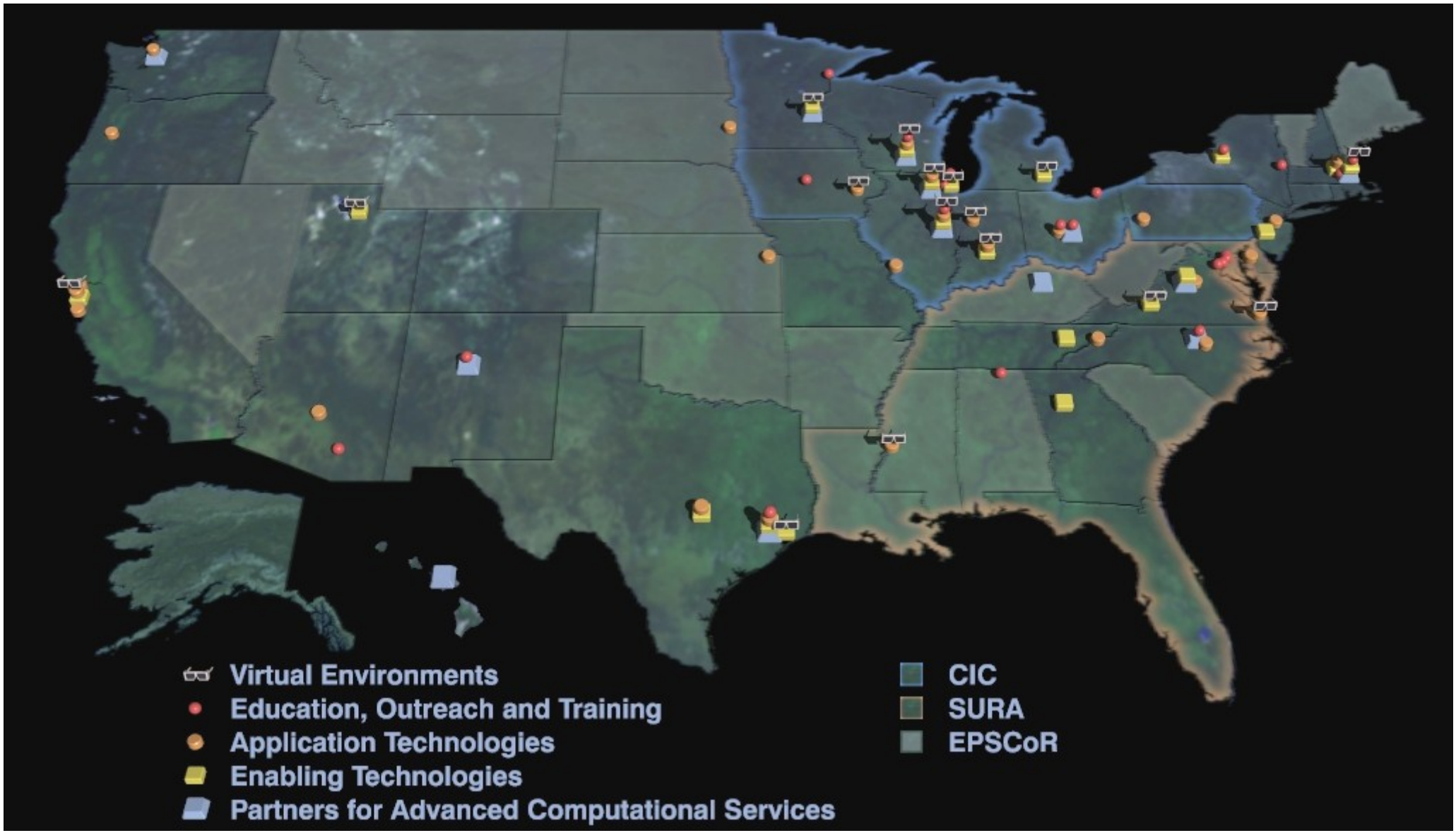
“Increasing Competitiveness Through the Utilization of Emerging Technologies”

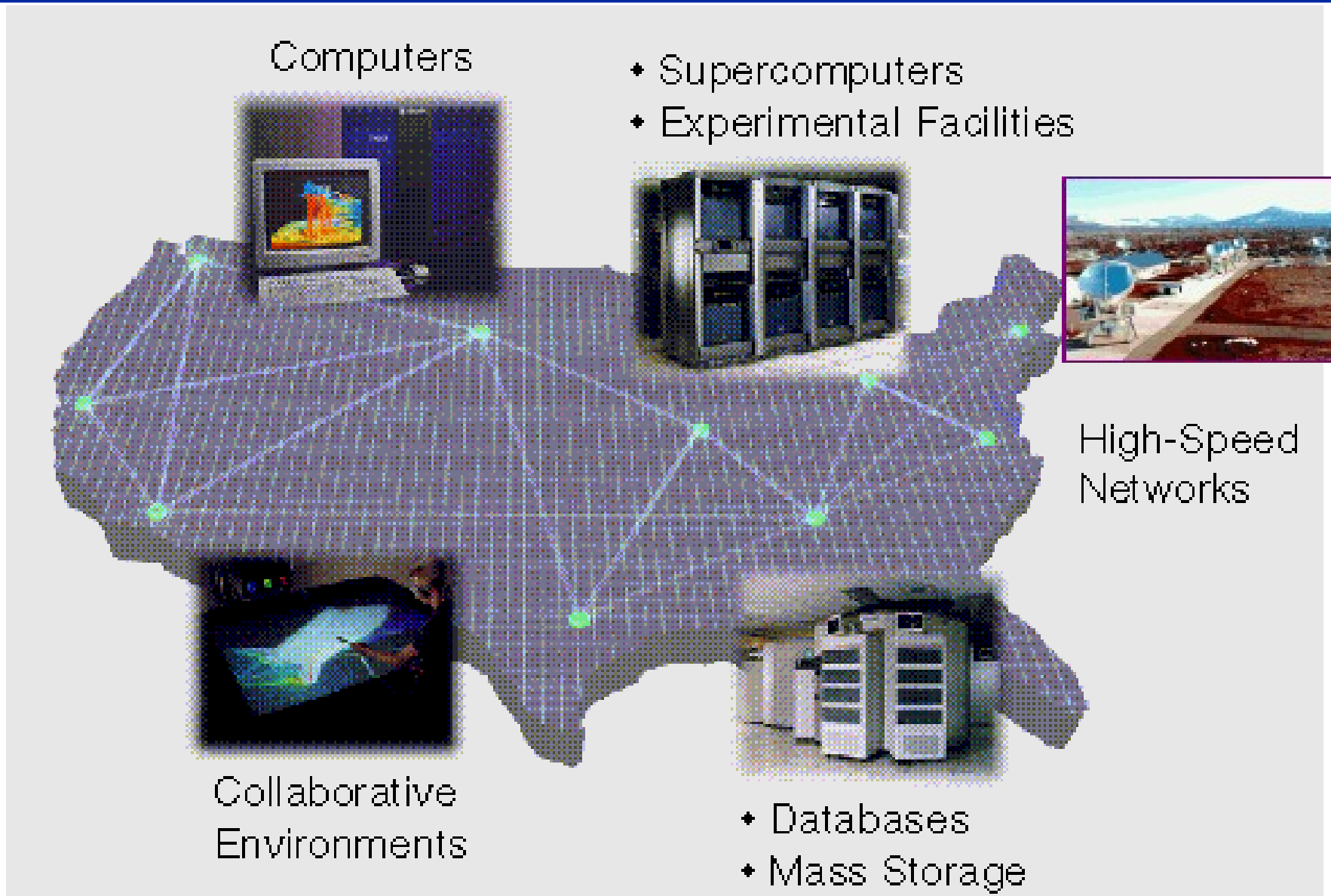
Leader to Leader Speaker Series,
Allstate Insurance Company
(Proprietary Material Removed)
July 17,1998

