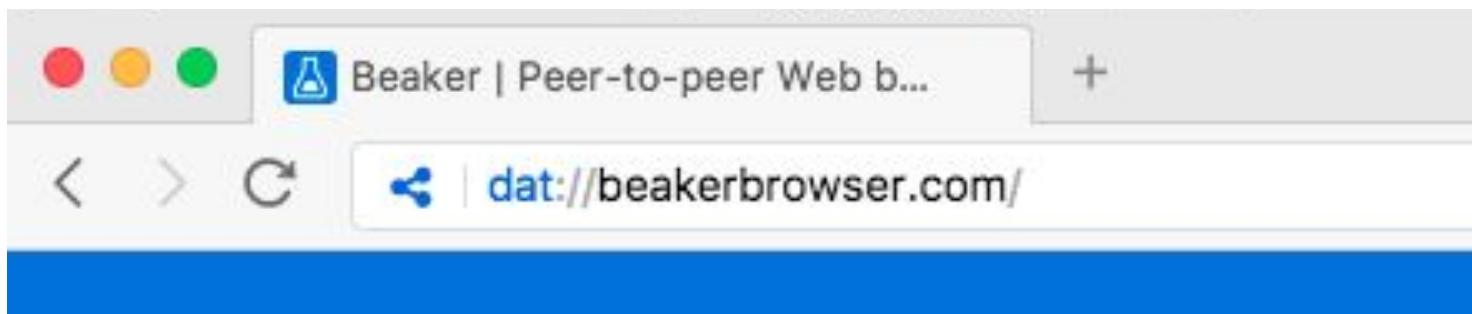
Tara Vancil

beaker-0.8

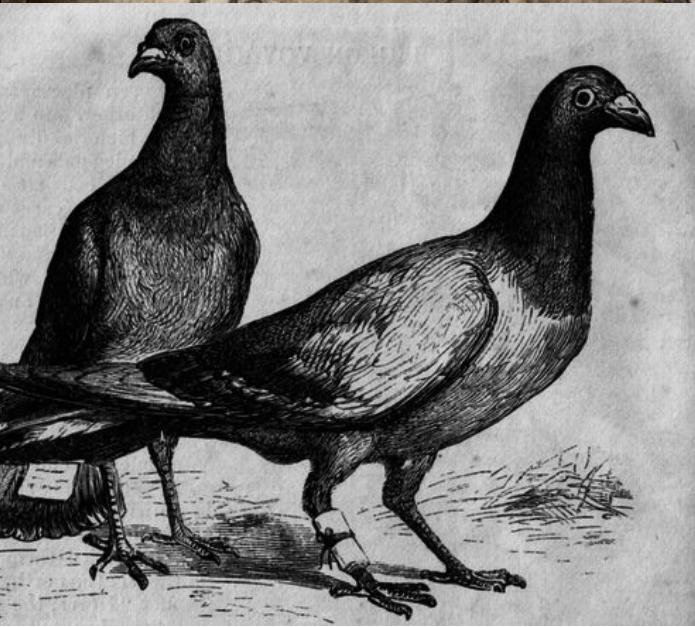
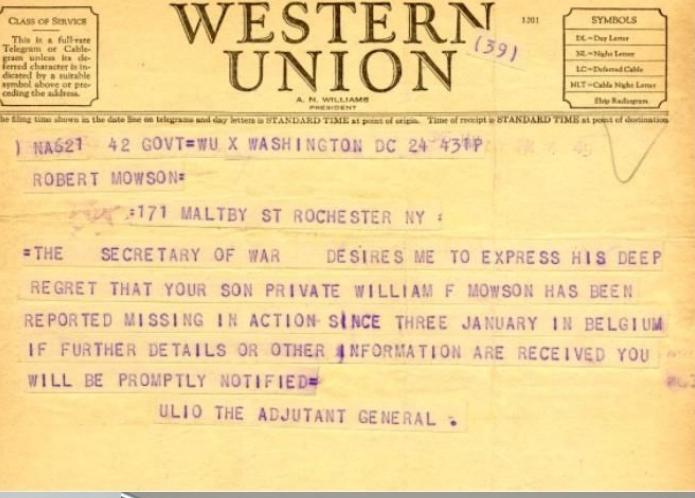
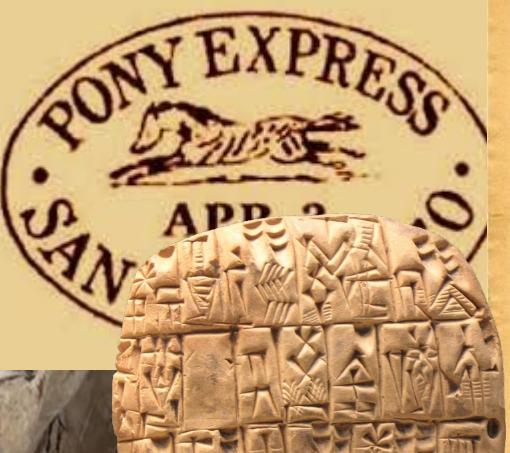
beaker-profile...

Twitter

NETWORK SETTINGS HISTORY BOOKMARKS LIBRARY

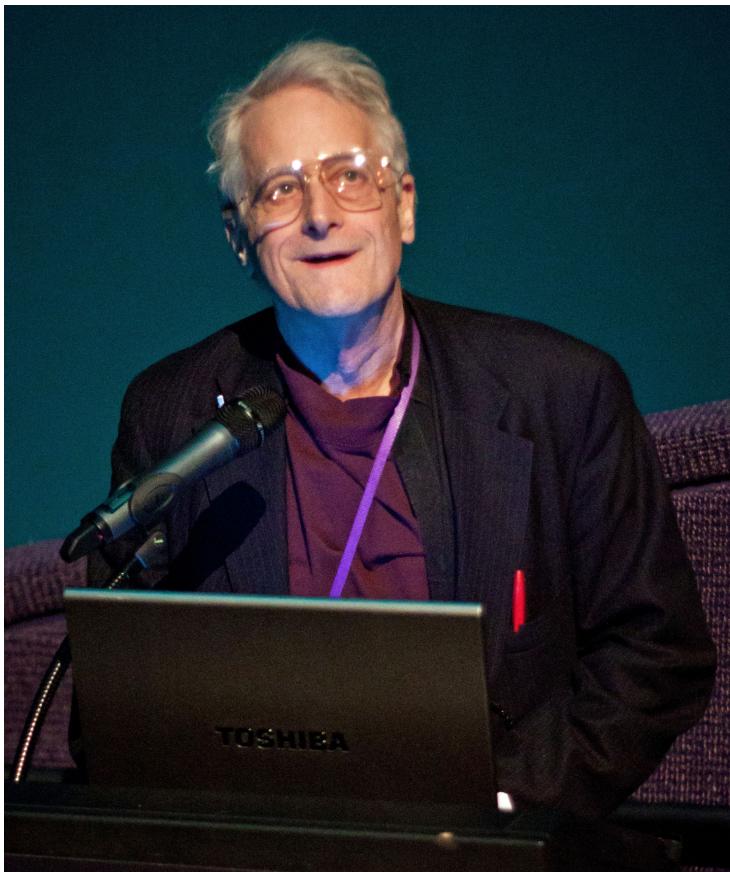


What *is* the Web?



