La naissance d'ARPANET en contexte

Valérie Schafer, C²DH, Université du Luxembourg

@valerie_schafer

SIF, CNAM, Octobre 2019

UNIVERSITÉ DU LUXEMBOURG

C²DH LUXEMBOURG CENTRE FOR CONTEMPORARY AND DIGITAL HISTORY

L'histoire d'internet en questions

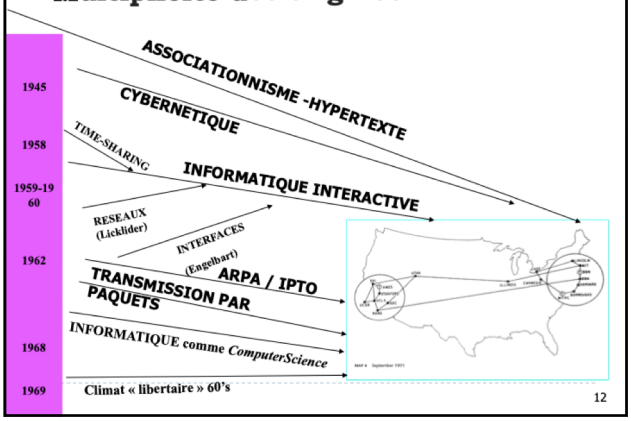
Valérie Schafer, ISCC

Alexandre Serres, URFIST de Rennes

Stage URFIST
16 juin 2016

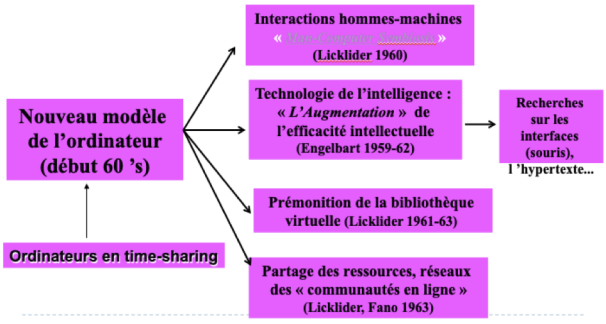
urfist Rennes

Multiplicité des origines d'internet



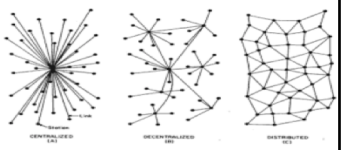
12

Origines d'internet : L'informatique interactive



Origines d'internet : Premiers travaux sur la transmission par paquets

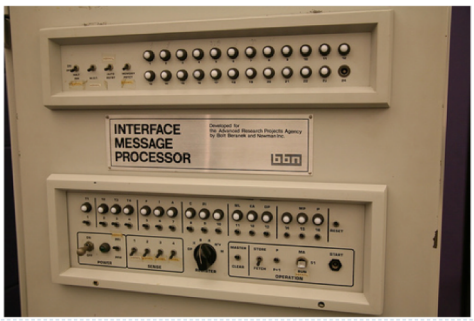
- Paul Baran :
  - 1960-65 : idée de réseau distribué
- Projet Baran souvent confondu avec Arpanet



Origines d'internet : L' IPTO (*Information Processing Techniques Office*)

- Petit service de la recherche informatique au sein de l'ARPA, créé en 1962
- Des dirigeants visionnaires (Licklider), jeunes et brillants (Sutherland, Taylor, Roberts)
- Des moyens financiers importants
- Une équipe très réduite (3-4 personnes)
- Un fonctionnement souple, informel
- Une vision de l'informatique interactive et communicationnelle
- Un réseau de chercheurs
- De nombreux projets de recherche avancée

Repères : les IMP (Interface Message Processor)



Larry Roberts et Thomas Marill en 1965 connectent deux ordinateurs différents, le TX-2 du Lincoln Laboratory conçu par Wesley Clark et un Q-32 d'IBM à Santa Monica

