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Blue Ribbon Panel on Cyberinfrastructure

Summary for the OSCER Symposium

13 September 2002

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Panel Members

- **Daniel E. Atkins**, Chair, Univ. of Michigan, EECS and SI, atkins@umich.edu
- **Kelvin K. Droegemeier**, Center for Analysis and Prediction of Storms, University of Oklahoma, kkd@ou.edu
- **Stuart I. Feldman**, IBM Research, sif@us.ibm.com
- **Hector Garcia-Molina**, CS Dept., Stanford University, hector@cs.standford.edu
- **Michael Klein**, Center for Molecular Modeling, University of Pennsylvania, klein@lrsm.upenn.edu
- **Paul Messina**, Cal Tech, messina@cacr.caltech.edu
- **David G. Messerschmitt**, UC-Berkeley, EECS & SIMS, messer@eecs.berkeley.edu
- **Jeremiah P. Ostriker**, Princeton University, jpo@astro.princeton.
- **Margaret H. Wright**, Computer Science Department, Courant Institute of Mathematical Sciences, New York University, mhw@cs.nyu.edu

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Formal Charge

With respect to meeting the needs of the scientific and engineering research community:

"Cyber-infrastructure"

- A) Evaluate the current PACI programs.
- B) Recommend new areas of emphasis for CISE Directorate,
- C) Recommend an implementation plan to enact recommended changes.

Process (1)

- Community-wide web survey
  - Widely publicized
  - >700 responses
  - Quantitative comparisons with the Hayes Report
- Oral public testimony (3 sessions)
  - 62 participants selected from: research scientists and engineers; computer and computational scientists; center directors; agency and corporate leaders; system administrators; educators; students and young scientists; technicians and consultants
  - Included traditionally underrepresented groups, EPSCOR and the physically challenged
  - Written transcripts and A/V materials assembled and is available.
- Ad hoc input from various sources.
- Used experiences and expertise of the Panel members.

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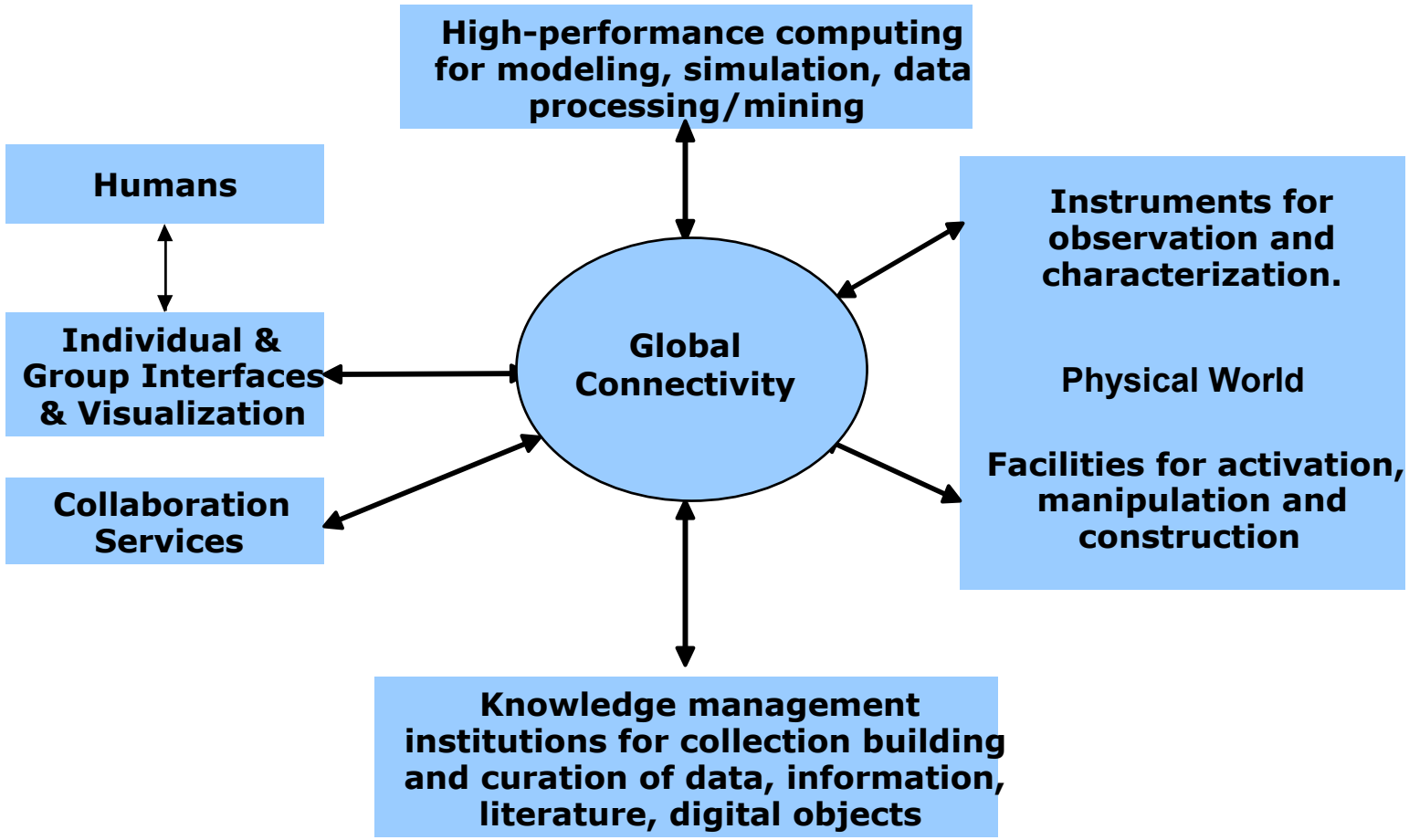
A broad, systematic, strategic conceptualization