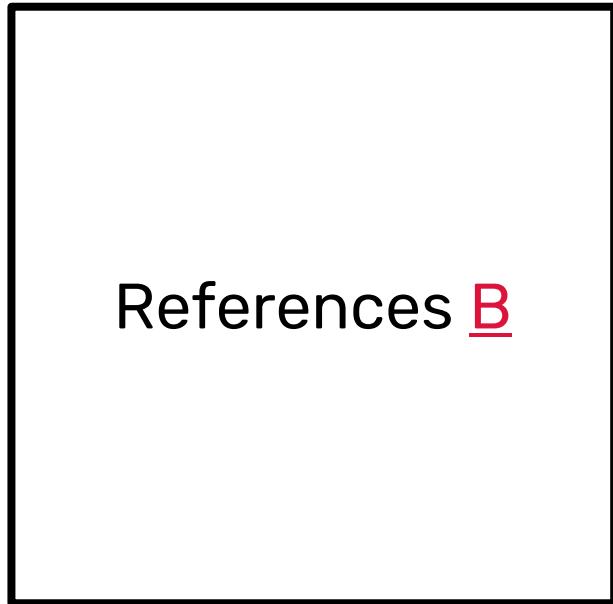
1201
SYMBOLS
DL = Day Letter
NL = Night Letter
LC = Delivered Cable
MLT = Cable Night Letter
Ship Radiogram

1965-1967

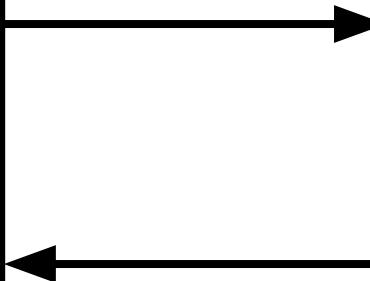
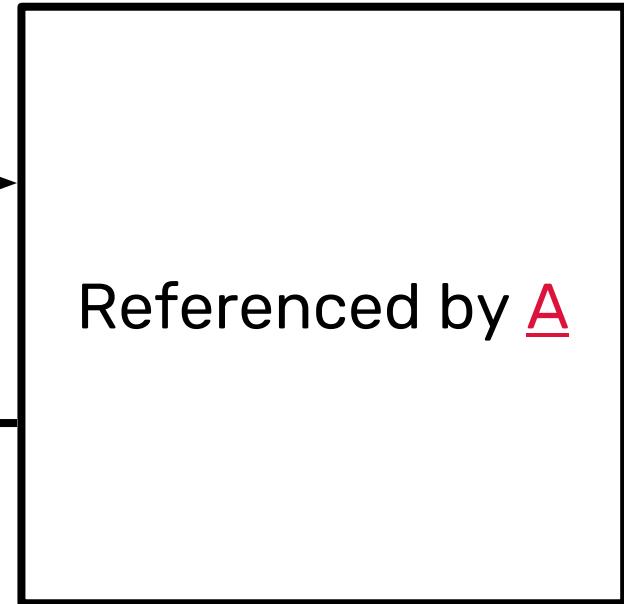


Ted Nelson coins *hypertext*

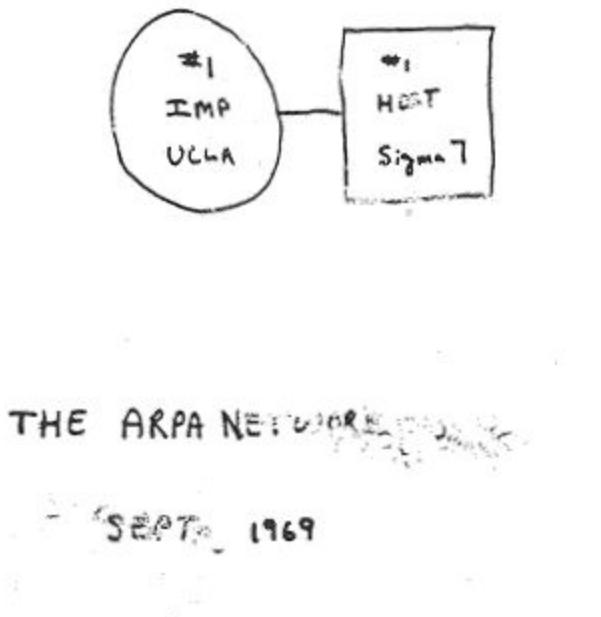
A



B



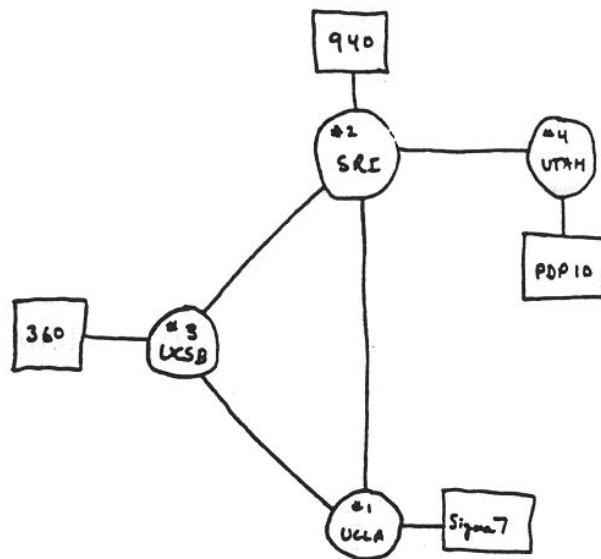
1966



DARPA allocates \$1 million to create military computer network

FIGURE 6.1 Drawing of September 1969
(Courtesy of Alex McKenzie)