Dr. Larry Smarr
Director, National Computational Science Alliance and the National Center for Supercomputing Applications
Professor in the Departments of Physics and Astronomy
University of Illinois Urbana-Champaign

NCSA is the Leading Edge Site for the National Computational Science Alliance



The Grid Links People with Distributed Resources on a National Scale



Source: NASA http://science.nas.nasa.gov/Groups/Tools/IPG

Alliance National Technology Grid Workshop and Training Facilities



Being Deployed Across the Alliance

Jason Leigh and Tom DeFanti, EVL; Rick Stevens, ANL

NCSA™ National Computational Science Alliance

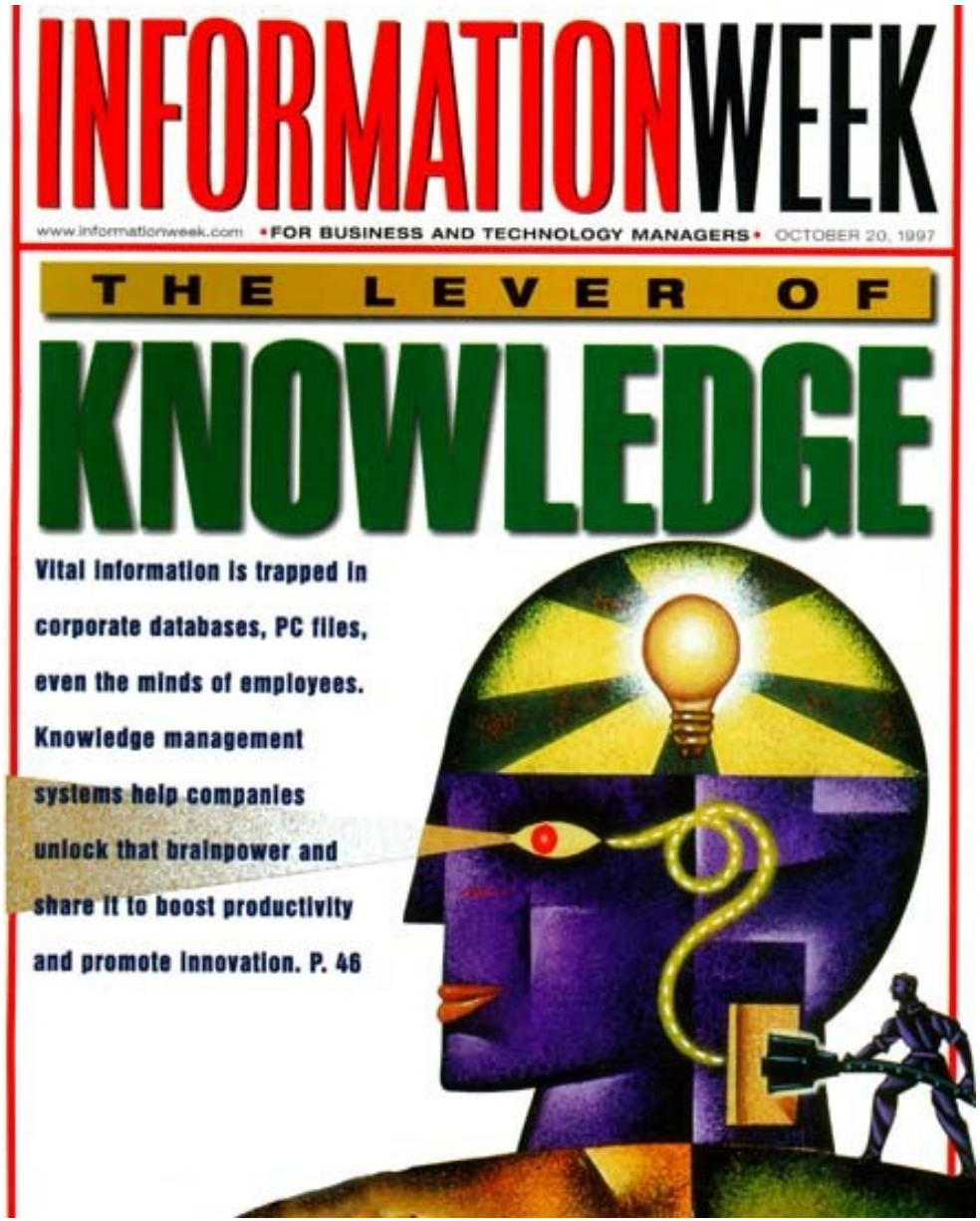
NCSA Expanded Industrial Partner Program

- **Four Types of Partnership**
  - Strategic Industrial Partner
  - Strategic Technology Partner
  - Infrastructure Development Partner
  - Professional Development Program
- **Created by Task Force in Spring 1998**
  - Committee Had Broad Representation
    - Industry
    - Campus
    - Alliance

NCSA Has Three Major Technical Focus Areas

- **Knowledge Management**
- **Visualization & Virtual Reality**
- **Scalable Computing**

The Emergence of Knowledge Management



Why Do We Need Knowledge Discovery?