« 1973. There was a major computer communications network conference in Brighton, England, at the University of Sussex. It was a great conference, in fact that's the conference where Bob Kahn and Vint Cef first started talking about this thing called TCP. I had to leave a day early, I came home, I'm unpacking, and I realise that I left my electric razor in Brighton. Now at that meeting, we had taken a high-speed line from London, which was an ARPANET node, down to University of Sussex (…). It was a crazy hour in the morning like four in the morning, in Brighton. So, I said: "What crazy person will be on the network at four in the morning? Maybe Larry Roberts would!" I got onto my computer terminal and there was a very nice program there called "Resource Sharing Executive". You could type in the name of anybody and say, "Where Roberts" (…). Finally, five minutes later, it came back and said, "Roberts logged on teletype 13". We had the ability to communicate. There was no formal chat session, it was an ad hoc kind of chat session. People were able to communicate by typing things out on the other person's terminal. I could type on his and he could type on mine. It was a kind of rudimentary chat session. (…) The next day, Danny Cohen came back with my razor, and so in fact, I admit that was the first illegal use of the Internet, because it was a personal use and not devoted to science and technology as it was supposed to be [Laughs] ».

Morten Bay (2018) Conversation with a pioneer:Leonard Kleinrock. *Internet Histories* 2:1-2, 140-152

De nouvelles tendances historiographiques

Histories of Networking vs. the History of the Internet
Andrew L. Russell
College of Arts & Letters, Stevens Institute of Technology

Paper presented at the 2012 SIGCIS Workshop, October 7, 2012

Abstract

In this paper I describe the difference between "the history of the Internet" and "histories of networking." The former phrase often describes a linear success story, one that starts with Sputnik (1957) and then moves to the creation of the Arpanet (1969), Cerf and Kahn's Transmission Control Program (1974), the commercialization of the Internet (early 1990s), and the global adoption of the World Wide Web (late 1990s). I argue that there is an opportunity now for historians to talk more about the latter category, "histories of networking," which includes both the Arpanet and Internet as only part of the story. Histories of networking also include developments in data networking, telecommunications, and wireless transmission that took place in other countries or that do not fit neatly into the narrative of the Internet's success—in other words, projects that are not necessarily part of the established linear history of the Internet but are nevertheless important to describe and to understand. The goal for this paper, therefore, is to destabilize the American-centric, triumphalist, and teleological narrative of linear success—from Arpanet to Internet to global information society—that is so pronounced in the existing popular accounts of the history of the Internet.

```
READY
10 PRINT "A PEOPLE'S"
30 PRINT "HISTORY OF"
40 PRINT "COMPUTING"
50 PRINT "IN THE"
60 PRINT "UNITED STATES"
70 PRINT "----"
80 PRINT "JOY LISI"
90 PRINT "RANKIN"
100 END
RUN

A PEOPLE'S
HISTORY OF
COMPUTING
IN THE
UNITED STATES

JOY LISI
RANKIN

READY
```

38: User Communities in the History of Computing: New Methods and Directions
New York Central
Sponsored by SIGCIS
Organizer: **Gerardo Con Diaz** (University of California, Davis)
Chair and Commentator: **Janet Abbate** (Virginia Tech)

Stephanie Dick (University of Pennsylvania): *MACSYMA: Making a Mathematical Community*
Marie Hicks (National Humanities Center): *Bootstrapping Digital Governance: Trading Programming for a New Computer at the Administrative Staff College of India in the 1970s*
Gerardo Con Diaz (University of California, Davis): *Copyright Law and the Angry Programmers: The League for Programming Freedom, 1985-1995*
Matthew Jones (Columbia University): *Through the List-Serve, Darkly: User Groups, and the Emergence of Data Mining in the 1990s*

The Production and Interpretation of ARPANET Maps

Bradley Fidler and Morgan Currie
University of California, Los Angeles

A 20-year series of ARPANET maps produced by the firm Bolt Beranek and Newman (BBN) signifies the earliest efforts to represent an early and central piece of the modern Internet. Once a functional tool for engineers, they now serve as an aesthetic backdrop used without explicit recognition of their intended purpose.

THE ARPA NETWORK

SEPT 1969

1 NODE

Figure 1. The first ARPANET node at the University of California, Los Angeles, September 1969.

THE ARPA NETWORK

DEC 1969

4 NODES

Figure 2. The first four nodes of the ARPANET, December 1969.