1969



THE ARPA NETWORK

DEC 1969

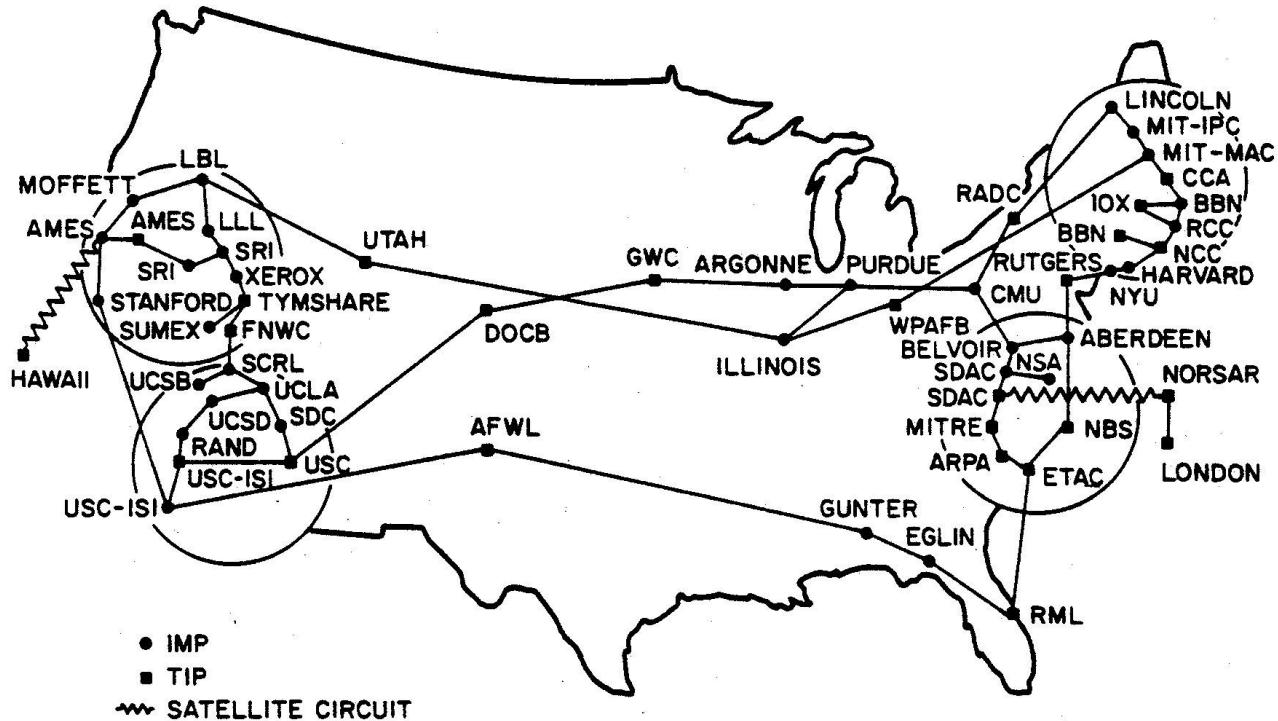
4 NODES

First transmission sent from UCLA
to SRI

"lo"

FIGURE 6.2 Drawing of 4 Node Network
(Courtesy of Alex McKenzie)

1975



1980

1. Introduction

ENQUIRE is a method of documenting a system. It concentrates on the way the system is composed of parts, and how these parts are interrelated.

This information about a system is difficult to store, and particularly to update, using paper documents, so ENQUIRE stores its information on a computer. The ENQUIRE-WITHIN program allows a person to create and edit the data, so that others can later extract it as it is relevant to them.

2. Scope

The ENQUIRE system is designed to fill a gap in many current documentation systems. A person finding himself faced with a piece "xxx" of a system should be able to ask ENQUIRE, for example

What is xxx part of?

What is xxx composed of?

What must I alter if I change xxx?

What facilities does xxx use?

Where do I find out more about xxx?

Who or what produced xxx?

ENQUIRE does not aim to answer such questions as

How does xxx work?

What format is 'xxx' in, exactly?

Why was xxx created?

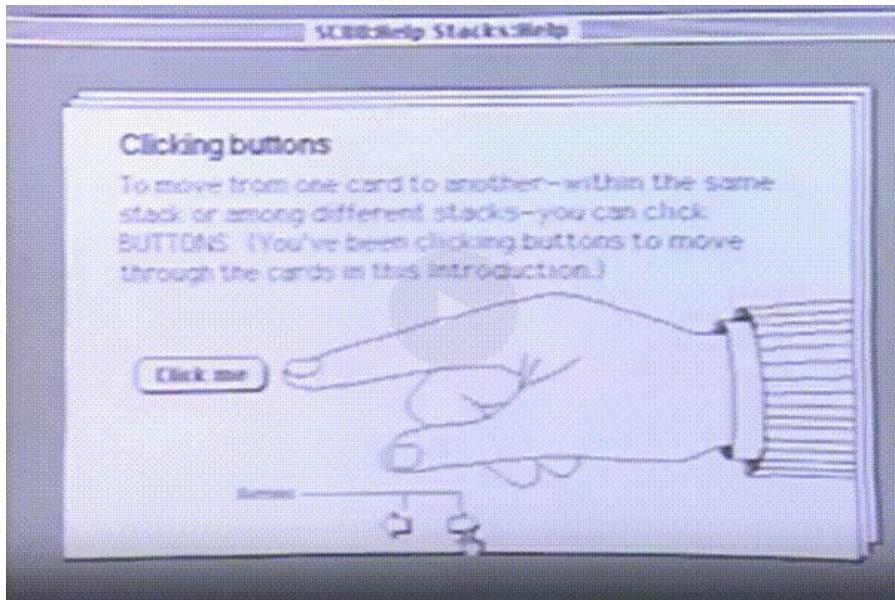
What is the format of the interface between xxx and yyy?

The answers to these questions are normally covered by the descriptions and specifications of xxx. ENQUIRE may be of use in helping a user to find such documents, but it does not reckon to store them.

"ENQUIRE is a method of documenting a system"

made	was made by
includes	is part of
uses	is used by
describes	is described by

1987



Apple releases HyperCard

1989

Vague but exciting ...

CERN DD/OC
Information Management: A Proposal

Tim Berners-Lee, CERN/DD
March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext system.

Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

The diagram illustrates the relationships between various information management systems and their integration into a hypertext system. At the center is a box labeled "This document". Arrows point from "This document" to several other components: "A Proposal X", "CERNDOC", "C.E.R.N", and "Hypermedia". "A Proposal X" has arrows pointing to "ENQUIRE", "VAX/NOTES", and "Hierarchical systems". "ENQUIRE" has an arrow pointing to "Hyper Card". "VAX/NOTES" has arrows pointing to "IBM GroupTalk" and "uucp News". "Hierarchical systems" has an arrow pointing to "CERNDOC". "CERNDOC" has an arrow pointing to "C.E.R.N". "Hypermedia" has arrows pointing to "HyperCard" and "Comms ACM". "HyperCard" has an arrow pointing to "Linked information". "Hypermedia" also has an arrow pointing to "Hypertext". "Hypertext" has an arrow pointing to "Hypermedia". "Comms ACM" has an arrow pointing to "atc". "atc" has an arrow pointing to "Tim Berners-Lee". "Tim Berners-Lee" has an arrow pointing to "wrote". "wrote" has an arrow pointing to "This document". "C.E.R.N" has arrows pointing to "DD division", "MIS", and "OC group". "DD division" has an arrow pointing to "RA section". "RA section" has an arrow pointing to "Tim Berners-Lee". There are also dashed lines connecting "for example" to "ENQUIRE", "VAX/NOTES", and "Hierarchical systems".

"Vague but exciting ..."

1990

- Hypertext Markup Language
 - HTML
- Uniform Resource Identifiers
 - URI/URL
- Hypertext Transport Protocol
 - http://

Hypertext Markup Language (HTML)

```
<h1>My page</h1>

<p>Welcome to my page!</p>

<p>
  <a href="/portfolio.html">
    My portolio
  </a>
</p>
```

My page

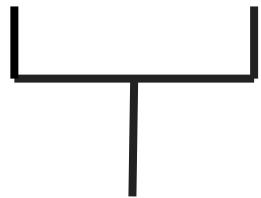
Welcome to my page!