- **Drivers**
  - Focus on Customer
  - Focus on Competition
  - Focus on Data Assets
- **Enablers**
  - Data, Data, Data Everywhere
  - Growth of Data Warehouses/Marts
  - New Information Technology Solutions
  - New Machine Learning Research

Knowledge Discovery Applications

Marketing

- Target marketing
- Customer relationships
- Market basket analysis
- Cross selling
- Market segmentation

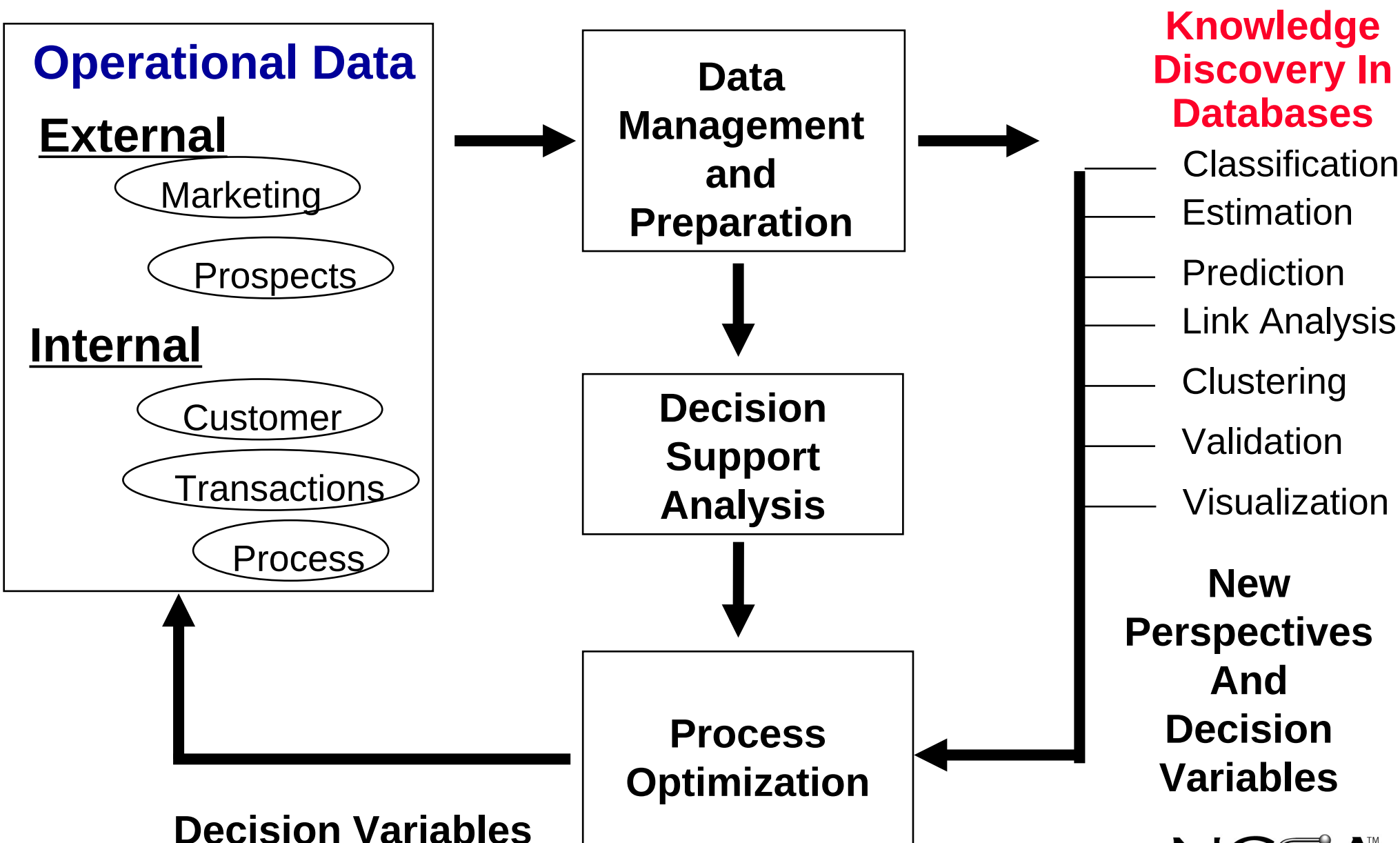
Strategic Analysis

- Forecasting
- Customer retention
- Improved underwriting
- Competitive analysis
- Fraud detection

Manufacturing

- Troubleshooting
- Problem prediction
- Reliability
- Quality control

Information Analysis
Operational Data to Optimal Decisions



NCSA's Autonomous Learning Group

- **Data Management**
- **Data Mining**
- **Information Visualization**
- **Autonomous Agents**

Data Mining - NCSA Industrial Partner Projects

- **Caterpillar**
  - Effluent Quality Control
  - Smart Selling
  - Warranty Claims Analysis
  - Customer Value Analysis
- **Ford**
  - Product Compatibility
  - Harshness, Noise, Vibration
  - Marketing
- **Sears**
  - Transaction Management
- **Boeing**
  - Post-Flight Diagnostics
- **Allstate**
  - Medical Claims

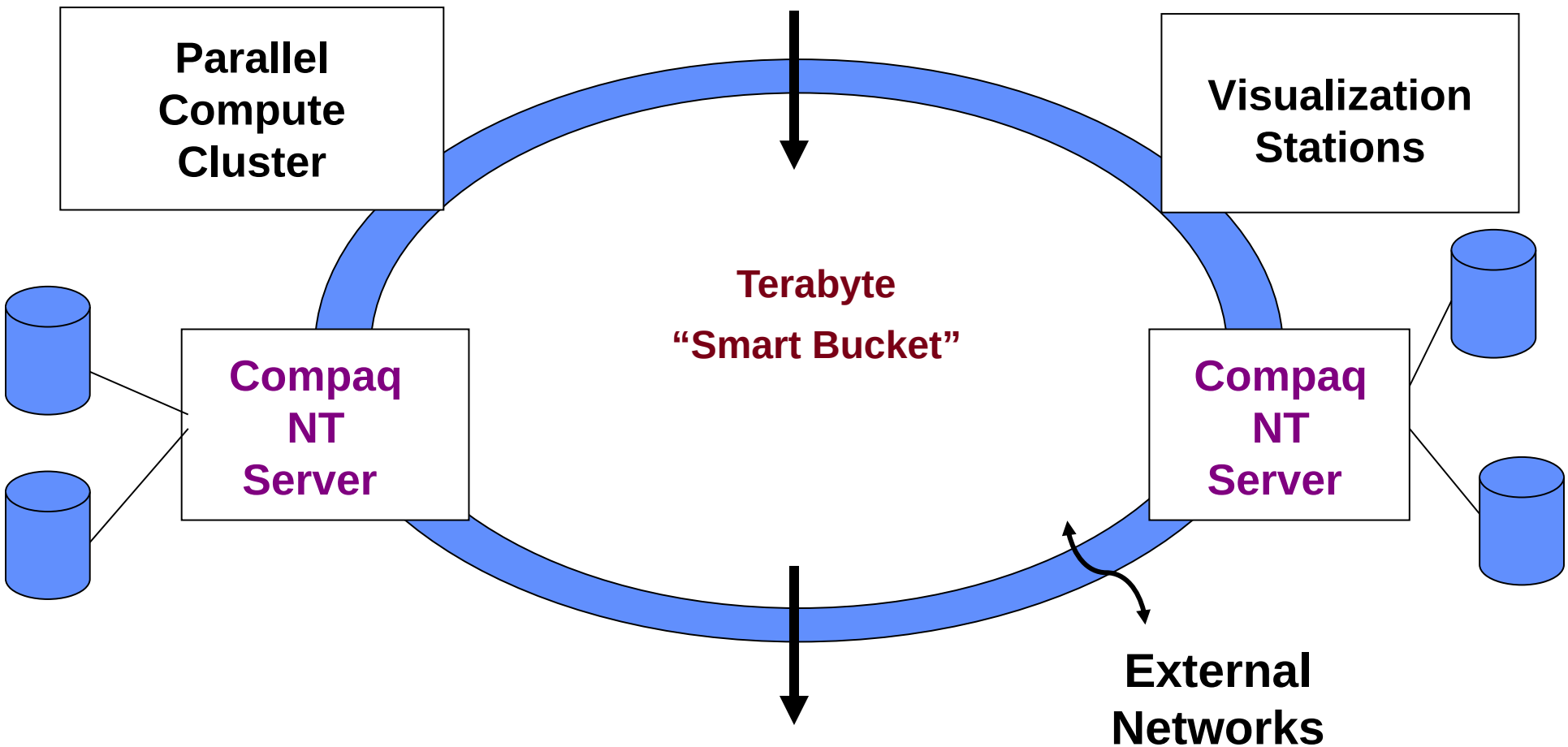
- **Financial Impact May Be Greater Than $30 Million**

