#### The Computing Community Consortium: Why, What, Who, How?



#### Dan Reed Chair, CRA Board of Directors www.cra.org



#### Two Messages ...

"For I dipped into the future, far as human eyes could see. Saw the vision of the world and all the wonder that would be."

Lord Tennyson

# "Where there is no vision, the people perish." *Proverbs* 29:18



#### **Computing's Impact: Billion Dollar Industries**



Source: From [6], reprinted with permission from the National Academy of Sciences, courtesy of the National Academies Press, Washington D.C. # 2003.

#### Science 2020

"In the last two decades advances in computing technology, from processing speed to network capacity and the Internet, have revolutionized the way scientists work.

From sequencing genomes to monitoring the Earth's climate, many recent scientific advances would not have been possible without a parallel increase in computing power - and with revolutionary technologies such as the quantum computer edging towards reality, what will the relationship between computing and science bring us over the next 15 years?"









#### **Displacement, Velocity and Acceleration**

Remember basic calculus

$$\boldsymbol{d} = \boldsymbol{d}_0 + \boldsymbol{V}_0 \boldsymbol{t} + \frac{1}{2} \boldsymbol{a} \boldsymbol{t}^2$$

- Displacement
  current position
- Velocity
  - rate of position change
- Acceleration
  - rate of velocity change
- Are we losing the race?
  - risk averse, siloed approaches
  - cultural inhibitions
    - inadequately educated population



# Why A CCC?

- What questions shape our intellectual future?
- What attracts the best and brightest minds of a new generation?
- What are the next big computing ideas?
  - that will define the future of computing
  - galvanize the very best students
  - catalyze research investment and public support
- Computing Community Consortium purpose
  - create compelling research visions



– create the mechanisms to realize these visions

# The CCC Challenge

- Catalyze the computing research community
  - debate long range, more audacious research challenges
  - build consensus around research visions
  - articulate those research visions
  - work with funding organizations
    - move the challenges and visions toward funding initiatives
- Do this without harming the research environment
  - that has created the computing world of today



#### **Vision and Opportunity**

Image source: www.amnh.org





"Never for me the lowered banner, never the last endeavor." Sir Ernest Shackleton



# How Will The CCC Work?





# Who Will Be The CCC?

- Broadly inclusive
  - the entire computing research community
- Welcome participation
  - any computing researcher who wishes to be involved
- The CCC Council's role
  - stimulate and facilitate visioning
  - NOT to do the visioning
- Cooperative Agreement with CISE
  - Will be an interactive partnership



## **Relationship to GENI**

- Not interdependent
  - GENI was impetus for CCC
  - But CCC's mission and impact much broader
- Serve as proxy organization
  - Create the GENI Science Council
    - Work with GENI Planning Group to evolve GENI Science Plan
    - Work with GENI Project Office to ensure design meets science needs
  - Communicate with the computing community on GENI
    - Expand community understanding of GENI
    - Maximize community participation



- science plan, design, and use

#### **GENI Research Challenges**

Security and Robustness

Pervasive Computing w Mobility Bridging Physical and Cyber space Realize Potential of Opto-Electronics

#### **GENI**

Capability: Information Access with High Availability & Trust Capability: Seamless information access any where and any time Capability: Access information about physical world in real time Capability: Access to Bandwidth-on-Demand with Iow latency & guarantees



## **GENI Facility: Motivation**





#### **Broader Impacts**

- General public
  - Promote computing as a thriving discipline
  - Show role of IT in tomorrow's world
- Students
  - Entice more students to enter computing fields
  - Provide training opportunities for future leaders



#### Plans

- Bootstrapping (Oct-Dec 2006)
  - Interim GENI Community Advisory Board
  - Interim CCC Council
  - Solicit nominations for chair & council
- Steady state
  - Council and chair members selected by
    - combination of CRA & CCC with community input



# Interim CCC Council

- Interim council members
  - Bill Feiereisen, LANL
  - Jessica Hodgins, CMU
  - John Hollerbach, Utah
  - Daniel Jackson, MIT
  - Dick Karp, California-Berkeley
  - John King, Michigan
  - Peter Kogge, Notre Dame
  - Dan Ling, Microsoft
  - Francis Sullivan, IDA
  - David Tennenhouse, A9
  - Ellen Zegura, Georgia Tech

- Office of the chair (interim)
  - Greg Andrews, Arizona
  - Susan Graham, UC Berkeley
  - Ken Kennedy, Rice
  - Ed Lazowska, Washington
  - Ran Libeskind-Hadas, HMC
  - Anita Jones, Virginia
  - Dan Reed, UNC



## **Requirements for Success**

- Community involvement
  - Computing community must believe in the mission & operation of the CCC
- Support from funding agencies
  - Funding agencies must be open to the directions identified by the visioning processes
- Effective leadership
  - Dedicated and visionary people must be willing to serve as chair & council members



#### Truth Is Beauty, Beauty Truth

To see the universe in a grain of sand And heaven in a wildflower, Hold infinity in the palm of your hand And eternity in an hour.

William Blake











# PCAST's IT Charge

- PCAST is charged to serve as the President's Information Technology Advisory Committee under the High-Performance Computing Act of 1991 (Public Law 102-194)
- This advisory committee shall provide the Director [of the Office of Science and Technology Policy (OSTP)] with an independent assessment of
  - progress made in implementing the [Networking and Information Technology Research and Development (NITRD)] Program;
  - the need to revise the Program;
  - the balance between the components of the Program;
  - whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in [networking and information] technology; and
  - other issues identified by the Director.





# **PCAST IT Committee**

- Co-chairs
  - Dan Reed, RENCI
  - George Scalise, Semiconductor Industry Association (SIA)
- Members
  - Duane Ackerman, CEO, Bell South
  - Erich Bloch, Washington Advisory Group
    - former Director, National Science Foundation
  - Richard Herman, Chancellor, UIUC
  - John Slaughter, CEO, National Action Council for Minorities in Engineering
    - former Director, National Science Foundation
  - Stratton Sclavos, CEO Verisign
  - Chuck Vest, NAE President designate



• former President, MIT