[My portfolio](/portfolio.html)



Uniform Resource Identifier (URI)

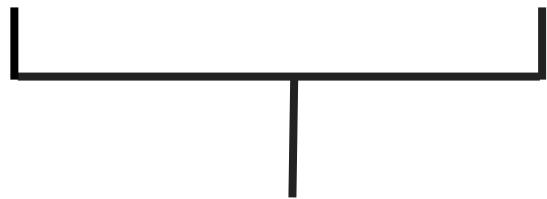
`https://example.com/images/cat.png`



scheme

Uniform Resource Identifier (URI)

https://**example.com**/images/cat.png



host

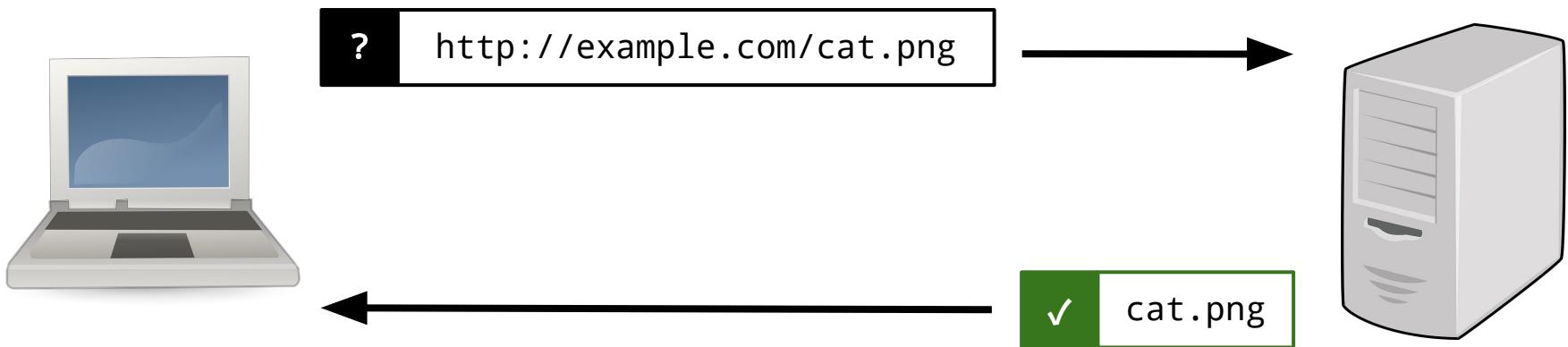
Uniform Resource Identifier (URI)

`https://example.com/images/cat.png`

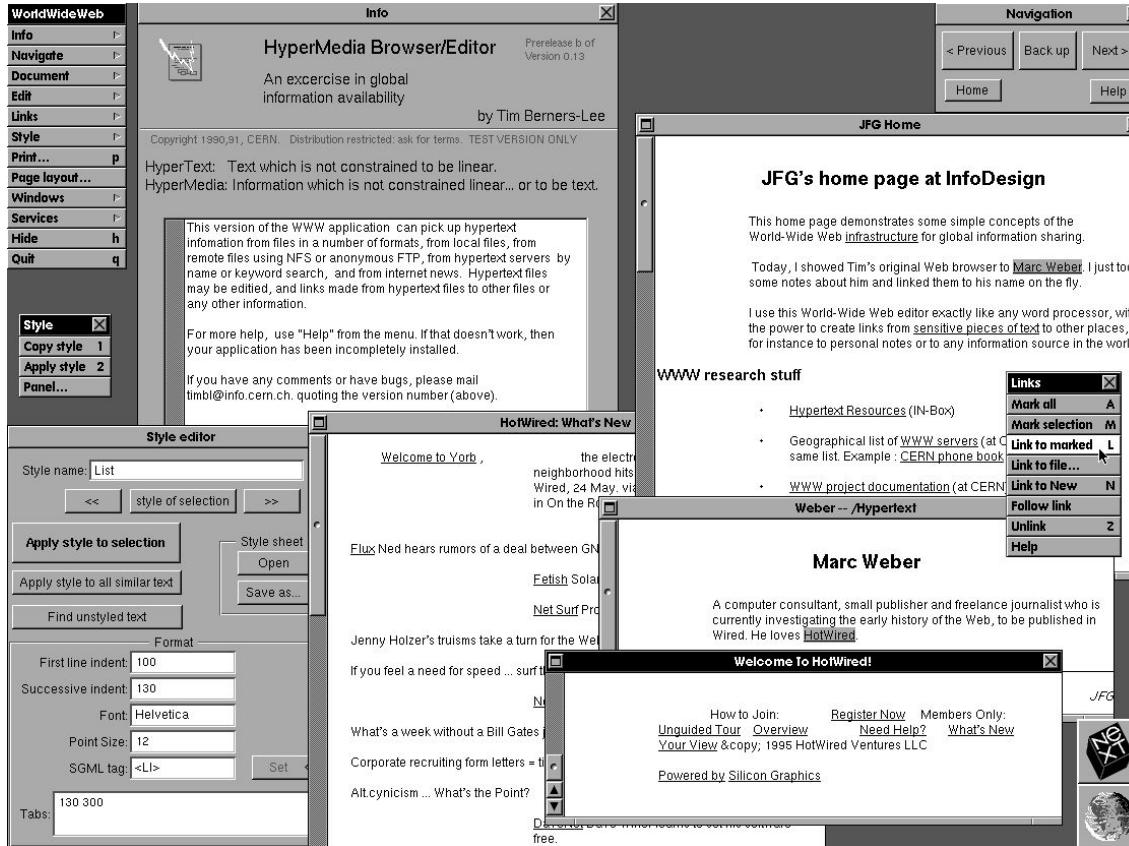


path

Hypertext Transport Protocol (HTTP)



1990



WorldWideWeb.app

1993

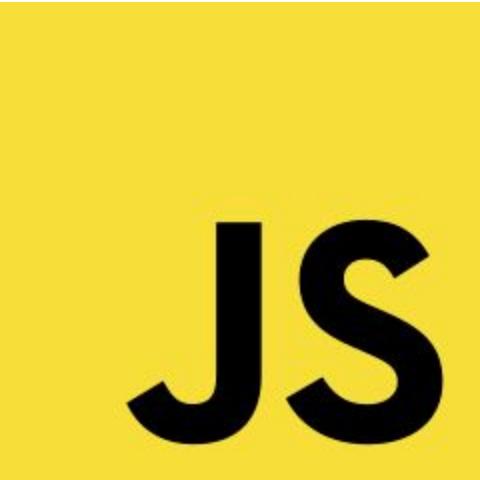
CERN releases WWW code into public domain

1994

W3C

World Wide Web Consortium

1995

A large, bold, black "JS" logo, likely representing JavaScript, set against a solid yellow rectangular background.

JS

Netscape creates JavaScript

What *is* the Web?

