“Supercomputing and International Network Collaboration in the 21st Century ”

Presentation to Ilinois Secretary of State George Ryan
University of Illinois, Urbana-Champaign
April 16,1998

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Professor in the Departments of Physics and Astronomy
University of Illinois Urbana-Champaign

Ten More Years!

- **The National Competition is Over**
  - **Illinois and California proposals funded**
  - **Cornell and Pittsburgh Will be Phased Out**
  - **Starts October 1, 1998**
- **Funded for 10 years**
  - **Renewable at 5 years**
  - **Yearly progress reviews**
- **Major Increase in Support Levels**
  - **NSF -- Over 1/3 Billion Dollars in Next Ten Years**
  - **State -- $8 million/year in Cost Sharing**
  - **Industry -- From 1 year to 3 year Contracts**

Exponential Cascade: From Leading Edge to Consumer Electronics



1985 **Cray X-MP**

Cost:$8,000,000

60,000 watts of power

No Built in Graphics

56 kbps NSFnet Backbone

1997 **Nintendo 64**

Cost: $149

5 watts of power

Interactive 3D Graphics

64 kbps ISDN to Home

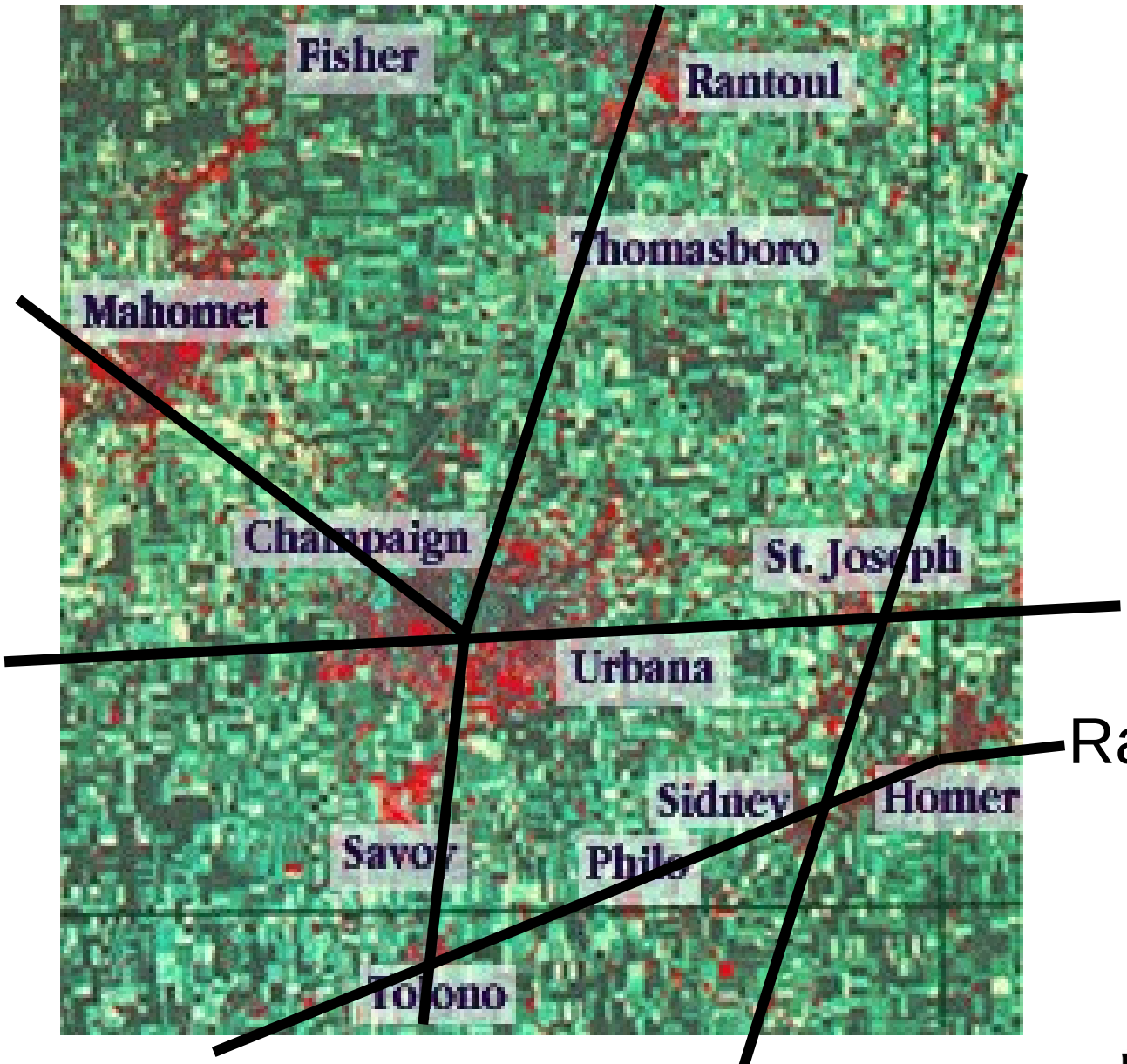


Source: Silicon Graphics, 1997

Largest University
SGI / CRAY Origin 2000 Supercomputer



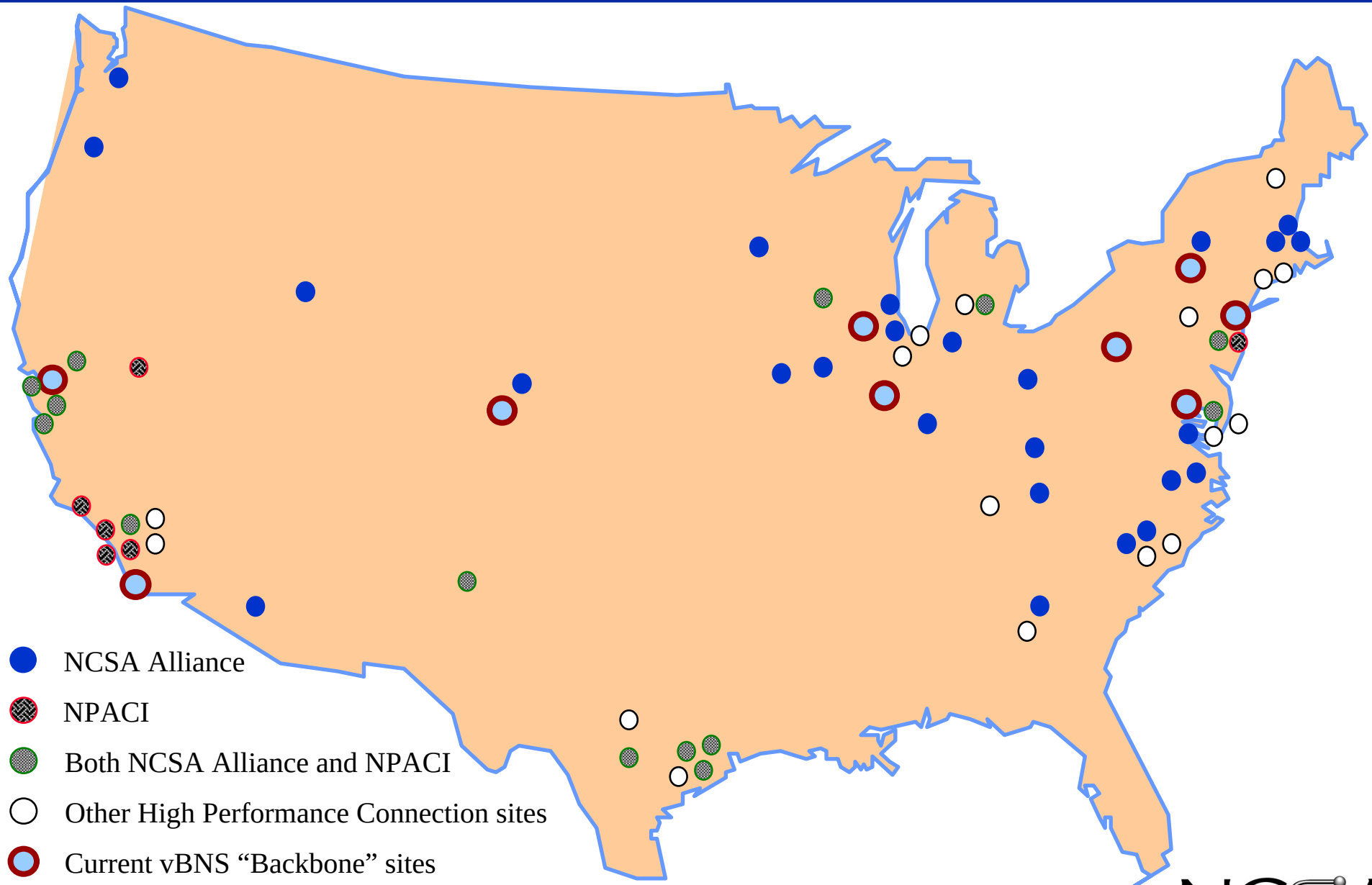
Infrastructure Leaves its Mark -- a Century Later



