



The Case for a State Higher Education Big Data/ACI Strategic Plan

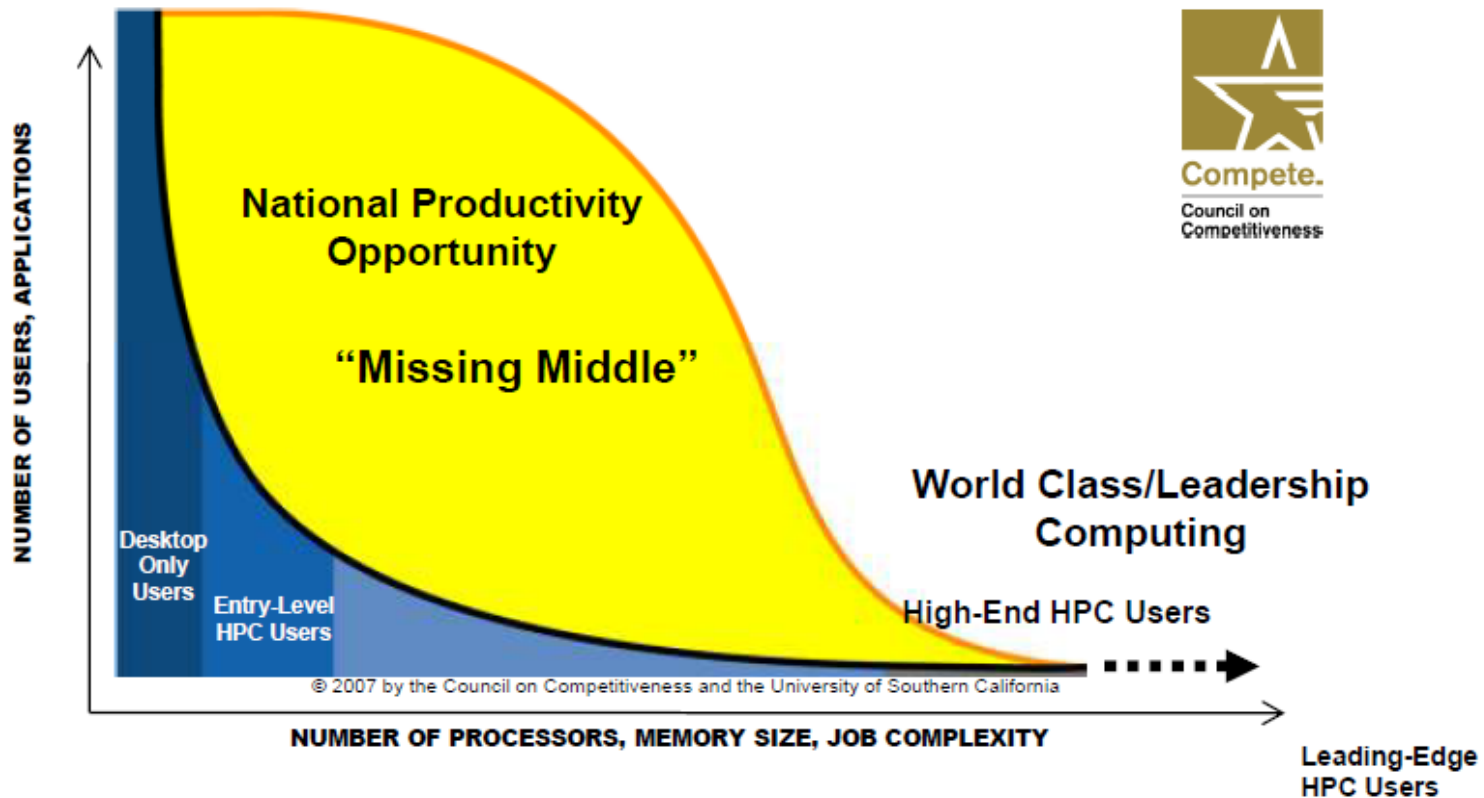
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Motivation: The National Situation

- The Council on Competitiveness asserts that US firms' reluctance to adopt High Performance Computing technology has created a "Missing Middle" in national productivity.