HTML



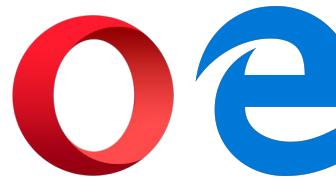
W3C®



SVG

A standardized set of tools for
transmitting and interacting with
documents

CSS



<https://>

WebRTC

OPEN

DECENTRALIZED

SHARED

OPEN

DECENTRALIZED

SHARED

**OPEN
DECENTRALIZED
SHARED**

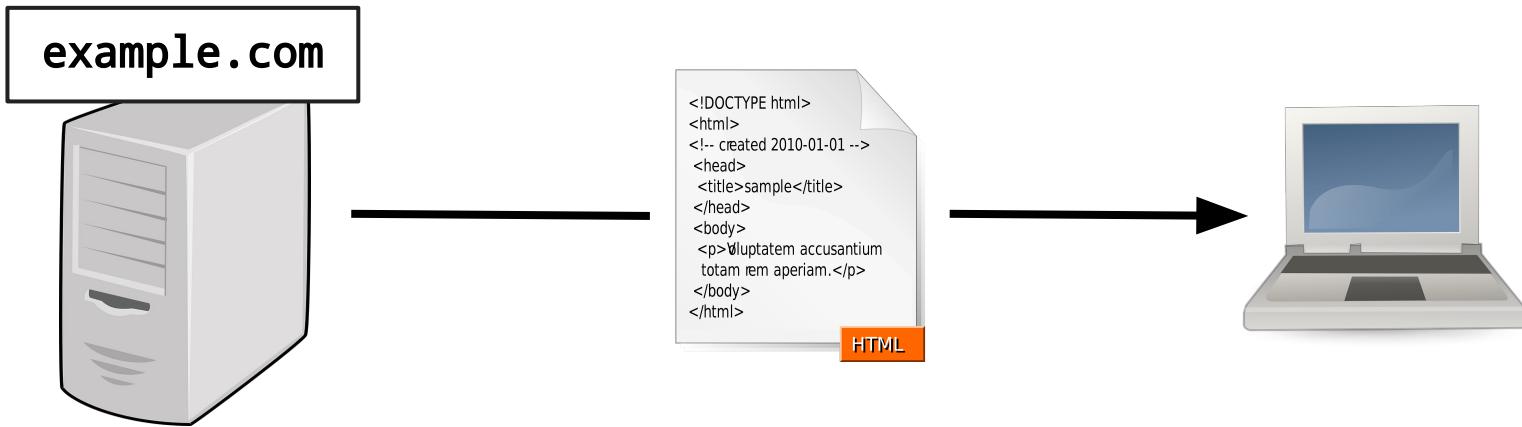
"I'm still an optimist, but an optimist standing at the top of the hill with a nasty storm blowing in my face, hanging on to a fence."

- Tim Berners Lee, 2017

HTTP ruined everything

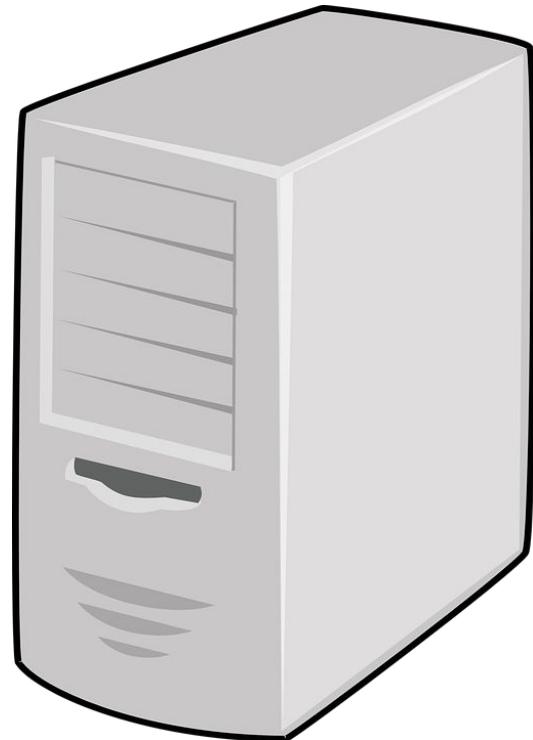
Servers

Λ-~~HTTP~~ ruined everything

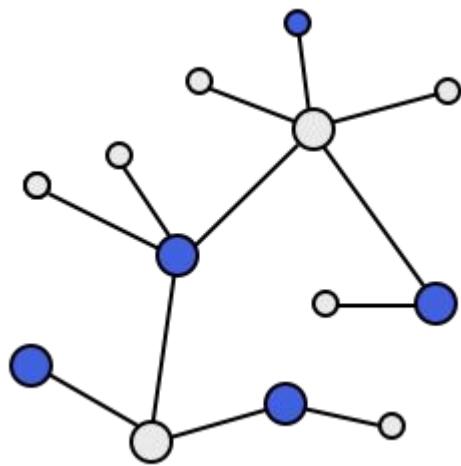


Running a server

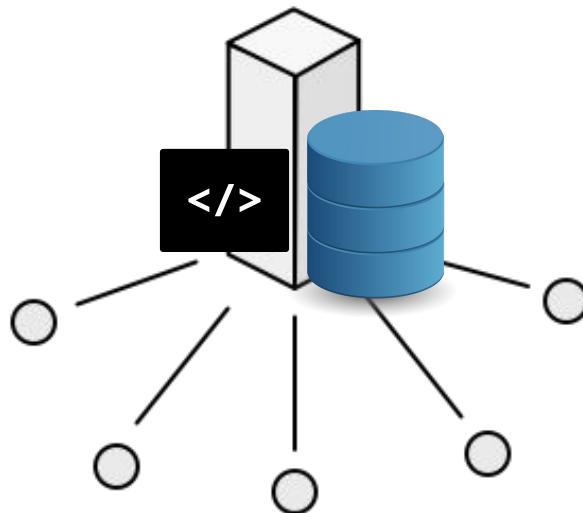
- Difficult
- Expensive
- Not fun (for most people)