NCSA Industrial Partners

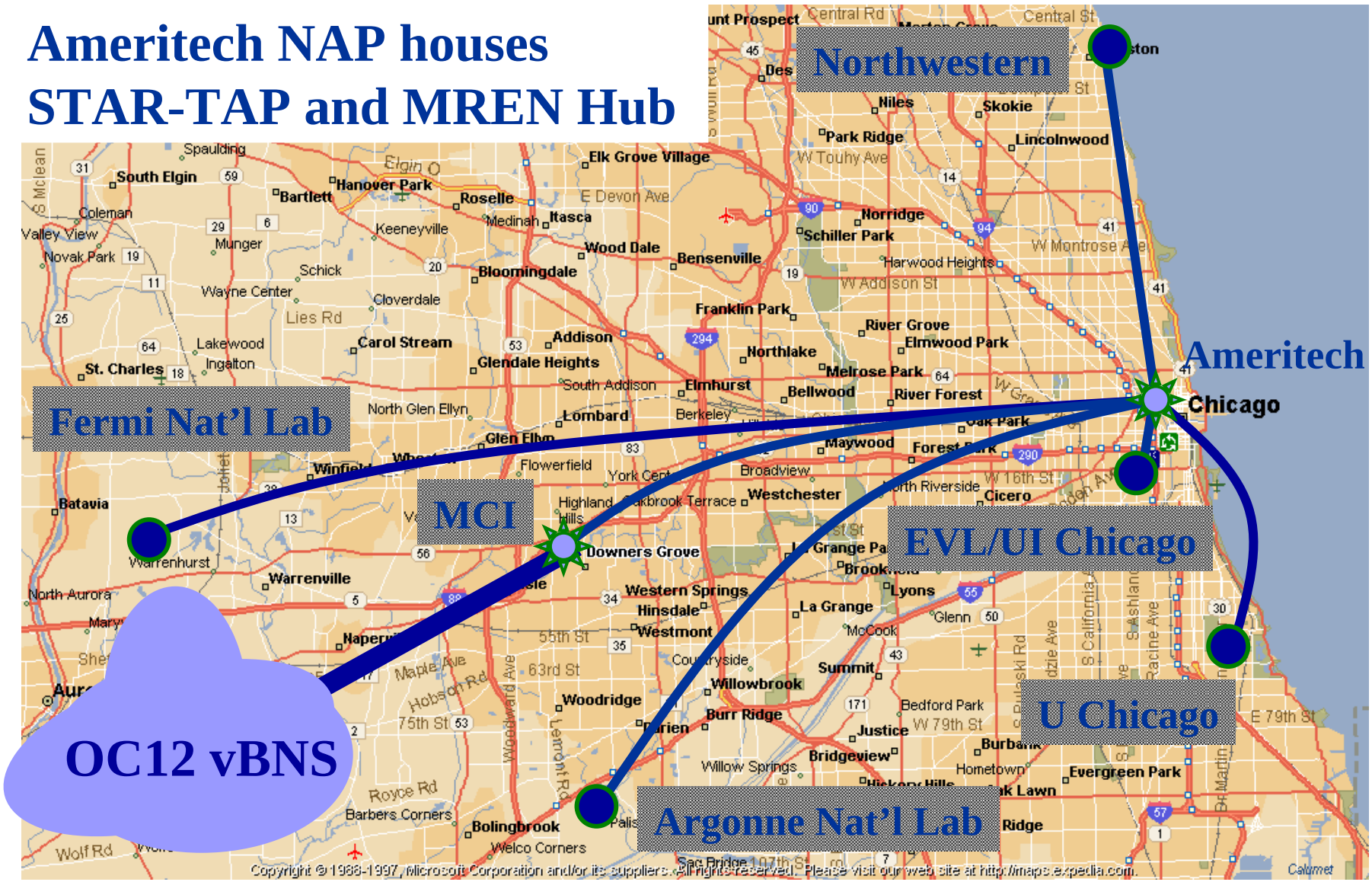
- Allstate Insurance Co.
- Boeing Company
- Caterpillar Inc.
- Eastman Kodak Co.
- Eli Lilly and Company
- FMC Corporation
- Ford Motor Company
- J. P. Morgan
- Motorola, Inc.
- Phillips Petroleum Co.
- SABRE Group, Inc.
- Schlumberger
- Sears, Roebuck & Co.
- Shell Oil Company
- Tribune Company

