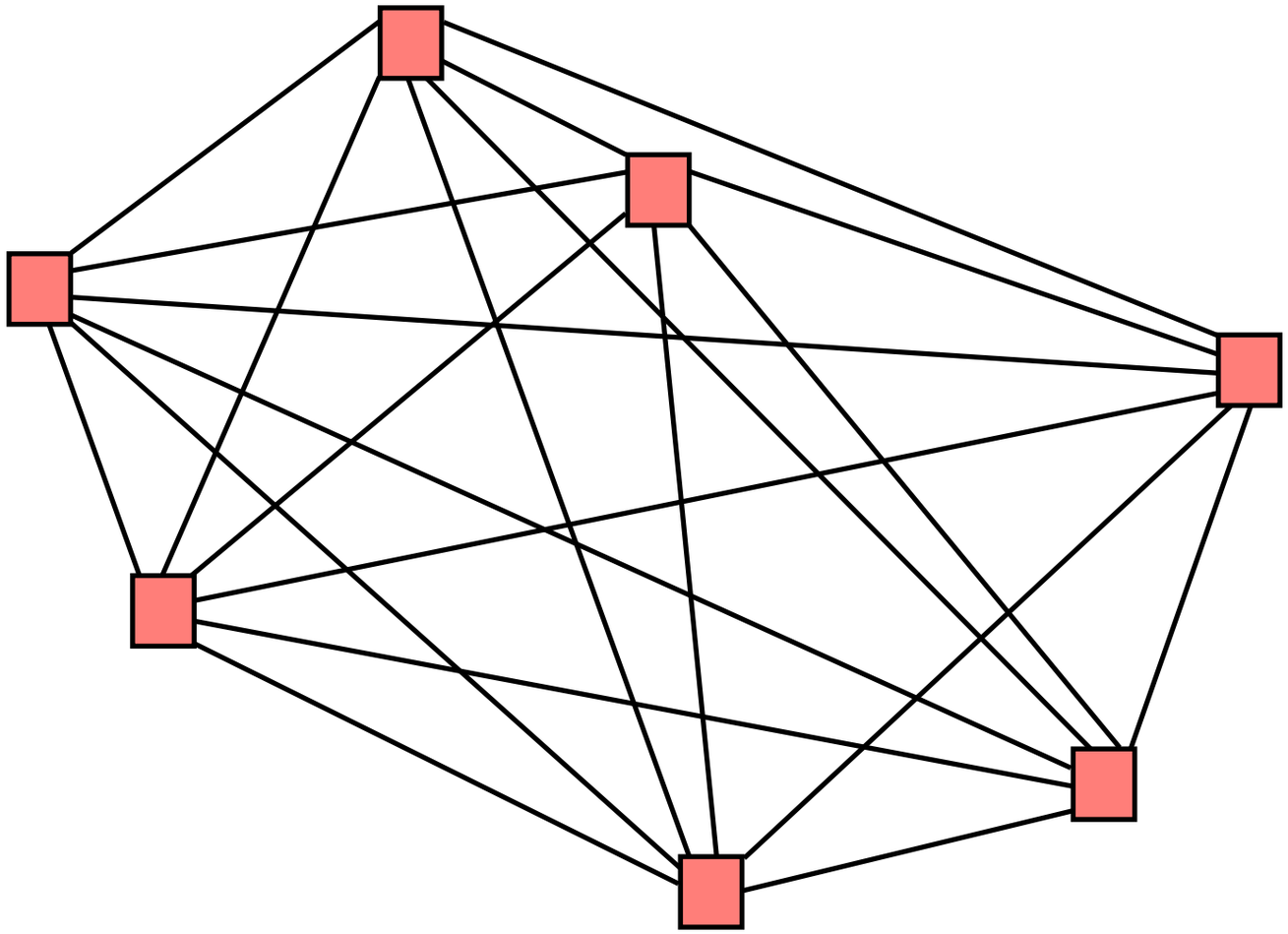
6.033 Spring 2017

Lecture #8

- **Introduction to Networking**

what is a network?