Original vision

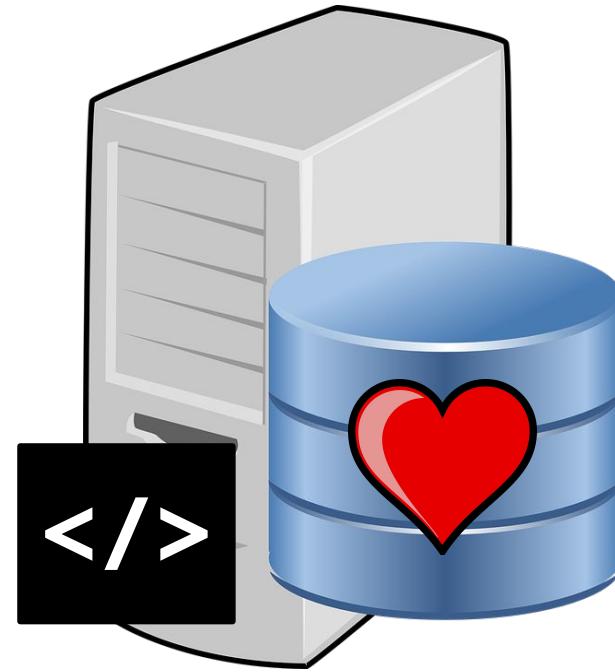


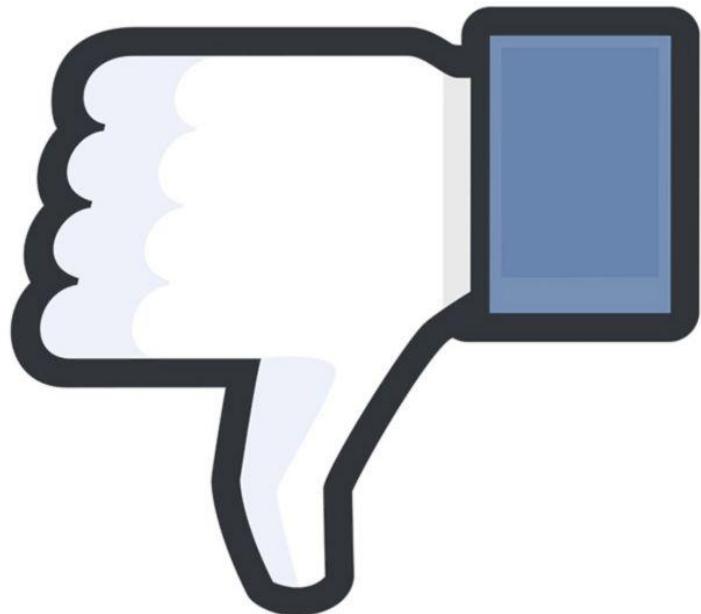
Today



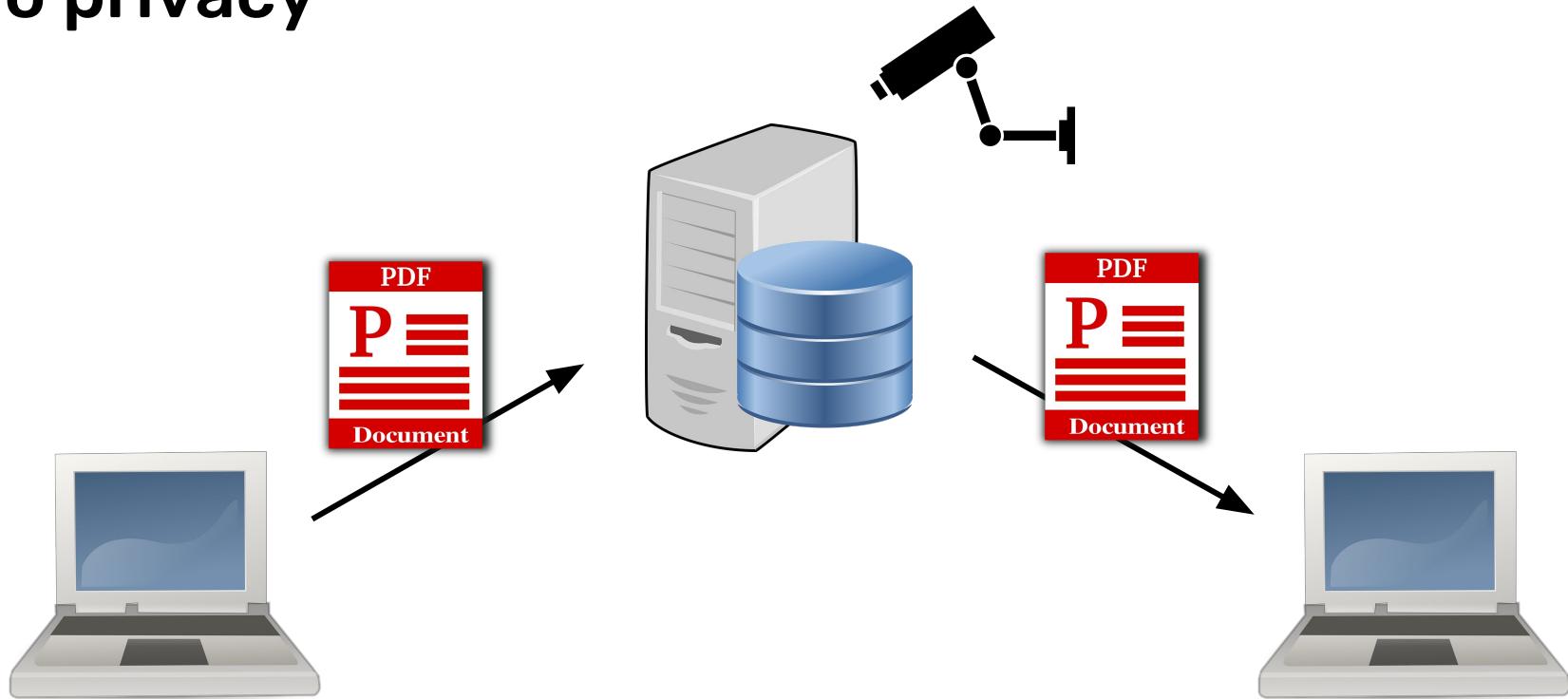
But ... the centralized Web works!