The Desktop Window into Data Spaces - Allstate is Pioneering an NT Intranet

- **Deployment of 60,000+ NT Desktops**
  - **15,000 Sales Locations**
  - **220 Claims Offices**
  - **17 Regional Offices**
  - **3 Large Data Centers**
  - **1996-2001**
- **Standard Software Environment**
  - **Microsoft Office**
  - **Internet Explorer**
- **TCP/IP Network with T3 Backbone**
- **Partnering with NCSA's NT Data Refinery**

NCSA / Allstate
NT Cluster Data Refinery

1000 Gigabytes of Allstate Claims Data



Data Mine on Cleaned Gigabyte Samples

Source: Allstate & Tilt Thompkins, NCSA

The University of Illinois NT Supercluster - 256 Intel Pentium II Processors

“Supercomputer performance at mail-order prices”-- Jim Gray, Microsoft

- **Andrew Chien, Computer Science UIUC**
- **Rob Pennington, NCSA**



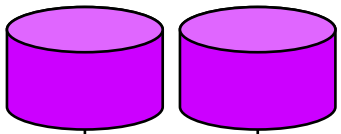


192 Hewlett Packard
300 MHz

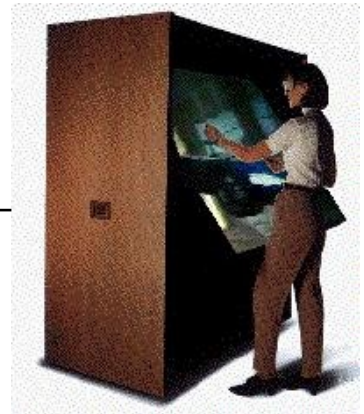
64 Compaq 333 MHz

NCSA Information Visualization Laboratory

Databases



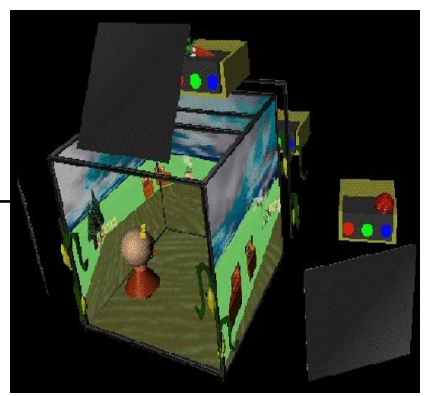
In3D™ for C++ and Java
VizIt/In3D™



Immersa Desk™

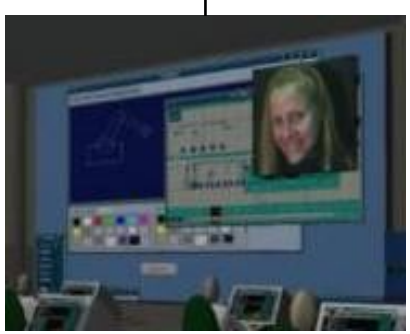


Graphics Workstations



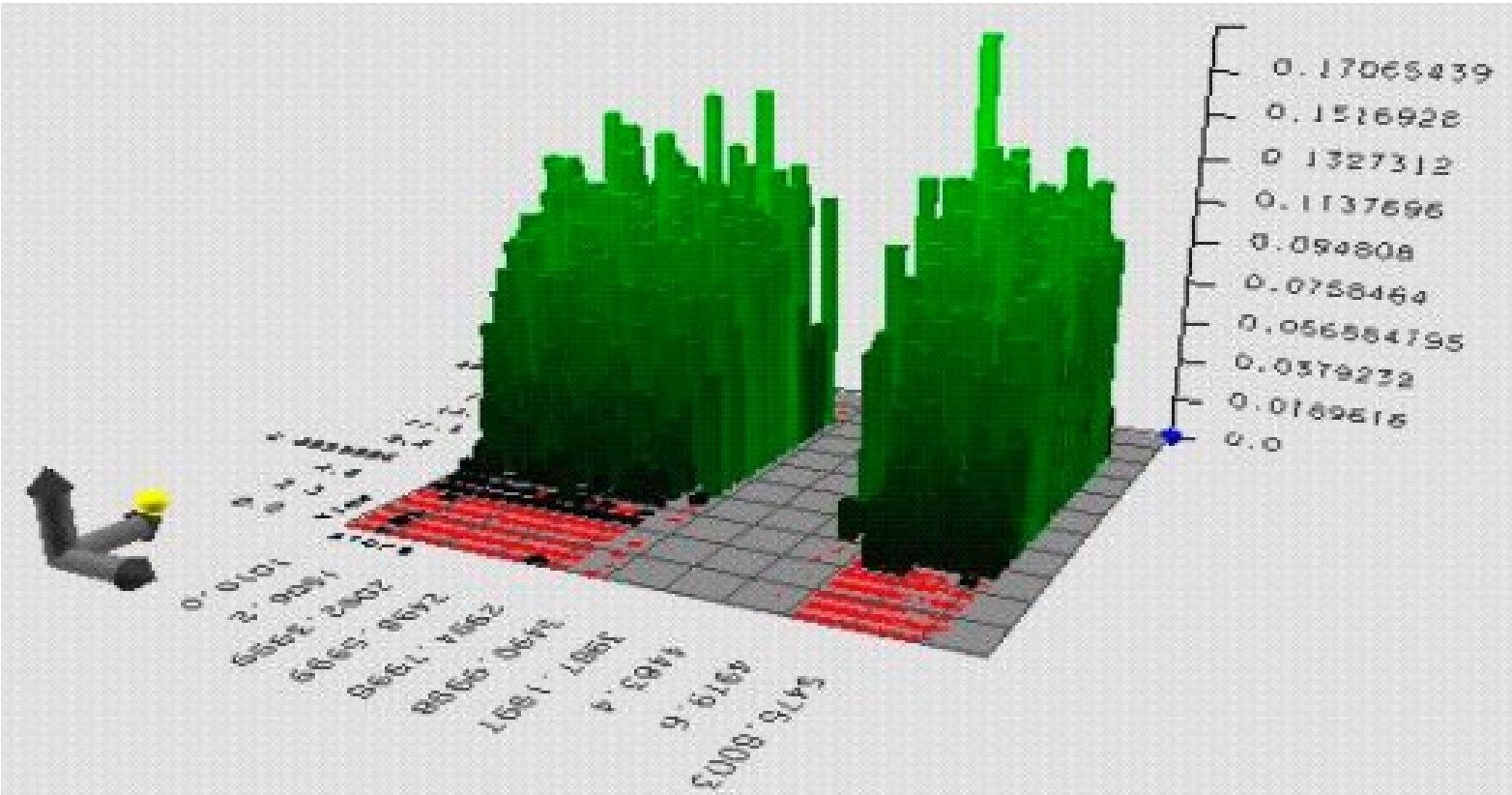
Cave™

MineSet
S-PLUS



Flat Panel Wall

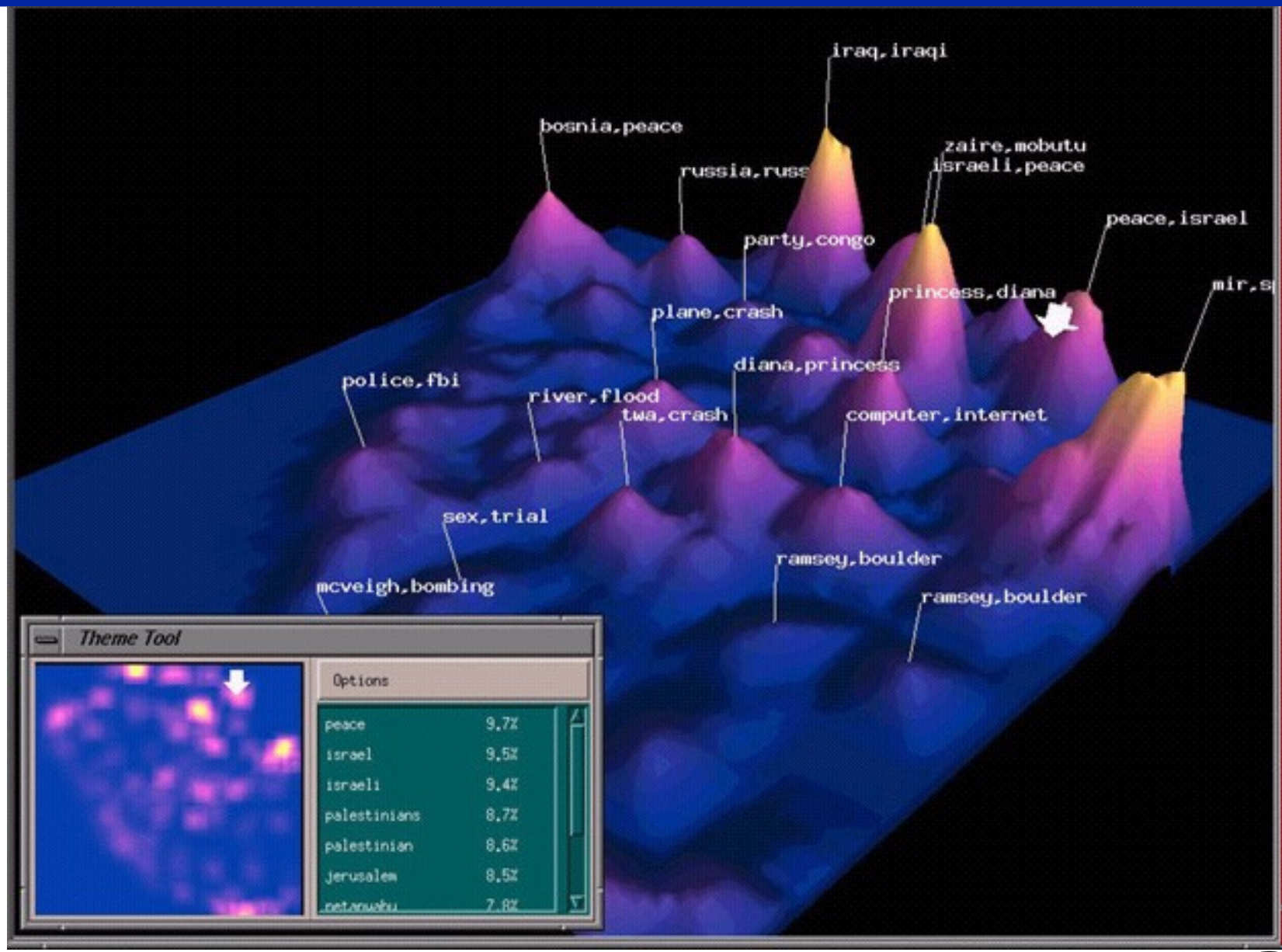
Sears Pioneers Massive Data Mining and Information Visualization at NCSA



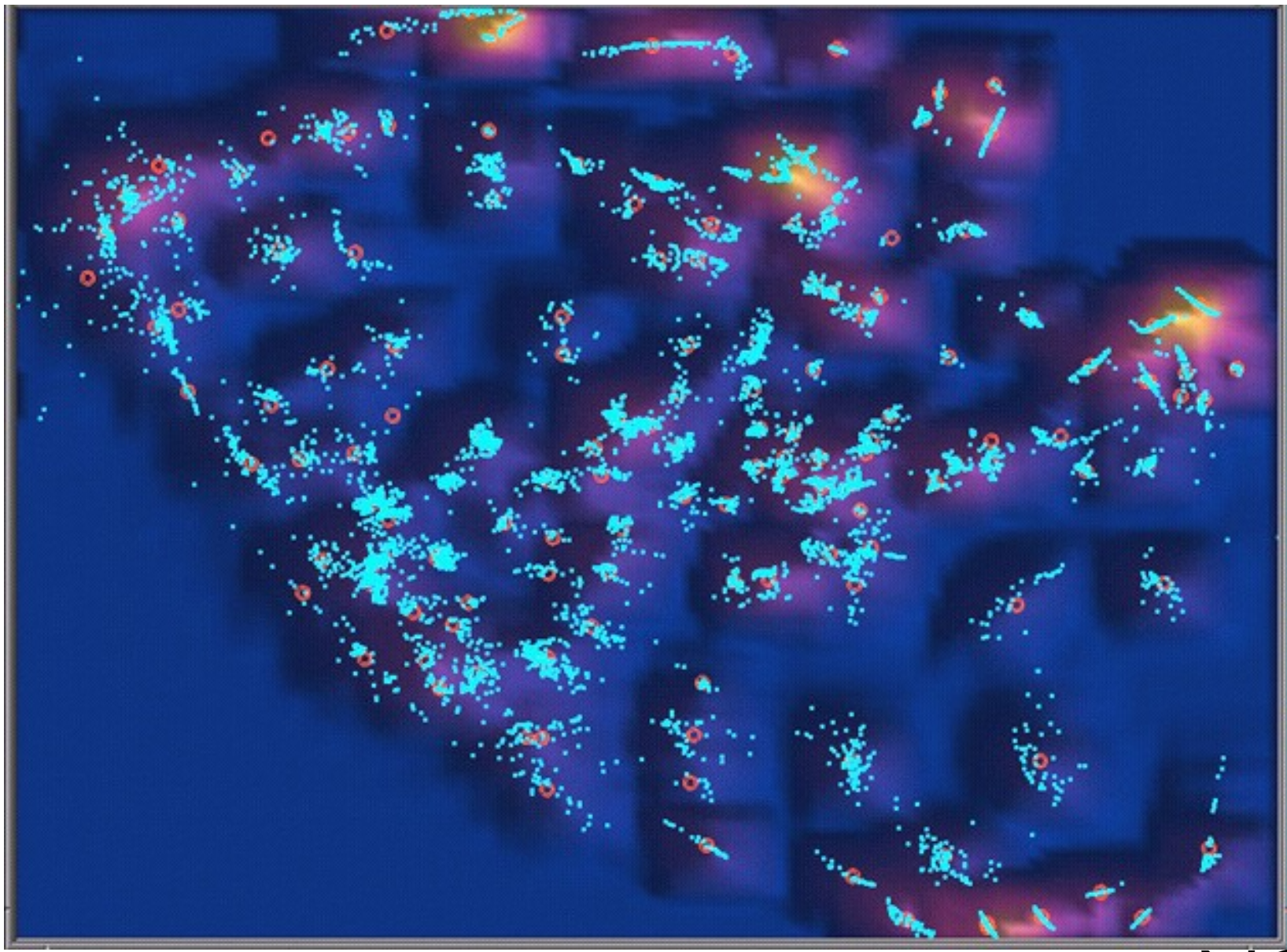
- **1998 VLDB Survey Program Grand Prize Winner**
  - **Largest Database**
    - **4.7 Terabytes of Data (Roughly 1000 PC Hard Drives!)**
  - **10 Terabyte Total Disk Space Capacity**
    - **Storage Provided by EMC**