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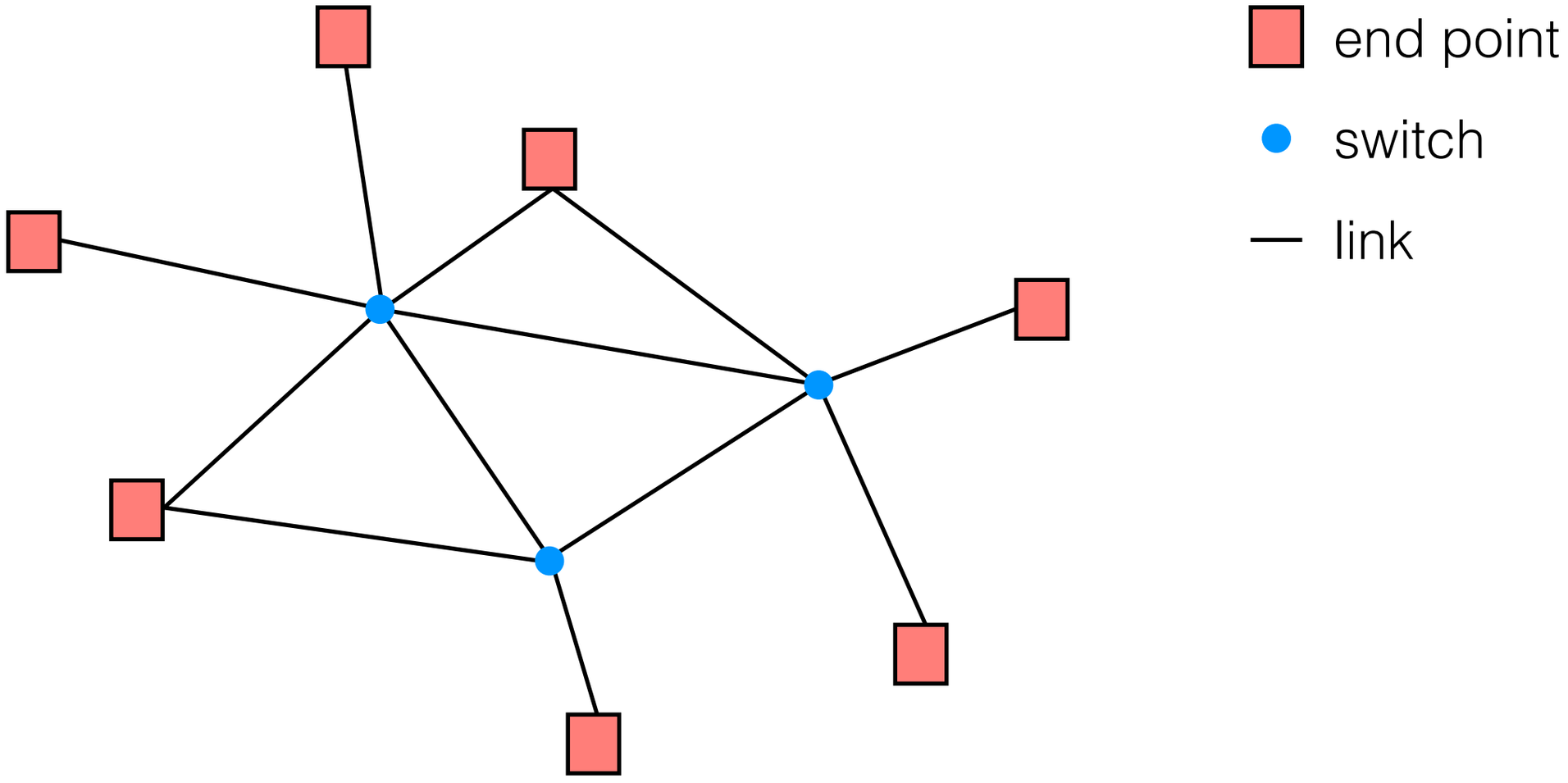
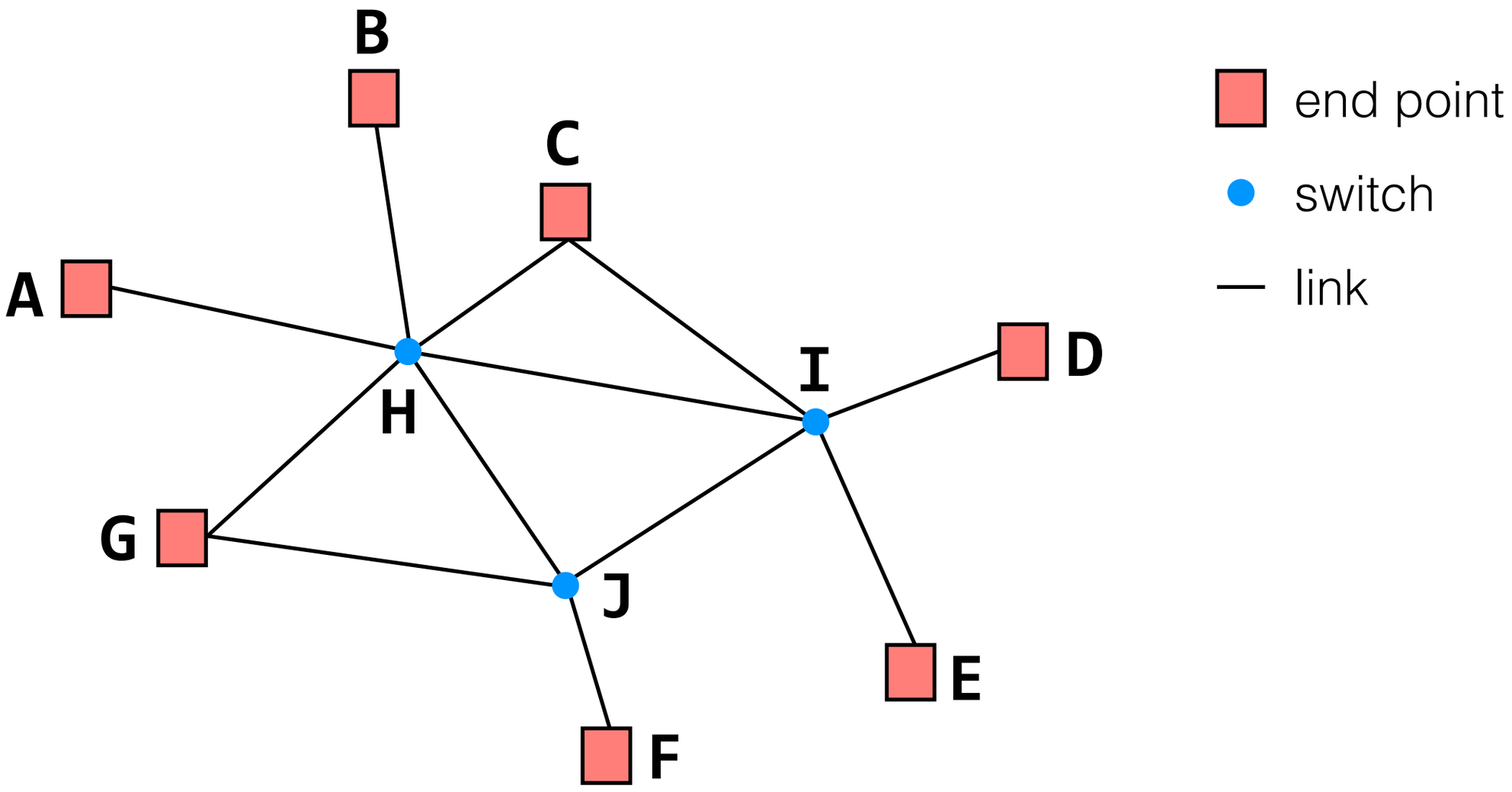