- Fast
- Free
- Reliable
- Easy to use

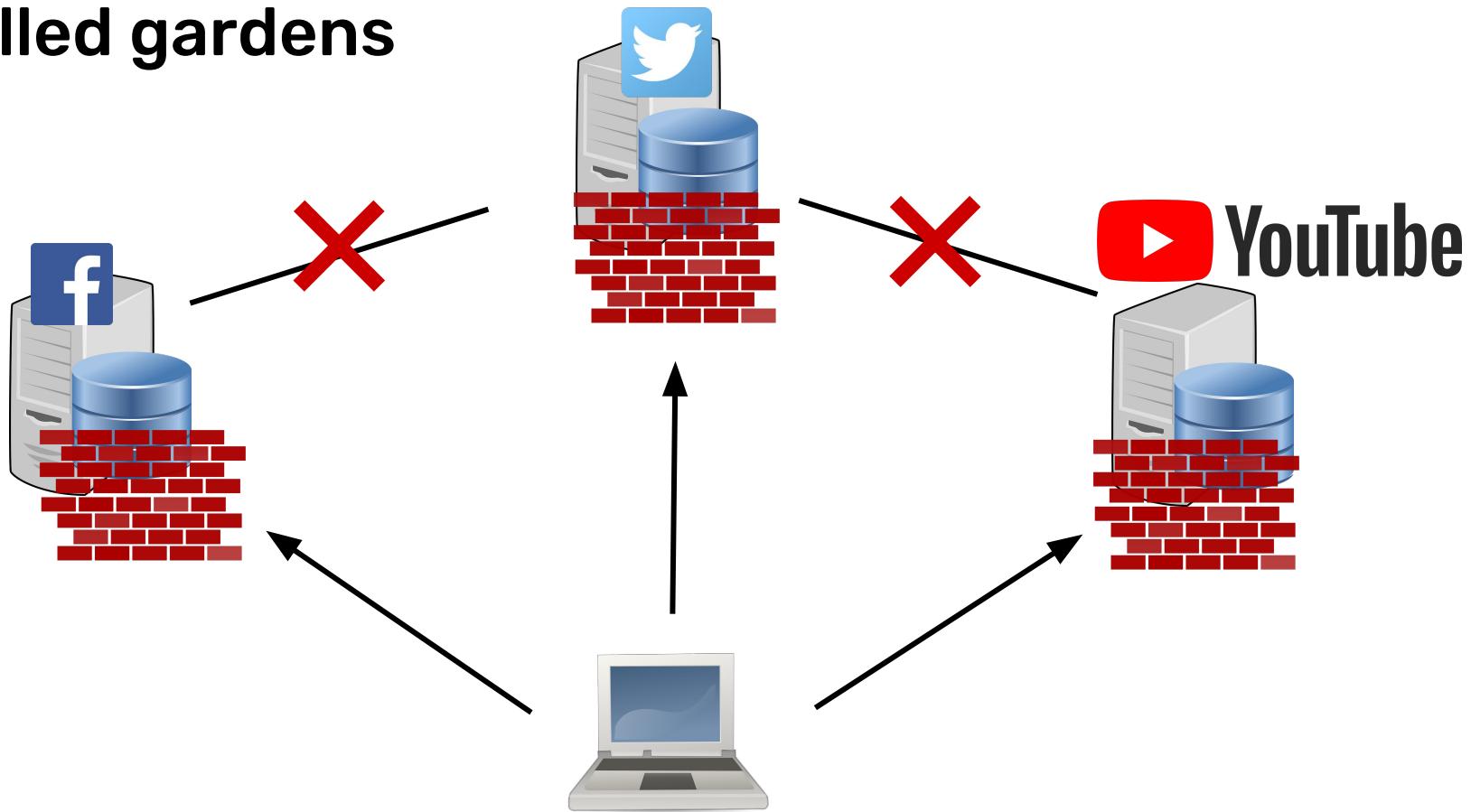




No privacy



Walled gardens



Rigid, un-customizable apps



Twitter

@Twitter

Follow



Can't fit your Tweet into 140 characters? 🤔

We're trying something new with a small group, and increasing the character limit to 280! Excited about the possibilities? Read our blog to find out how it all adds up.

#WomenBoycottTwitter

What if we didn't need servers?

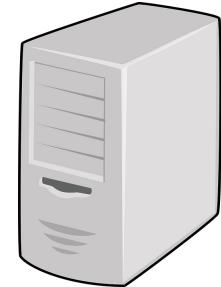
Peer-to-peer protocols

- Dat
- BitTorrent
- IPFS
- Tahoe-LAFS



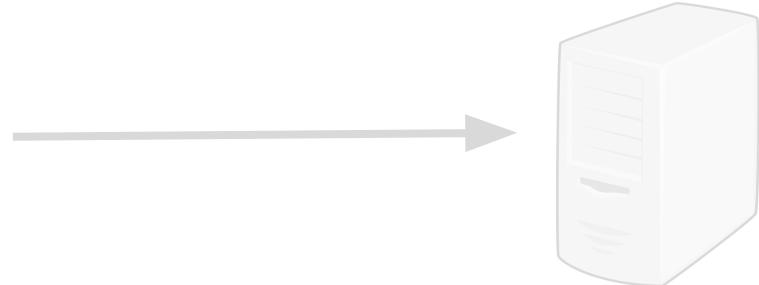
?