Image Courtesy of Michael Welge, NCSA and Sears

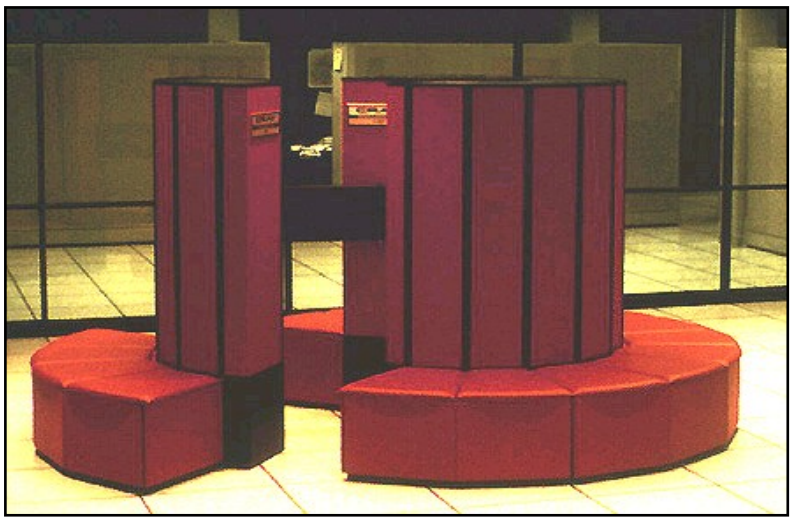
Visualizing Relationships Between Documents-
6500 News Stories from the WWW in 1997



Visualizing Relationships Between Documents - Need Extension to Millions of Web Documents