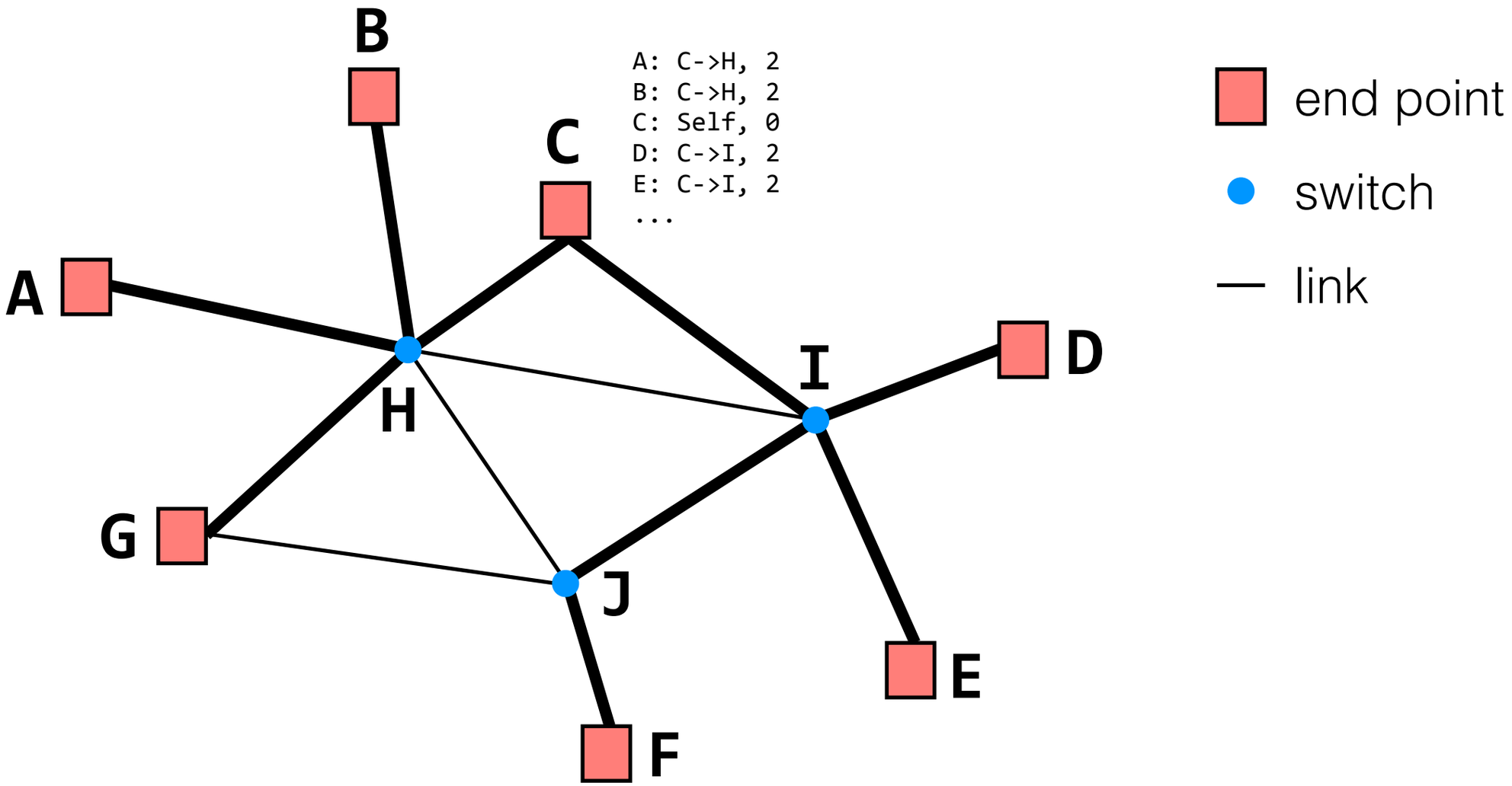