<http://example.com/cat.png>

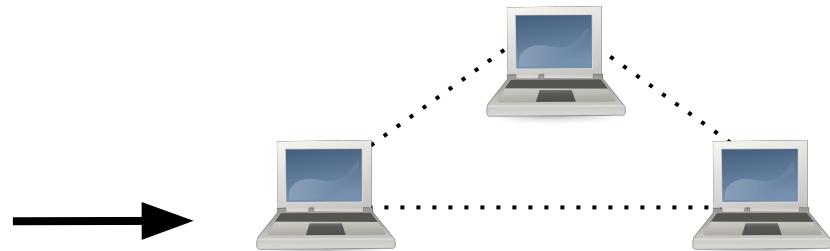




? example.com/cat.png

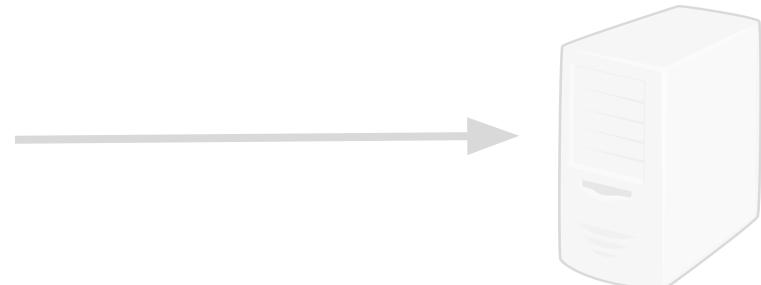


? example.com/cat.png

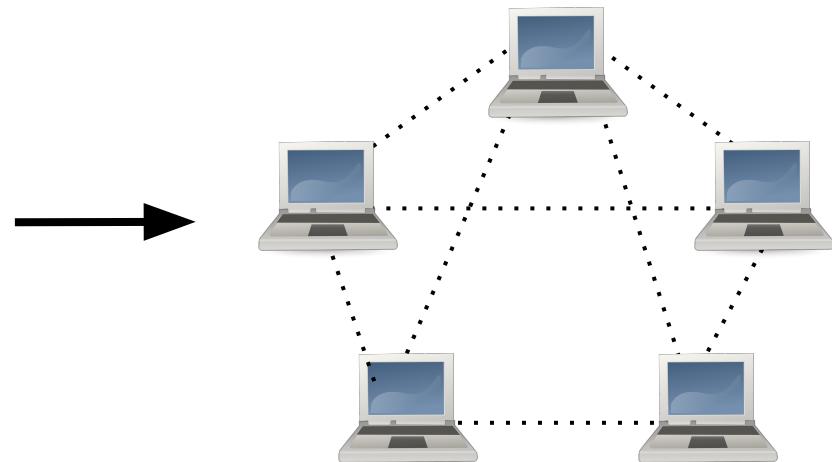


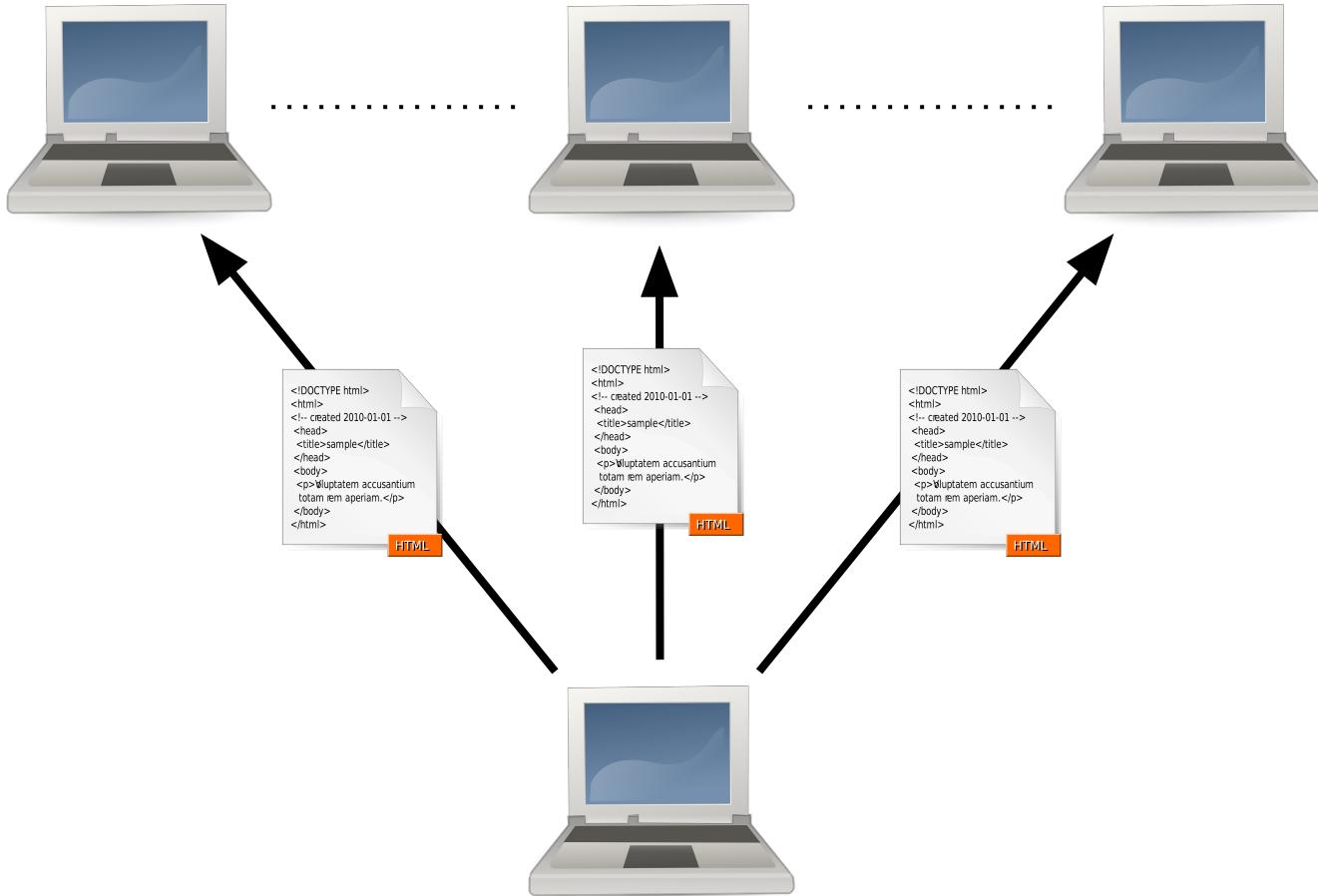


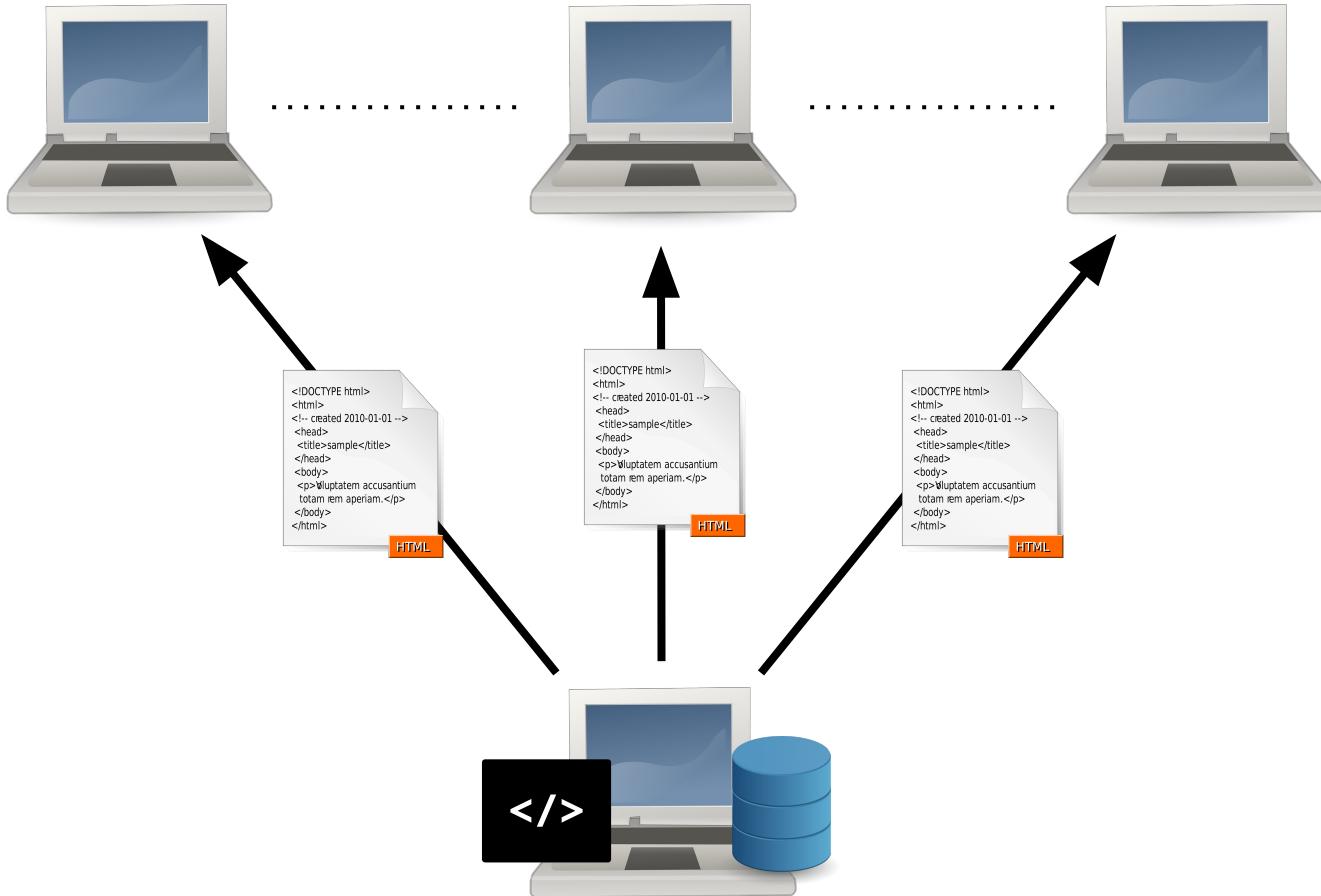
? example.com/cat.png



? example.com/cat.png







The Web, but peer-to-peer

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