The Continuing Exponential Agent of Change



1985

Cray X-MP Supercomputer

Located at National Center

Cost: $8,000,000

No Built in Graphics

56 kbps NSFnet Backbone

1998



IBM Desktop PC

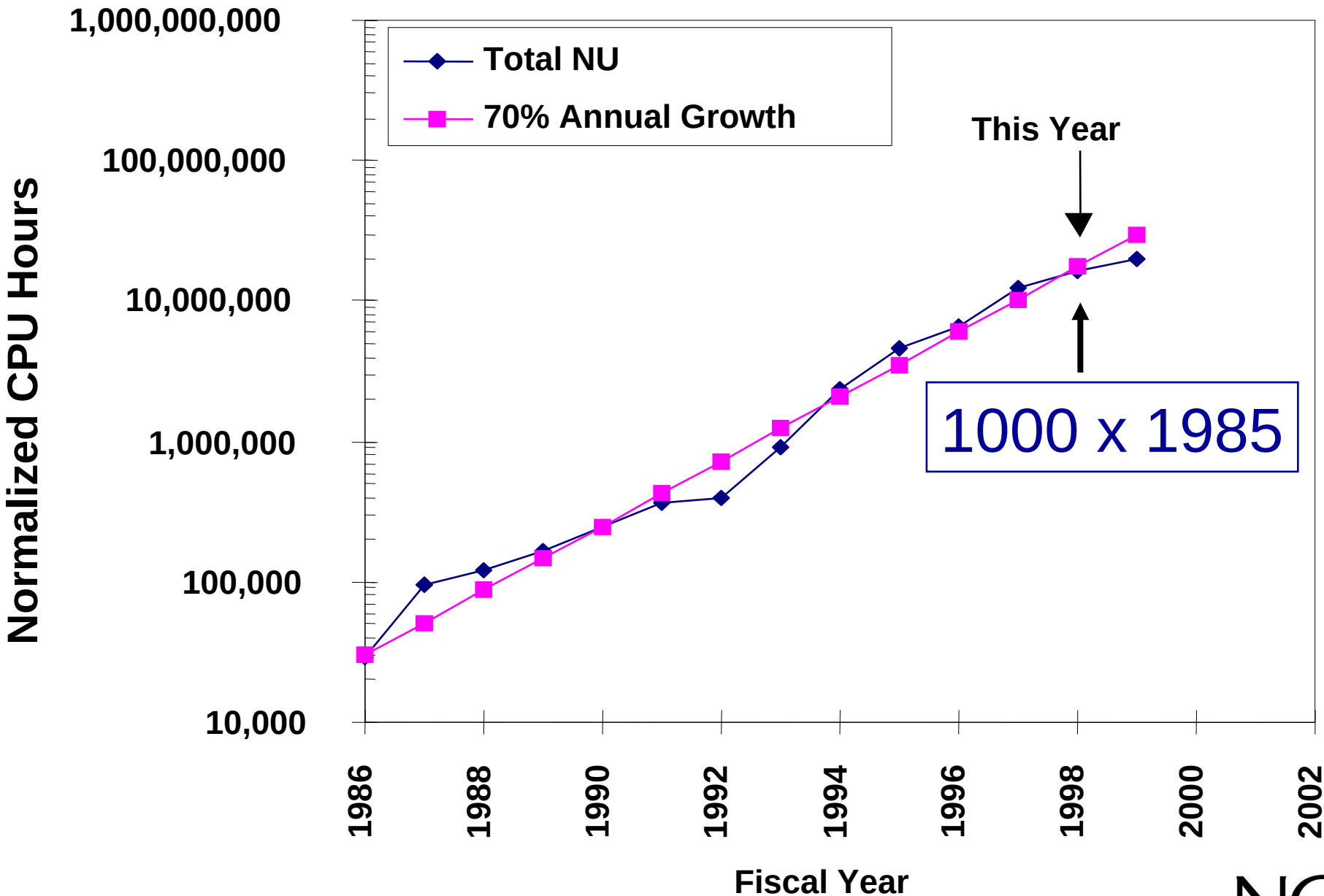
Located on 60,000 Allstate Desks

Cost: $2,000

Interactive 3D Graphics

56 kbps Modem to Home

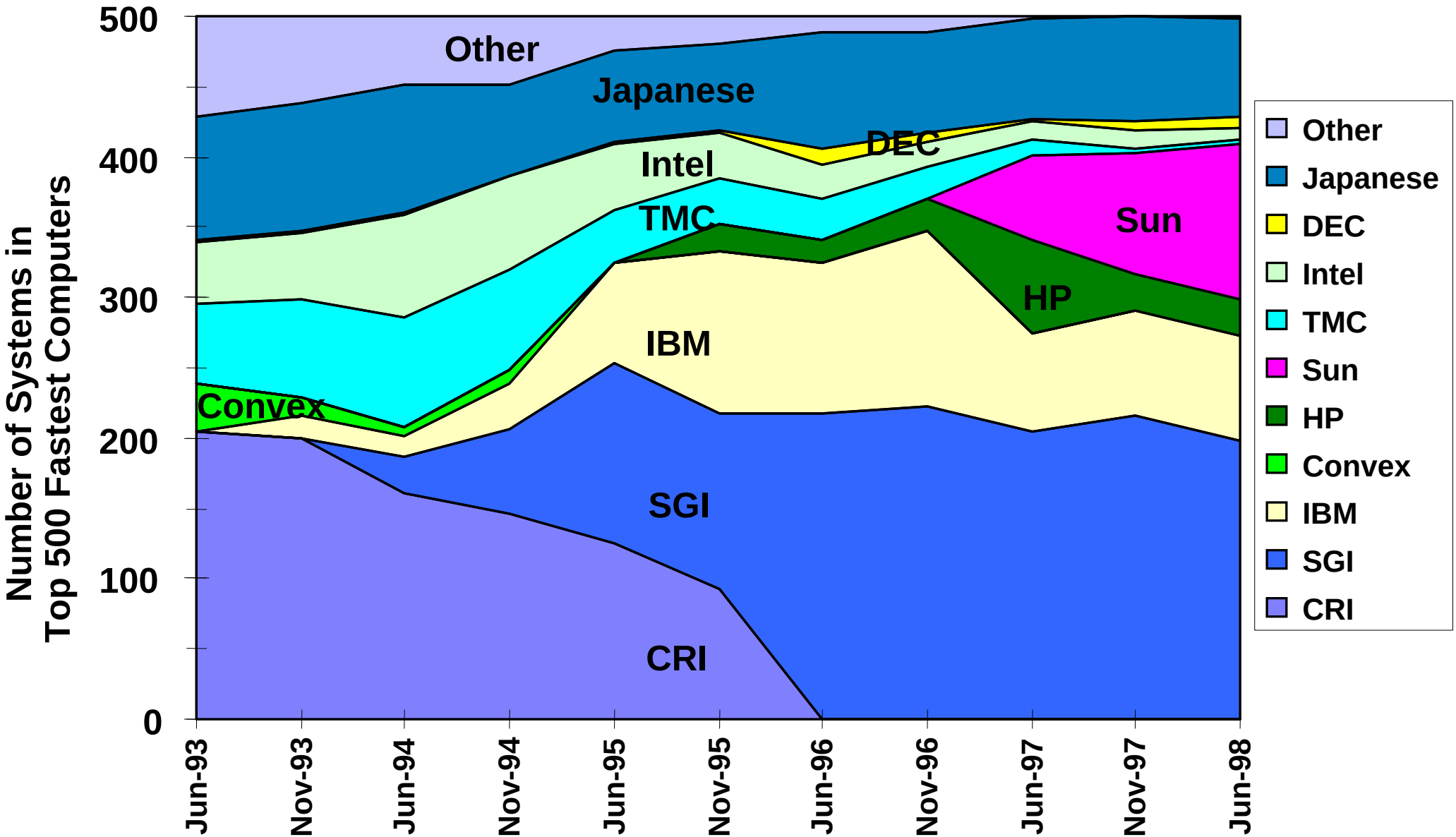
Growth Rate of the NSF Supercomputer Capacity is 70% Compounded Per Year!



Source: Quantum Research; Lex Lane, NCSA

National Computational Science Alliance

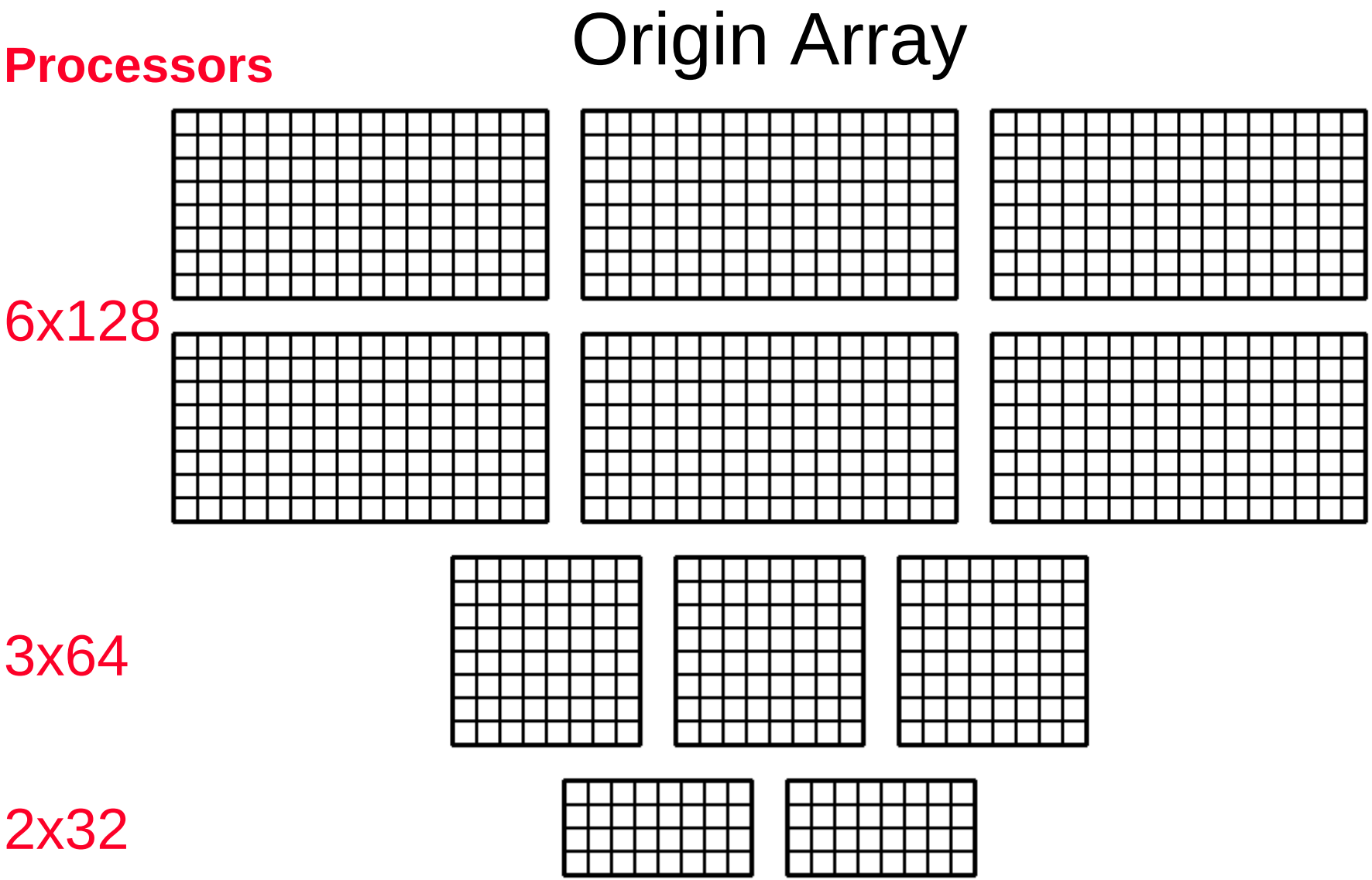
Market Driven Companies Replace Stand-Alone Supercomputer Companies