what is a network?



naming and addressing: assigning unique names (or addresses — names imbued with location information) to nodes

what is a network?



routing: each node learns a (min-cost) route to every other reachable node

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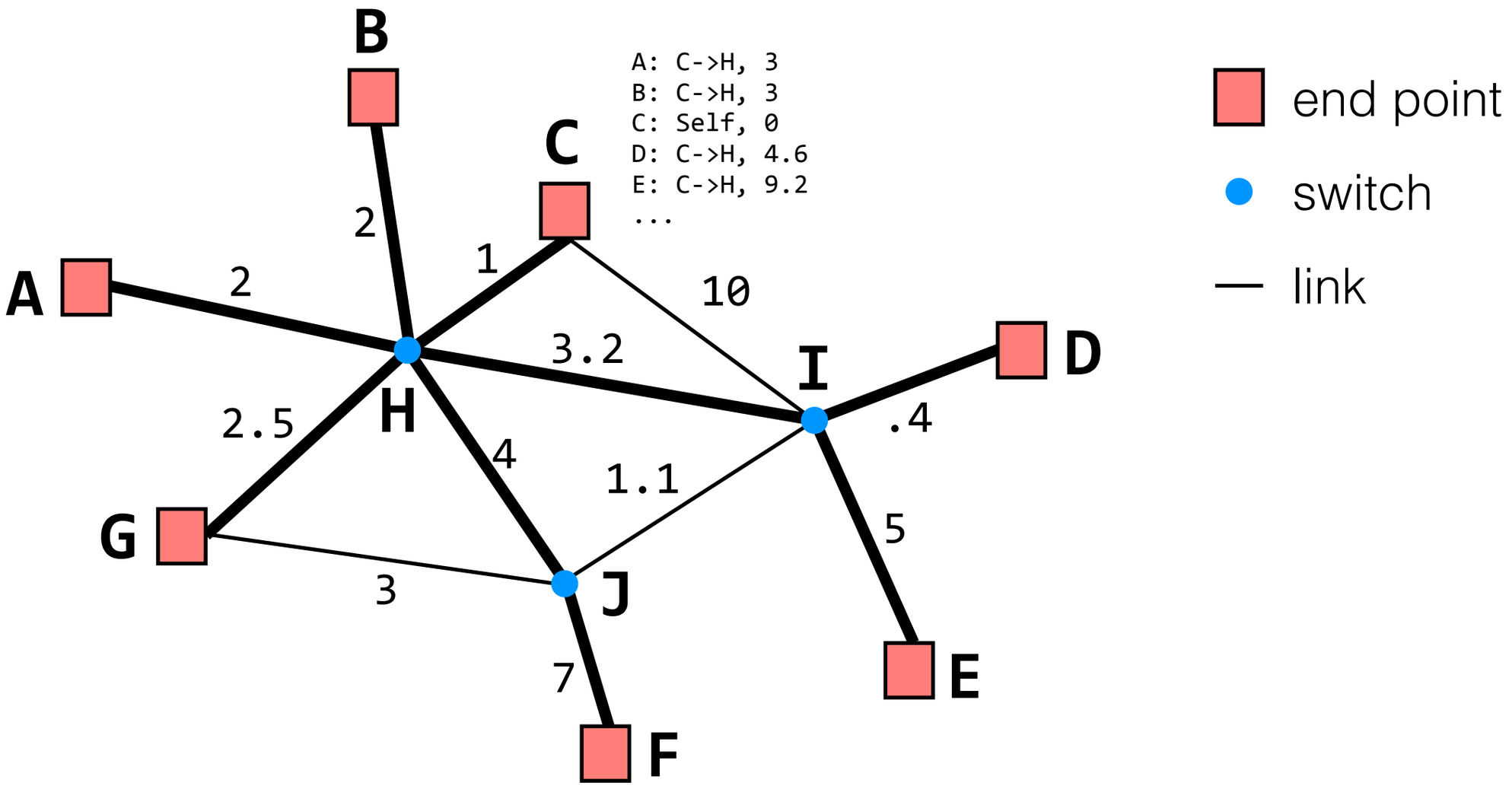