NSF vBNS and PACI - Mutually Interdependent

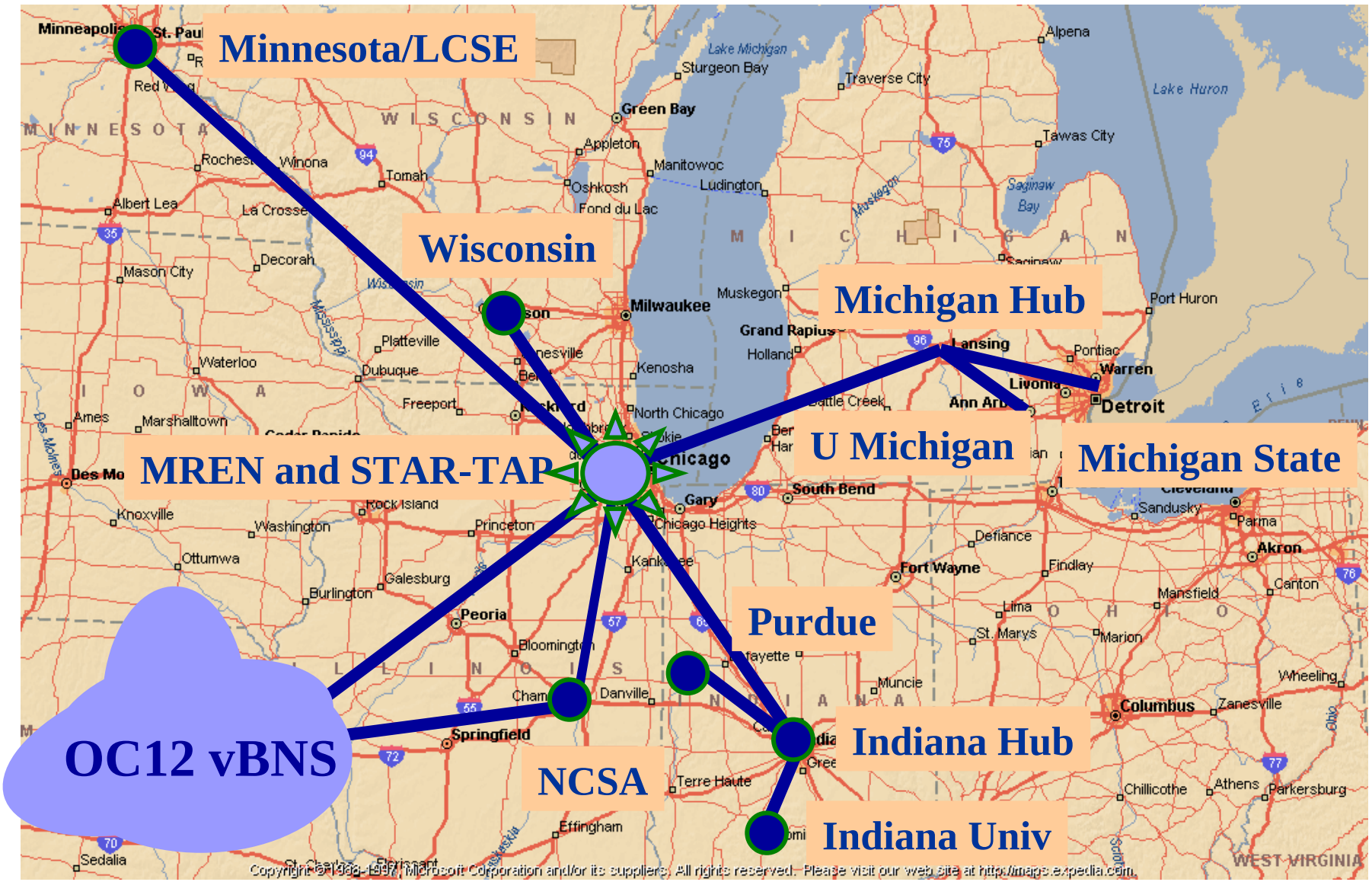


MREN - America's First Operational GigaPOP - Chicago Area Sites

Ameritech NAP houses STAR-TAP and MREN Hub