TOP500 Reports: http://www.netlib.org/benchmark/top500.html

National Computational Science Alliance

Proposed NCSA Silicon Graphics Cray Origin Array - 1024 Processors



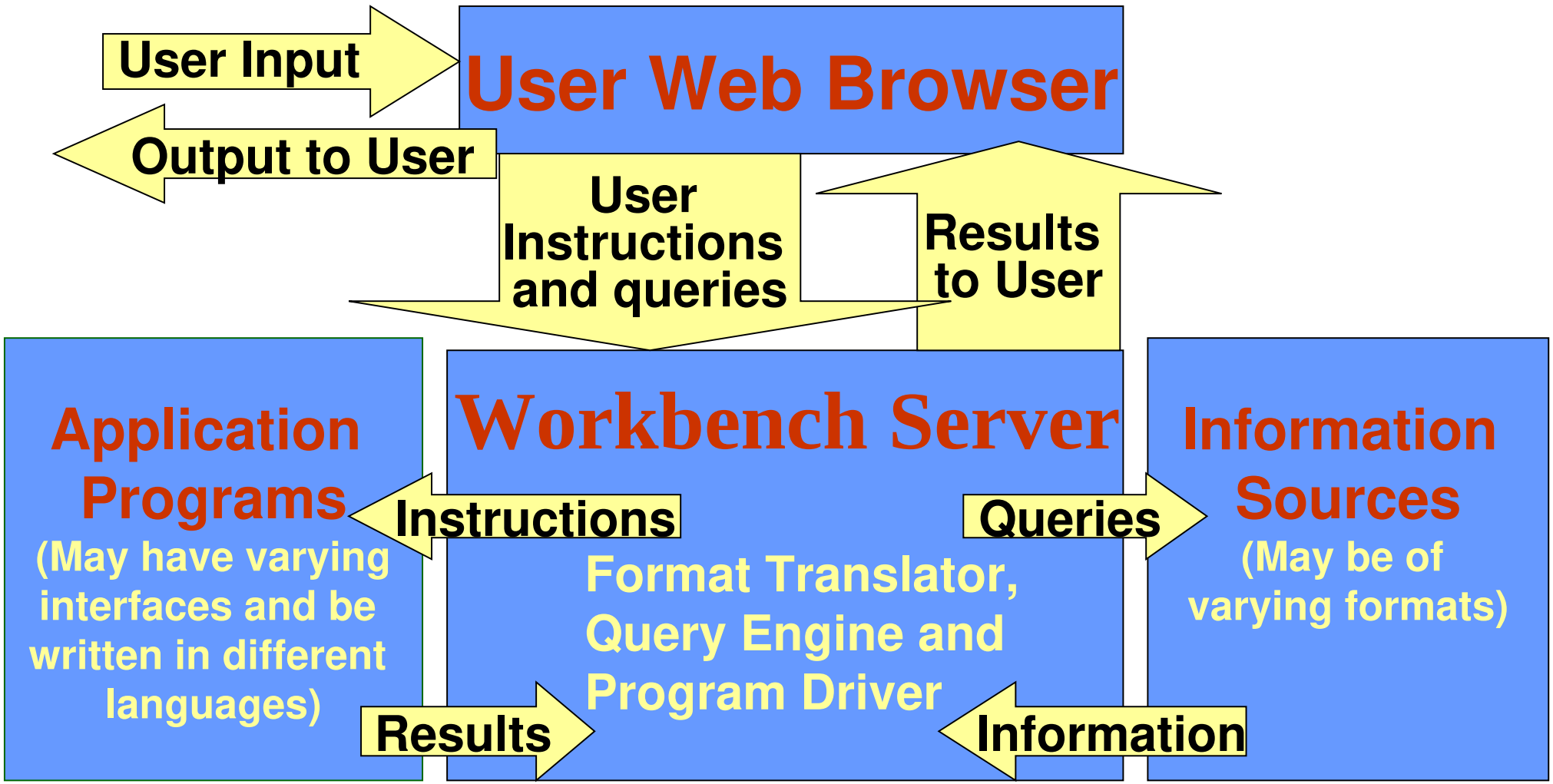
Subject to NSF Approval of Funds

National Computational Science Alliance

JP Morgan Hero Calculation

- HPC Strategic Business Analysis
- Calculations Used 128-Processor SGI Origin
  - Two Week Period in January 1998
  - NCSA and SGI Doubled Memory in a Week
- Extended JPM's Risk Management Capabilities
- Hundreds of Market Scenarios Simulated
- NCSA, Strategic Vendor, Industrial Partner
  - Existing Relationships Facilitated Quick Startup
  - Win-Win-Win Result

The NCSA Information Workbench - An Architecture for Web-Based Computing



The Future of Business on the Web - What Customers are Coming to Expect

- **Human Agents Become Advisors and Tutors**
  - K-12 Teachers
  - Stock Brokers
- **The Competitive Equation**
  - Controlling Cost
  - Customers Want to Compare Value
  - Adding Share Holder Value (Stock Price Last 12 Months)
    - Dell vs IBM (188% vs 14%)
    - Amazon vs Barnes & Noble (820% vs. 95%)
- **Getting on the Learning Curve**