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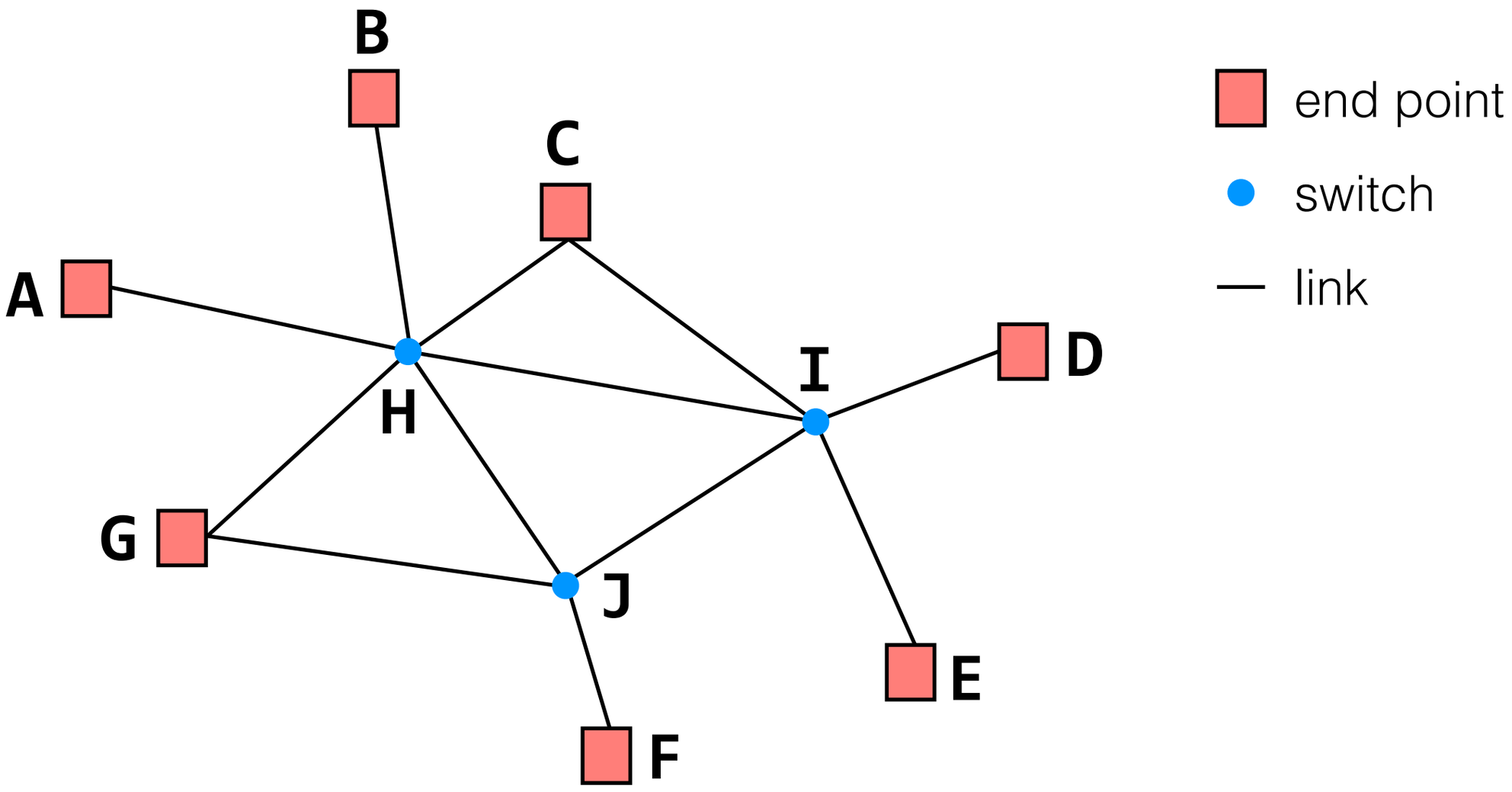
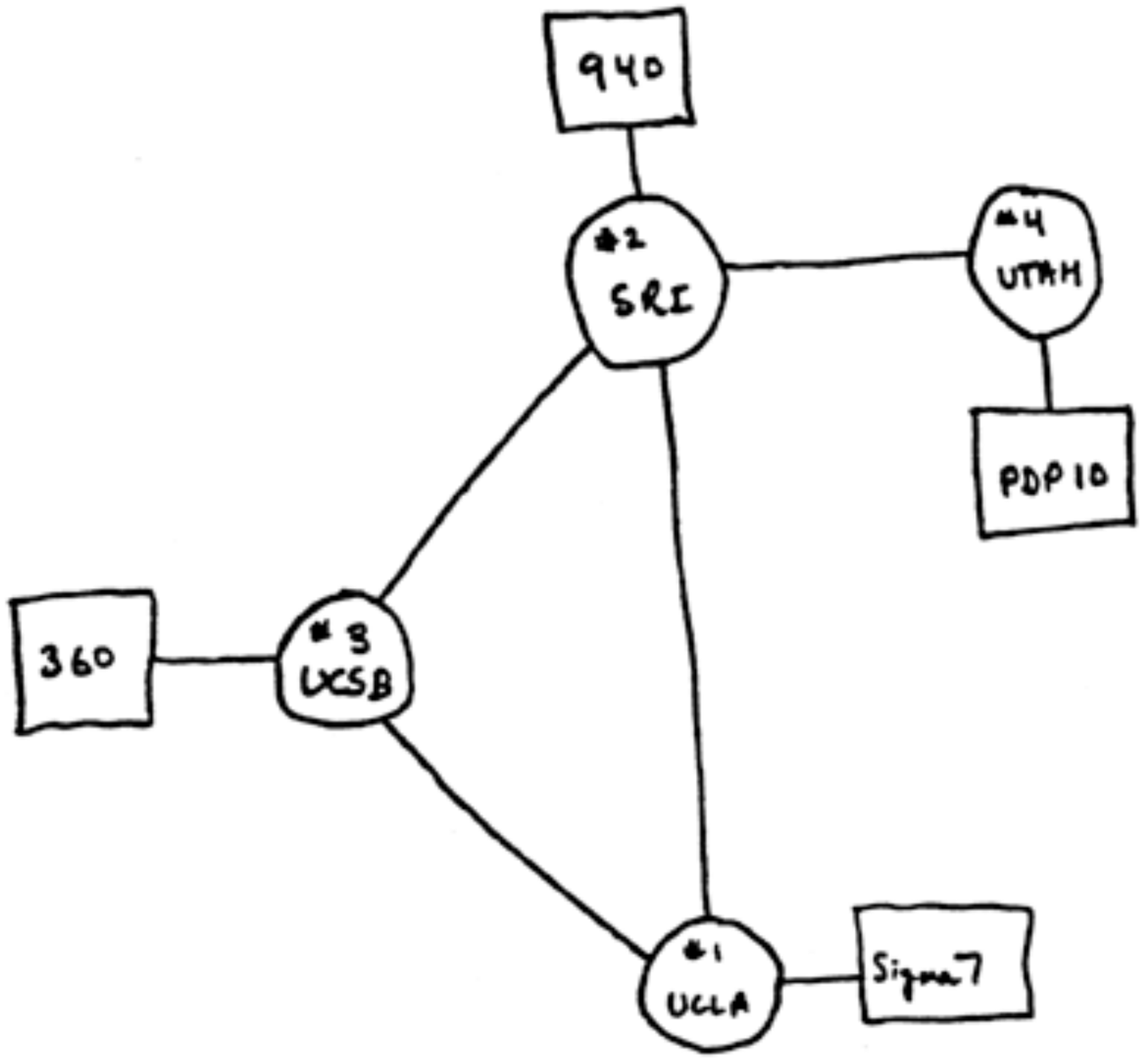
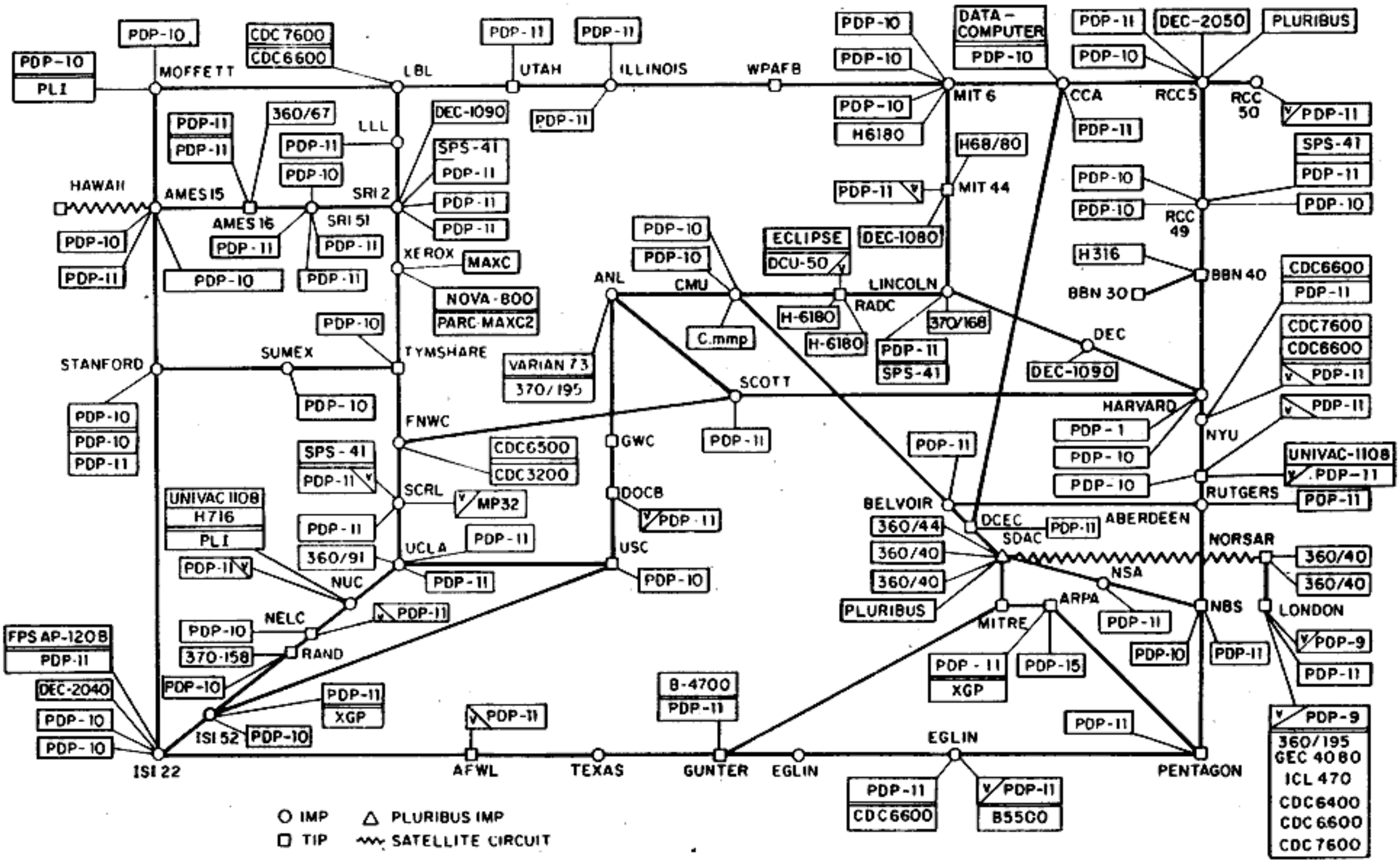


transport: sharing the network efficiently and fairly, dealing with reliability and differing application needs, etc.



ARPANET (http://www.computerhistory.org/internet_history/)

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

1978: flexibility and layering

early 80s: growth → change

mid 80s - early 90s: growth → problems

1993: commercialization

the Internet's design informs the problems we deal with today (and how we deal with them)

- The Internet was designed to be **flexible** and **robust to failure**. The commercialization of the Internet has hindered its flexibility. When we design protocols for the Internet, or design applications that use the Internet, we have to work within the constraints of these early design decisions.

- **Recurring themes:** layering, hierarchy, scalability, performance and efficiency, diversity of applications, economics, the end-to-end argument