Components of CI-enabled science & engineering



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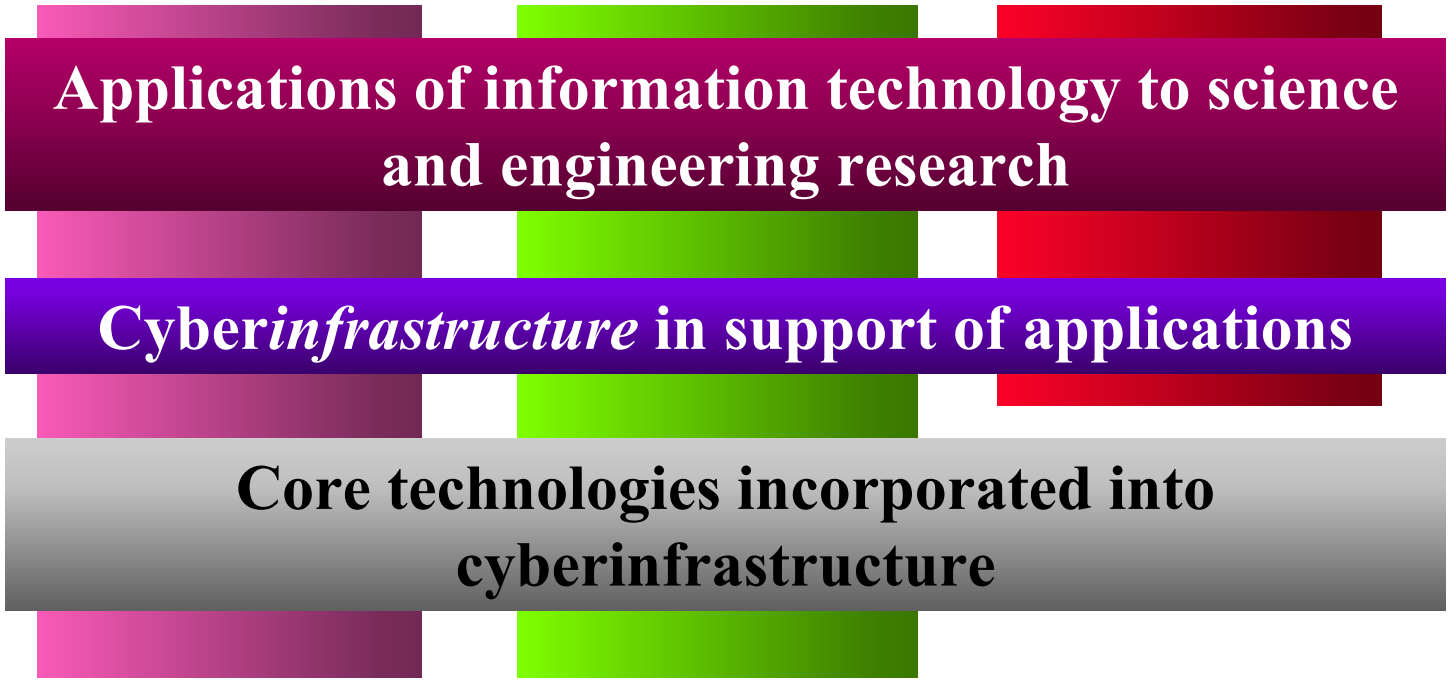
Coordination (synergy) Matrix



Research in technologies, systems, and applications

Development or acquisition

Operations in support of end users

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Network for Earthquake Engineering Simulation

Remote Users

Instrumented Structures and Sites

Laboratory Equipment

High-Performance Network(s)

Field Equipment

Curated Data Repository

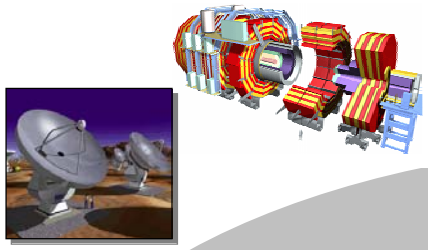
Leading Edge Computation

Global Connections

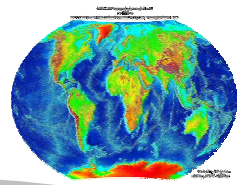
Laboratory Equipment

Remote Users

Futures: The Computing Continuum



United States virtual observatory



NEESgrid

NEON
National Ecological Observatory Network

Petabyte Archives

National Petascale Systems

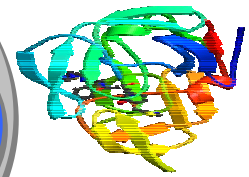
Collaboratories

Terabit Networks

Responsive Environments

Smart Objects

Ubiquitous Sensor/actuator Networks



Laboratory Terascale Systems

Contextual Awareness

Ubiquitous Infosphere

Building Up

Building Out

Science, Policy and Education

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Bottom-line Recommendations

- **NSF leadership for the Nation -- an INITIATIVE to revolutionize science and engineering research capitalizing on new computing and communications opportunities.**
  - **21st Century Cyberinfrastructure includes supercomputing massive storage, networking, software, collaboration, visualization, and human resources**
  - **Current centers (NCSA, SDSC, PSC) and other programs are a key resource for the INITIATIVE.**
  - **Budget estimate: incremental $990 M/year (continuing).**

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Budget Overview
(Incremental in $ Millions)

• Research in IT and its application	$218
• Software development & support	$200
• High-end distributed centers and networks	$392
• Information and data support	$180
• TOTAL	$990