

Networks and the Digital Revolution:  
Economic Myths and Realities  
Mises Academy EH625

# Economics of the Internet

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# Review of key constructs

- ▶ Information as an economic good
- ▶ Metcalfe's law
- ▶ Network effects and network externalities
- ▶ Tipping
- ▶ Path dependence
- ▶ How new is new?



# Why the Internet matters

- ▶ Primary market for exchange of (modern) information goods
- ▶ Role of standards (and hence network effects/externalities, path dependence)
- ▶ Flagship “New Economy” thing!

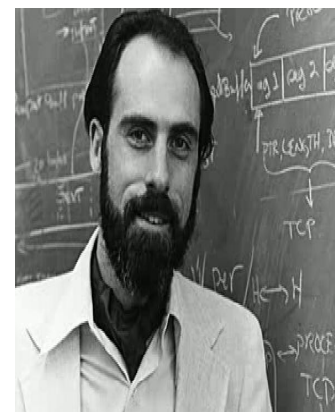


# History of the Internet

- ▶ ARPA (1950s)
- ▶ Rand Corporation (1960s)
  - Baran, “On Distributed Communications,” 1964
- ▶ Stanford and other universities (1970s)
  - Cerf, Dalal, and Sunshine, “Specification of Internet Transmission Control Program,” 1974
- ▶ MIT, CERN, UIUC, other institutes (1980s, 1990s)
  - Tim Berners-Lee



Paul Baran (1926–)



Vinton Cerf (1943–)

# Objectives of distributed computing networks

- ▶ Secure military communications
  - Absence of central nodes

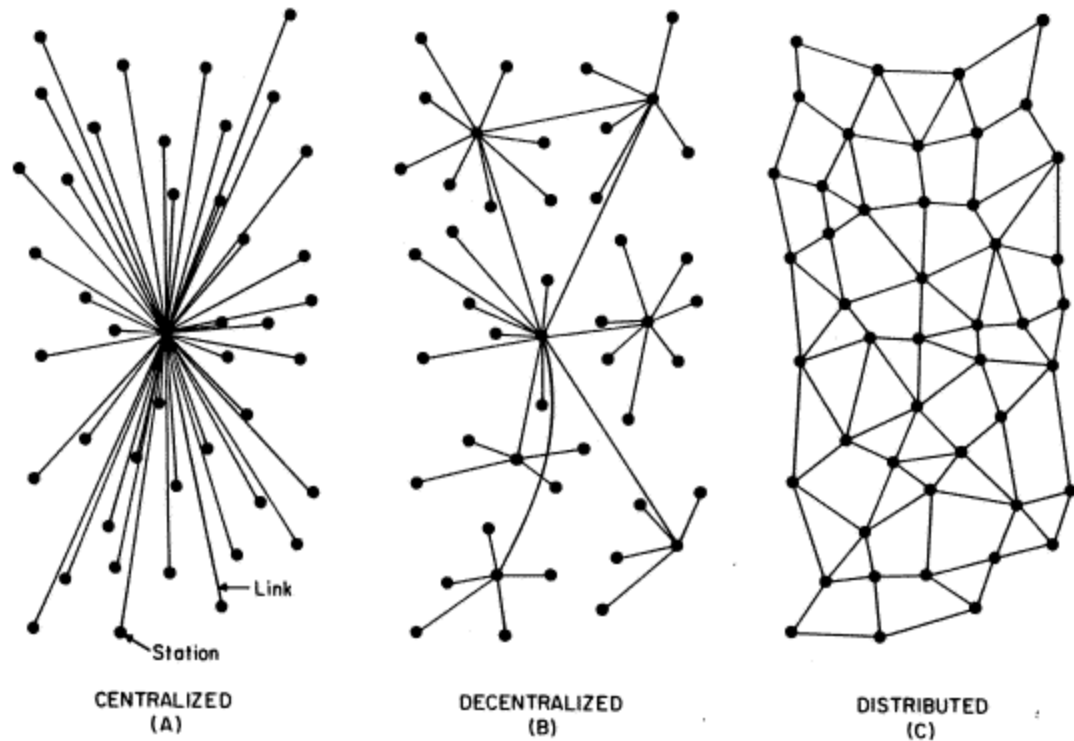
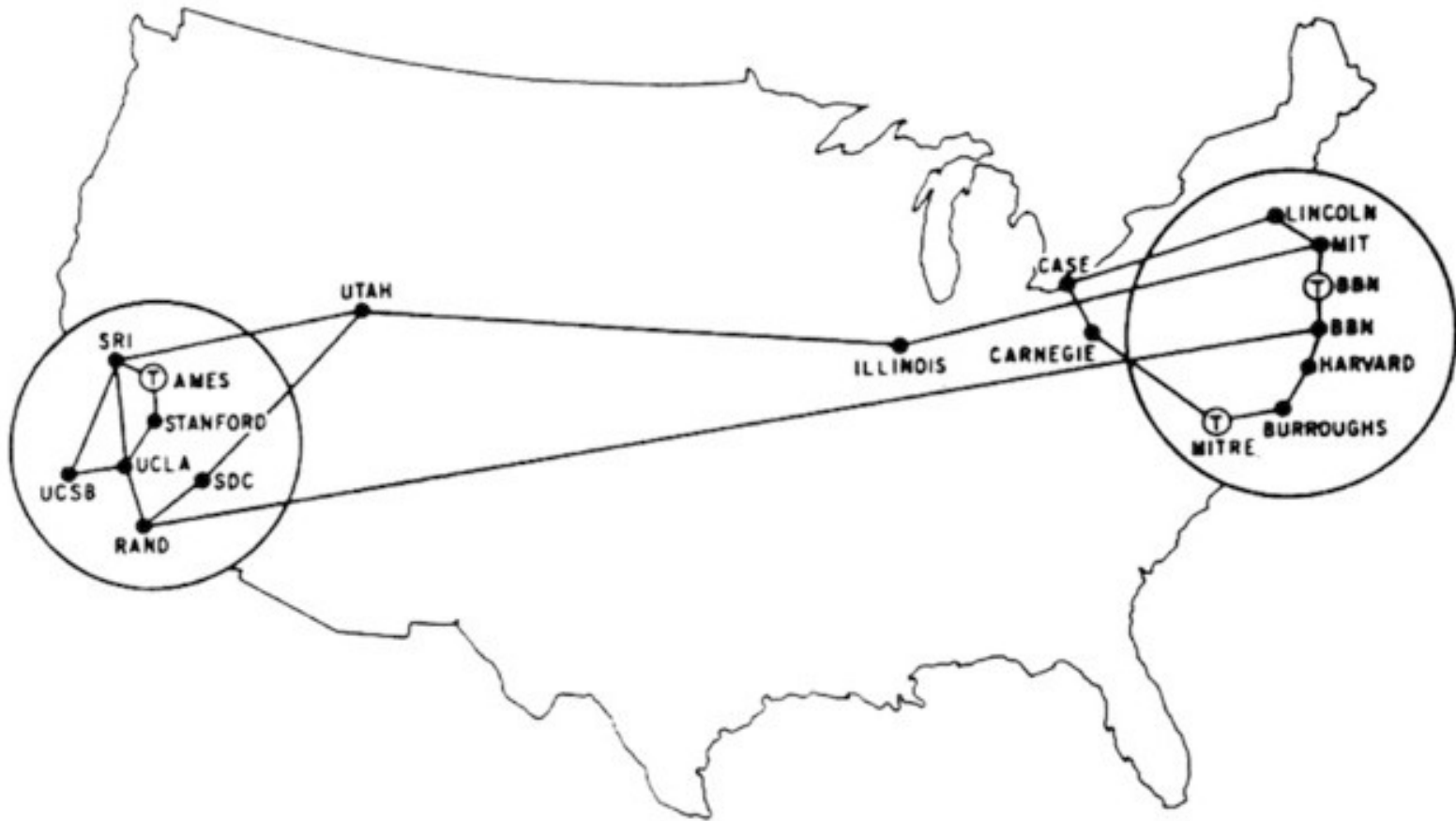