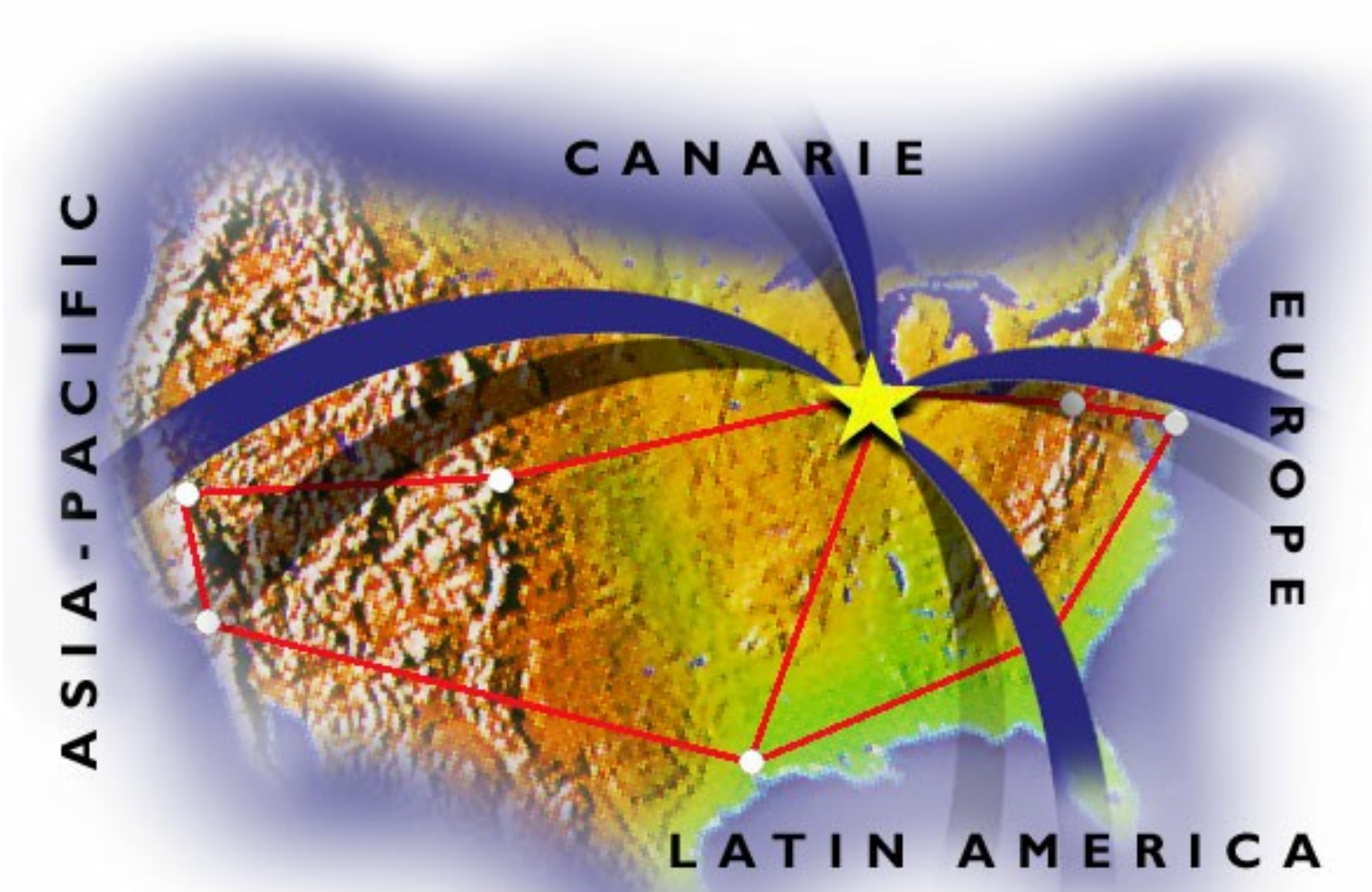


MREN - America's First Operational GigaPOP - Midwest Sites



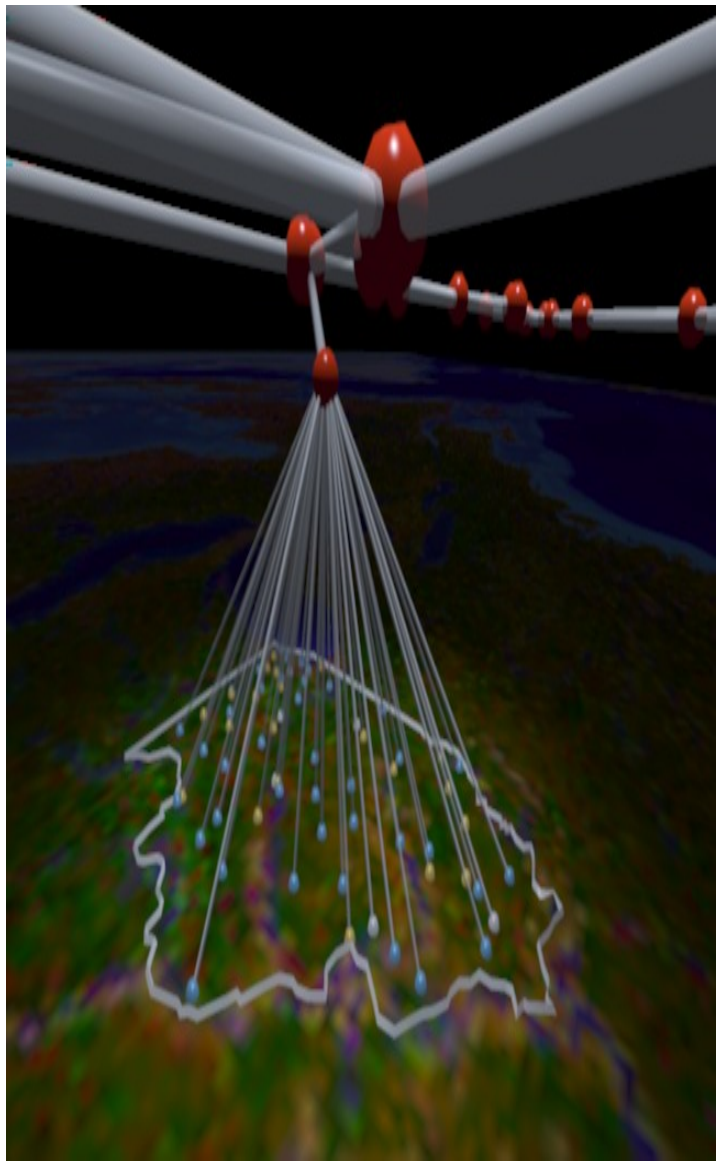
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International Connections Through STAR TAP