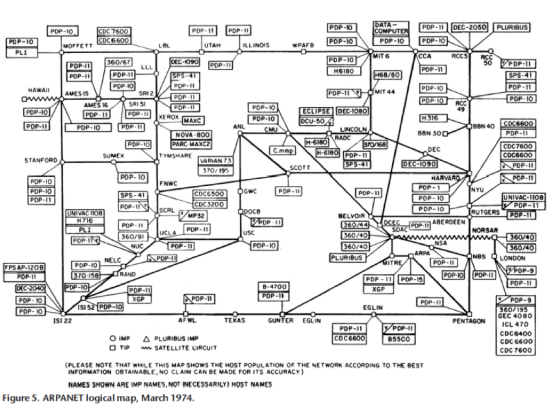


Figure 5. ARPANET logical map, March 1974.

A Specific Parameterization

The maps' focus on the subnet stayed in place while the ARPANET grew in complexity with the introduction of new applications such as email and FTP, as it began connecting to both external and local networks, and as it reconfigured its institutional governance and access control policies (to name just a few developments). BBN had no reason to alter its interpretive strategies as staff could access more encompassing data that reflected these changes. Rather, BBN parameterized its maps by selecting from a larger set of static data it maintained on the configuration of the network, such as IMPs and their interconnections (the subnet), the type of IMP connection to its hosts, the name of each host, as well as line and modem numbers.

Finally, the links on the map represent leased lines from telephone carriers, the connections between the subnet. The geographic maps appear to privilege geography to show these connections, although geography is pushed aside in the case of nodes in Hawaii or London, which simply show up as "outside the continental United States"; concentrations of nodes, power centers of the US network, are magnified to fit the nodes on the printed map. On later geographic maps, satellite connections were represented as uneven links (and experimental satellite connections were not shown at all.[33] In the case of both maps, all links between IMPs, even on geographic maps, are displayed logically, only revealing their origins and destinations: the actual geographic route of the ARPANET's leased lines, and the connections and transfers across the line's routes, were unknown to BBN. Indeed, even though the

692 Views
2 CrossRef citations to date
41 Altmetric

Articles

ARPANET and its boundary devices: modems, IMPs, and the inter-structuralism of infrastructures

Fenwick McKelvey & Kevin Driscoll

Pages 31-50 | Received 21 Apr 2018, Accepted 02 Nov 2018, Published online: 28 Dec 2018

Download citation https://doi.org/10.1080/24701475.2018.1548138

Full Article | Figures & data | References | Citations | Metrics | Reprints & Permissions | PDF

In this article

Introduction

From boundary objects to boundary devices

The telephonic platform for ARPANET

Rugged, plastic, and technically portable: the interface message processor

Twisted pairs: IMPs and long lines

Abstract

Our paper focuses on the Interface Message Processor (IMP), an important device in the history of ARPANET. Designed as the interface between ARPANET nodes and the common carrier telephone system, the IMP actualized the ARPANET as an experimental packet-switching communication system. We conceptualize the IMP as historical boundary object that exposes ARPANET's close relationship to the telephone system. Our analysis offers a novel history of ARPANET as a repurposing of the existing telephone infrastructure. Beyond the historical contribution, this approach has wider implications for the theory of media infrastructures, specifically the "inter-structuralism" of ARPANET and the nature of borders between seemingly disparate social, political, and technological regimes.

Keywords: ARPANET, infrastructure, boundary objects, gateways, internetworking

Introduction

Figure 1. BBN IMP, Modem Cabinet, and IMP Teletype

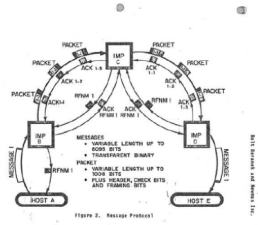


Figure 2. Message Protocol

Technol Cult. 2018;59(4):899-924. doi: 10.1353/tech.2018.0090.

Financial and Administrative Infrastructure for the Early Internet: Network Maintenance at the Defense Information Systems Agency.

Fidler B, Russell AL.

Abstract

Popular and scholarly histories of computer networking often focus on technical innovation and the social impact of those innovations. These histories are marked by a contradiction, namely, failing to explain the existence of the infrastructure that they must ultimately use as evidence for the success of innovation, and the conduit of its social impact. The story of the U.S. Defense Advanced Research Agency's (DARPA's) Arpanet, and the role of both in the invention of the modern Internet, is a central archetype of this genre. Taking our lead from recent work in infrastructure and maintenance studies, we propose a methodological and ontological inversion of Internet historiography-centering our explanation around the infrastructure that is assumed but not explained in innovation-centric accounts. We do so by focusing on the U.S. Defense Communications Agency (DCA; now the Defense Information Systems Agency), which is traditionally cast, contra DARPA, as a conservative enemy of innovation. We explore its maintenance of the financial and administrative infrastructure necessary for the Arpanet to function as a contribution to broader histories of network infrastructure.