FIG. 1 – Centralized, Decentralized and Distributed Networks

# Objectives of distributed computing networks

- ▶ Secure military communications
  - Absence of central nodes
  - Simple address system, flexible routing algorithms
- ▶ Efficient sharing of fixed computing resources
  - Client-server computing (the Cloud before the Cloud)
  - High processing and storage costs
- ▶ Need for standards
  - Node addresses
  - Information transfer protocols (FTP, Telnet, HTTP, etc.)

# The Arpanet, circa 1972



# Rise of the commercial Internet

- ▶ Within a few years the ARPANET became less a network for shared computing than a high-speed, federally subsidized, electronic post office. (Main traffic: email.)
- ▶ As parts of the ARPANET were declassified, commercial networks began to be connected to it. Any computer using TCP/IP could connect.
- ▶ Trunk lines continued to be financed by the Department of Defense until 1984. NSF operated them from 1984 to 1994, when they were sold to private operators.





# Economic issues

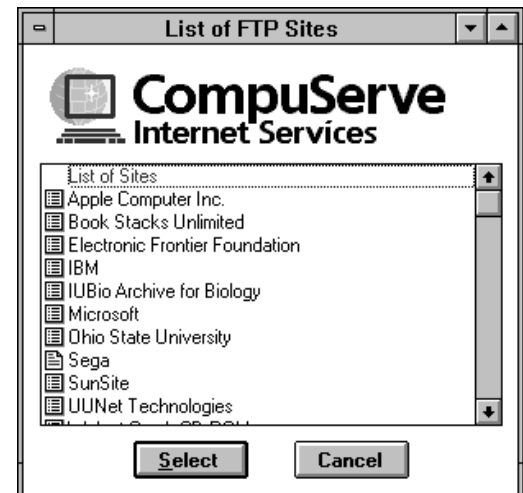
## ▶ Pricing

- Bandwidth as a scarce resource
- The “tragedy of the commons” (Hardin)
- Allocation methods: pricing, waiting, administrative direction

## ▶ Path dependence

- None of the relevant, underlying protocols selected by the market!
- Politics and path dependence

## ▶ The broken-window fallacy



# The market and the internet

The current global computer network has been developed by scientists and researchers and users who were free of market forces. Because of the government oversight and subsidy of network development, these network pioneers were not under the time pressures or bottom-line restraints that dominate commercial ventures. Therefore, they could contribute the time and labor needed to make sure the problems were solved.

— “The Netbook,” [www.columbia.edu/~hauben/netbook/](http://www.columbia.edu/~hauben/netbook/)

# Is the Internet a spontaneous order?

- ▶ Role of public funding
- ▶ Objectives of key decision makers
- ▶ Technological versus economic value
- ▶ Application to open-source programming