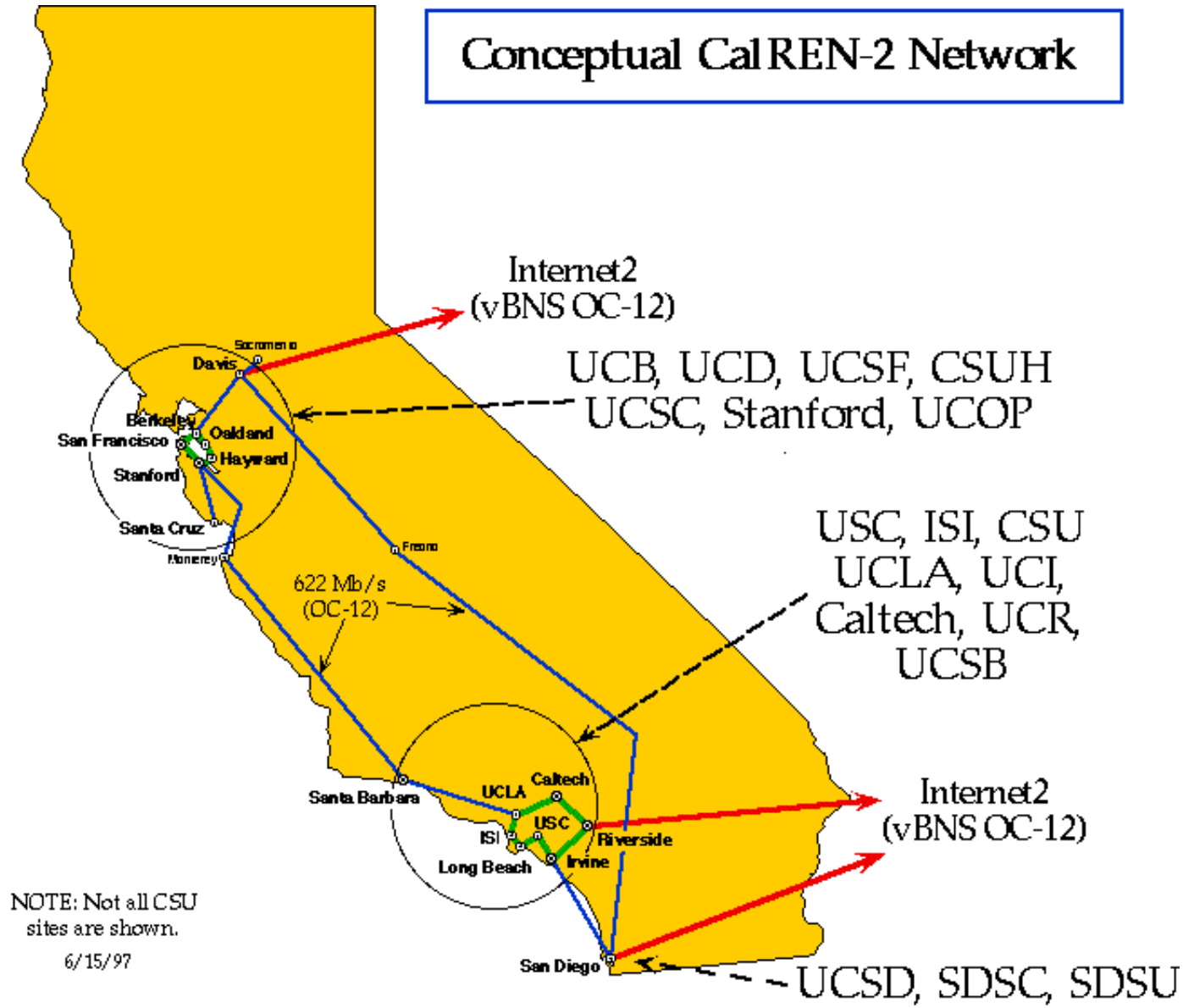
High-performance networks from across the United States connect with international networks at the STAR TAP access point in Chicago, Illinois