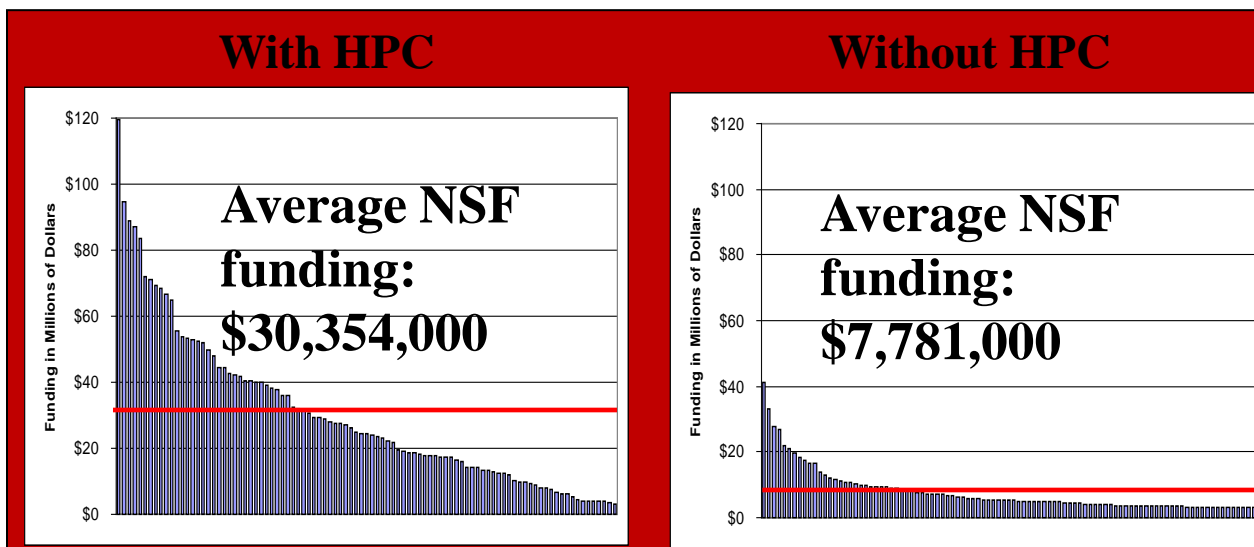


Motivation: The New Jersey Situation

- CNBC ranked New Jersey 30th in its 2011 edition of *America's Top States for Business*
 - New Jersey was ranked behind Virginia, Massachusetts, Pennsylvania, New Hampshire, New York and Maryland
 - New Jersey performed worst in the areas of cost of business, economy, business friendliness, and cost of living
 - New Jersey performed best in the areas of technology and innovation, access to capital and education

Motivation: The Return on Investment

- A sustained competitive advantage in recruiting prominent, talented and successful faculty and talented workforce
- University investment in ACI systems increases both the number of papers published by university researchers and NSF funding earned by the institution
- Provides a strong base for state economic development



Objective: Become an “Enabling Factor”

- The problems around big data that need to be solved will be huge, multifaceted, multi dimensional requiring numerous collaborations and partnerships.
- The Council on Competitiveness asserts that enabling factors that can take a systemic approach to reducing the barriers to ACI adoption are an effective way of promoting ACI usage.
- The Council recommends that universities and government entities play this role.
- The Big Data Alliance can serve as an enabling factor for New Jersey industry, academia and government in the adoption of advanced cyberinfrastructure with applications for big data.

New York State High Performance Computing Consortium (HPC²)

- HPC² is a partnership:
 - NYSERNet
 - RPI's Computational Center for Nanotech Innovations
 - Stony Brook University/Brookhaven National Laboratory's NY Center for Computational Sciences
 - University at Buffalo's Center for Computational Research.
- **Goal** - *to increase New York State's competitiveness in research and development, provide education, outreach and training in simulation based engineering science, and help support job growth.*
- Funded by the New York State Foundation for Science, Technology and Innovation ([NYSTAR](#))

HPC² Objectives

- Provide HPC technical assistance
- Advance the science (academia)
- Apply the science (business)
- Create a knowledge repository (build the culture)
 - Code
 - Know how
 - Applications
- Create a viable self sustaining HPC community
- Make New York industries more competitive in the global economy through the application of HPC.