PMID: 30581182 DOI: 10.1353/tech.2018.0090

Les maintenance et infrastructure studies pour une nouvelle approche de l'histoire d'ARPANET

De quoi la naissance d'ARPANET est-elle la fête ?

- *UCLA computer science professor Leonard Kleinrock establishes the first local connection between two computers in his lab. Matthew Moore of The Telegraph called this "the most appropriate" of all the anniversaries. Discovery magazine and National Geographic both identify this as the true date of birth."*

Gustini R. (2011). "Happy Birthday Internet? Today is one of the many dates people cite as the Internet's birthday". *The Atlantic*, 7 April.

- *"Happy birthday, Internet! You may be turning 45 today, but we swear you don't look a day over 30. […]*

How do we define the invention of the internet? It's a question that scholars and armchair historians have debated for decades. Did it start with the birth of the web? Did it start with the adoption of TCP/IP? You could make a case for either. But one seminal moment in the creation of the internet cannot be denied: the first host-to-host connection of the ARPANET between UCLA and Stanford on October 29, 1969. At 10:30pm."

Novak M. (2014). "Happy 45th Birthday, Internet!" *Paleofuture*, 29 October.https://paleofuture.gizmodo.com/happy-45th-birthday-internet-1651891185

French memories about the ARPANET: a conversation with Michel Élie and Gérard Le Lann

The idea of making profit from the network was completely absent. It was an idyllic world where people just shared, and the NWG was the main apostle of this. For instance, Lawrence Roberts, the project manager, immediately accepted that the specifications would be open. The NWG was strongly opposed to computer manufacturers and their influence on the shape of networks.

(…) The ARPANET anniversary should emphasize the non-profit, social and societal sides of network developments and uses. It should be an opportunity to stress that the urgency seems not to be in technology but in re-humanizing the Internet and its uses in order to serve social needs all over the earth: let the Internet be human again!

PROJECT MUSE

INWG and the Conception of the Internet: An Eyewitness Account

Alexander McKenzie

IEEE Annals of the History of Computing, Volume 33, Number 1, January-March 2011, pp. 66-71 (Article)

Published by IEEE Computer Society

- "A guy named Gérard Lelann (sic) was at IRIA working with Pouzin and came to my lab at Stanford for a year and had a lot to do with the early discussions of what the TCP would look like. So did Bob Metcalfe, it turns out. Metcalfe was at Xerox at the time and in June of 1973 we began working together, Lelann, Metcalfe, and I, on the design of the host-to-host protocol for INTERNET. Eventually Metcalfe got impatient with the rate at which things were going. I was trying to get a large number of people to agree on a set of protocols, and every time you brought in a new player we had to go through the argument again. Meanwhile Metcalfe had five or six guys over at Xerox trying to get the local area nets running. Finally they said they didn't want to wait until this process of agreement and consensus finally concluded, so they went off on a slightly different tack and invented XNS that took some different choices than the TCP did. And they got it up and running before ours, in fact. Of course in the long run we've... They kept it secret, and that was a mistake, I guess, now looking back. If they hadn't kept it secret, we might all be using XNS instead of TCP. But as it stood, TCP turned out to be the open protocol that everybody had a finger in at one time or another. That is just how it all worked out."

Cerf, Vinton G. (1990). Oral history interview with Vinton G. Cerf. Charles Babbage Institute.
https://conservancy.umn.edu/handle/11299/107214

The Publication of the First RFC

communication, computer science 7. April 2018 1 Harald Sack

Steve Crocker is the inventor of the Request for Comments series, authoring the very first RFC

On April 7, 1969, Steve Crocker of University of California, Los Angeles (UCLA), published the first Request for Comment – RFC 1 – entitled "Host Software". This might be considered as the beginning of the internet, because Request for Comments (RFC) are memoranda describing methods, behaviors, research, or innovations applicable to the working of the Internet and Internet-connected systems. Originally, Steve Crocker's RFCs were intended to help record unofficial notes on the development of the ARPANET , the precursor of today's internet.

http://scihi.org/steve-crocker-rfc/