The Illinois Century Network: Illinois Board of Higher Ed. Technology Task Force

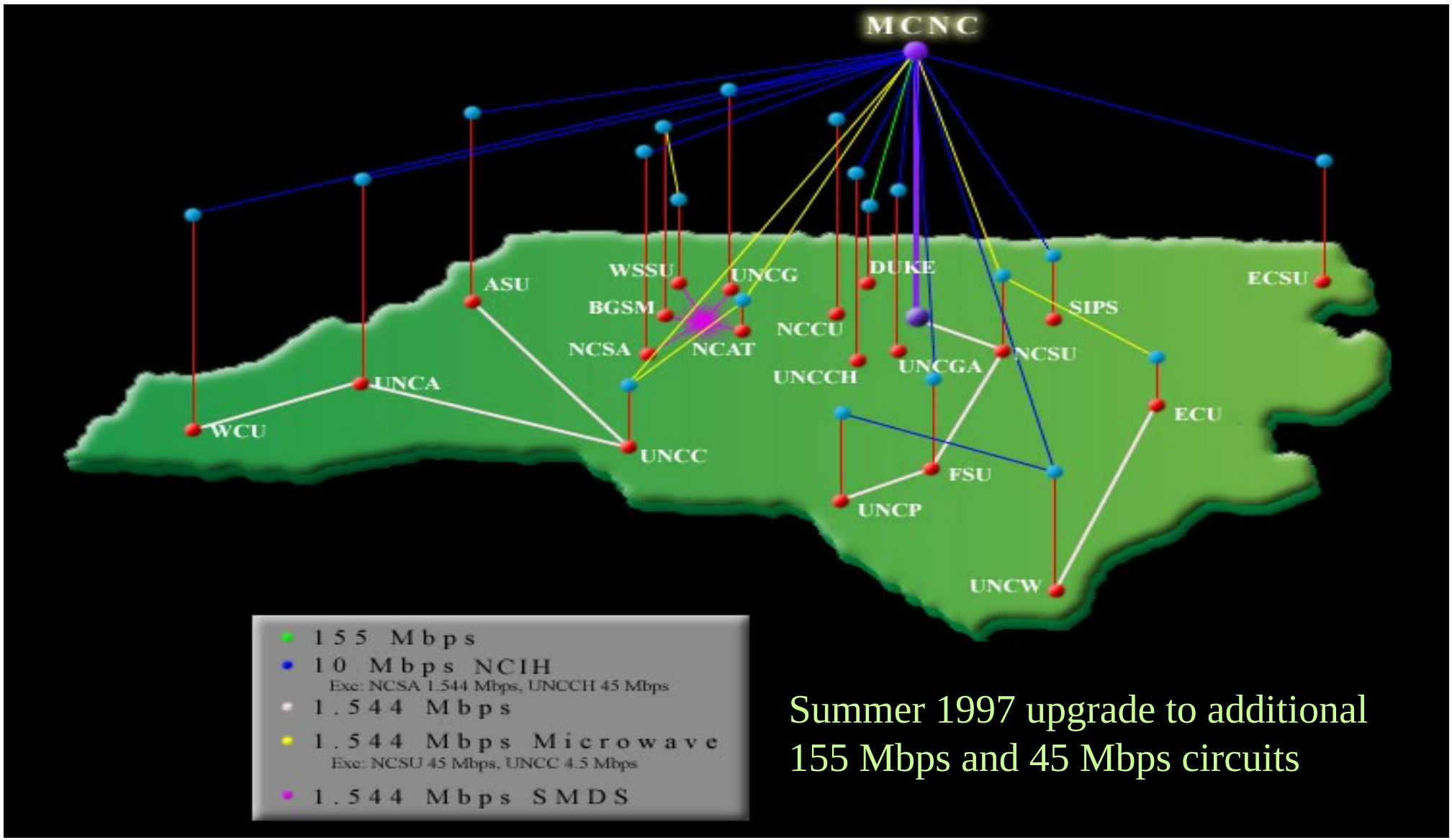


- Proposal calls for the creation of a high-speed state backbone 155-622 Mbps. (Internet 2 Type speeds)
- Higher education institutions would connect at 45-155Mbps
- Suggested substantial investment by the state, $405M in capital over five years, and $29.5M per year operating

California Has Taken the Networking Leadership



North Carolina For Years Has Had a State Network NC-REN



Summer 1997 upgrade to additional 155 Mbps and 45 Mbps circuits

Iowa Communications Network (ICN)

- **Initiated 1992**
  - Phases I and II (1992-4) at $88M
  - Phase III (1995-1999) at $23M/yr
- **Leased Fiber Optic Network**
  - Connects all Counties
- **Used for Education, Government, Internet**
  - Distance Education and Audio/Video
  - 1.5 Mbit/s through 45 Mbit/s
- **Variable fees and State Government Subsidy**
  - Usage fees pay most operating costs