MA Big Data Initiative

- **Goal** - *expand Massachusetts' position as a world leader in the rapidly expanding Big Data sector and to become the premier destination for big data.*
- Combines business and academia into the initiative to maintain a visible presence at the forefront of Big Data.
- Massachusetts Big Data Consortium led by academia and industry, and facilitated by the Massachusetts Technology Collaborative.
- The Massachusetts Green High Performance Computing Center in Holyoke, a collaboration with MIT, the University of Massachusetts, Boston University, Northeastern, Harvard, Cisco and EMC, has been designated a major public-private resource for the Big Data Initiative.

MA Big Data Programs

- Research and development matching grant program devoted to Big Data;
- Big Data internship program modeled after the successful internship programs at the Massachusetts Life Sciences and Clean Energy Centers;
- Newly-created Governor's Council for Innovation will work with the Big Data Consortium to see how data analytics and applications can help improve the efficiency and effectiveness of government programs and services; and
- Co-sponsor of Hack/Reduce, an innovative non-profit community "hackspace" in Boston, where people working with Big Data can share infrastructure resources and knowledge.

Arkansas Cyberinfrastructure Plan

- Arkansas Cyberinfrastructure Taskforce charged with developing a consensus plan for building out the cyberinfrastructure of the state in both the near and long term.
- **Goal:** *The state will benefit from an improved understanding of cyberinfrastructure and the recommendation of cyberinfrastructure policies to leverage technology investments in order to energize the economic development of the state, and to evolve cyberinfrastructure for the benefit of education, research, and job creation.*
- Arkansas has already made significant strides in the creation of shared CI.
- The University of Arkansas and all of the state's four-year public universities will soon be connected to the Arkansas Research and Education Optical Network, ARE-ON, a high-speed fiber-optic-based Internet communications network.

Arkansas Shared Cyberinfrastructure

The Arkansas Research and Education Optical Network



Use ARE-ON to share and access expensive resources across the state

Arkansas Cyberinfrastructure Strategic Plan

- **Communicate**
 - Cyberinfrastructure Council of key stakeholders
- **Develop**
 - Identify resource needs and develop a plan to build these resources and operate them across the state
- **Sustain**
 - Make the case for sustained funding for cyberinfrastructure – on the campus and at the state level

Plan led to creation and passage of the **Arkansas Cyberinfrastructure Task Force Act** - recognizes that the implementation and sustainment of the 2008 Cyberinfrastructure Strategic Plan and associated CI development policies is crucial to the future of Arkansas and its citizens.

Creating A Cyberinfrastructure Strategy

Goal - to enable scholarship at the cutting edge of every discipline, while promoting and enabling use by industry and the state.

- **Planning** - Developing a viable state cyberinfrastructure is an ongoing process of responding to the co-evolution of technology and the scholarship and innovation it enables.
- **Sharing** - connection to national and global cyberinfrastructure is far more important today than in the past. Sharing is not only a good way to control costs, but also a way to improve the resource itself.
- **Designing funding models that promote scholarship and stewardship** - Few universities have funding models for HPC, data storage and management, and specialized technical support.
- **Conducting cyberinfrastructure impact analysis** - Important to understand how any proposed investment will benefit current and potential users and the state.

Six High Priority Investment Areas in Big Data Support

- The Committee on Institutional Cooperation suggests priority investments in order to meet the current and future needs of researchers, industry and the expectations of funding agencies:
 1. R&D.
 2. Maintaining state-of-the-art communication networks.
 3. Providing stewardship of research data.
 4. Consolidating computing resources while maintaining diverse architectures.
 5. Expanding cyberinfrastructure support to all disciplines.
 6. Exploring cloud computing to manage long-term financial commitments.

Benefits of Forming a Statewide Higher Education Big Data Alliance

- Collaboration puts all our institutions in a position to benefit more together than the sum of our individual contributions.
- Leveraging this strength to amplify the value of every dollar of cyberinfrastructure investment
- Rapid spread of innovation within Alliance
- Shared investment in shared infrastructure
- Coordinated support for research and education at both the state and national levels
- Avoiding a proliferation of big data initiatives that could result in "big data silos." Early efforts can be focused on well-defined opportunities.

State Economic Impacts

- Improves the competitiveness of companies across multiple industries in the State to help retain existing companies and better enable them to grow and expand.
- Improves the State's competitive position and its ability to attract new companies and growth in high-paying, knowledge intensive industries.
- Improves the State's innovation capacity and its ability to attract talent and entrepreneurs.