The Champaign County Chamber Commerce and NCSA - CCNet

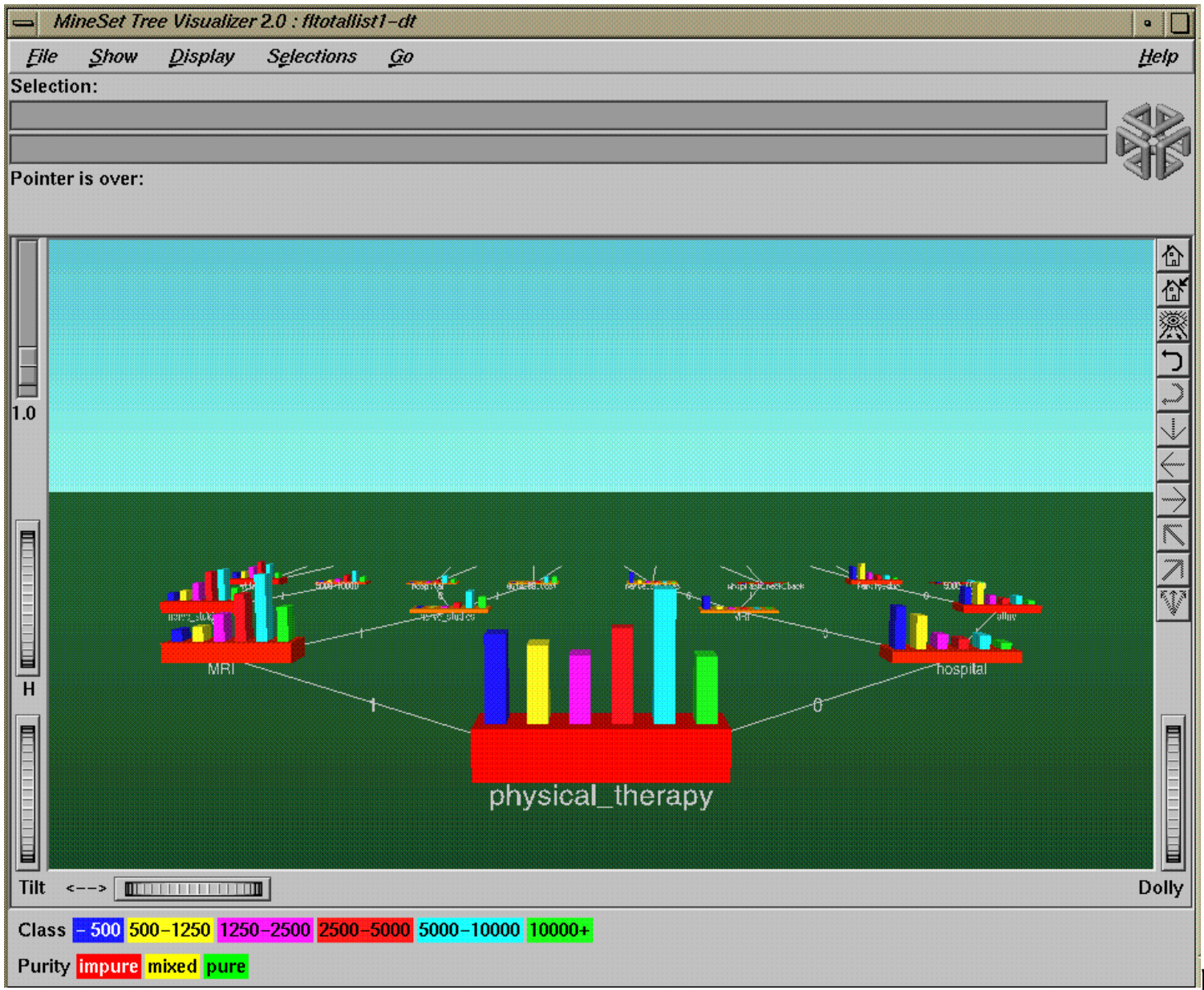


NCSA Designed the Original Chicago Mosaic

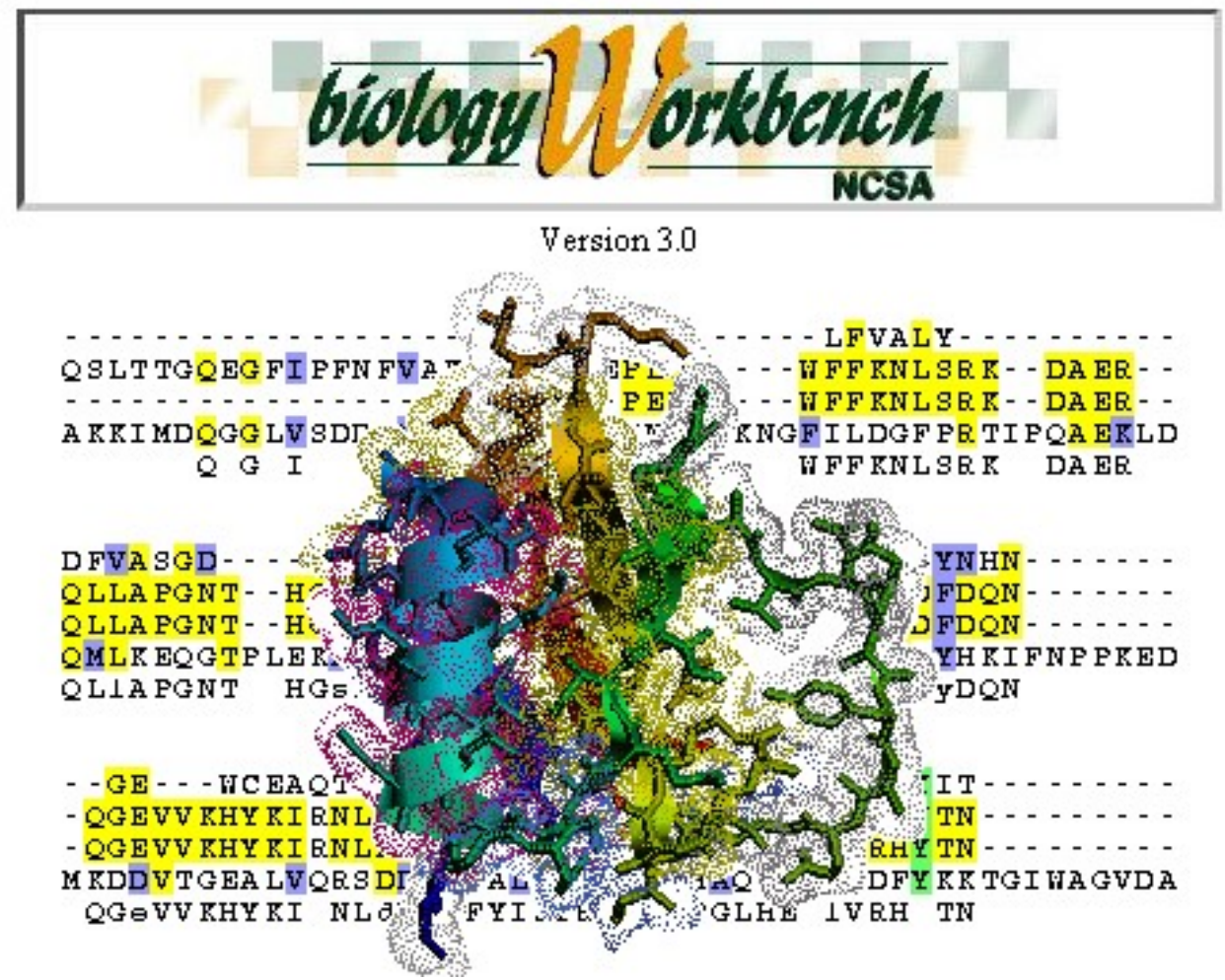


What's New on Chicago Mosaic

Information Visualization - Insurance Claims Data



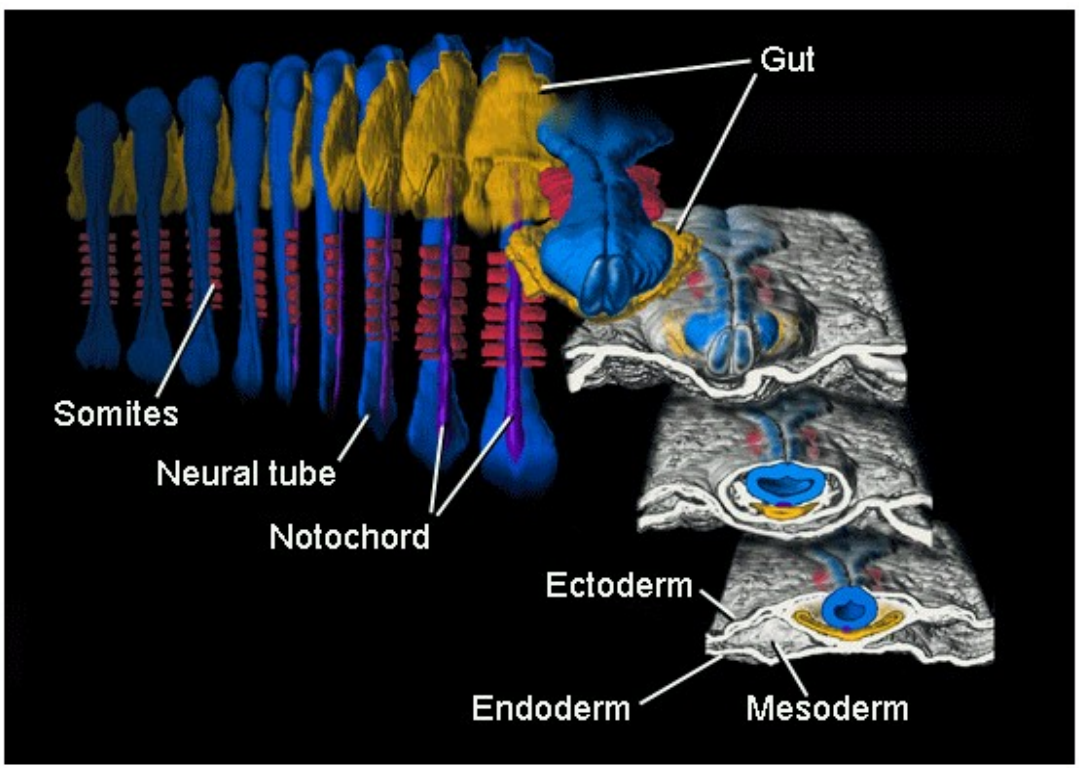
NCSA Biology Workbench - Web Interface to Programs and to Data



ChickScope - Networked Scientific Instruments Enables K-12



3-D Reconstruction of a 24 Hour Chick Embryo



Crossing Streets:
A K-12 Virtual Reality Application



Collaboration between the UIUC Transition Research Institute & NCSA

81 students involved from Champaign & Urbana area. 41 developmentally disabled, 40 general students.

Goal to teach students to cross virtual streets and probe their ability to generalize this learning to actual realities.