U.S. Department of Energy's
Office of Science

Perspectives on the IT R&D Ecosystem

Presentation to CSTB Panel

Dr. Dan Hitchcock
Daniel.hitchcock@science.doe.gov
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Office of Science

- **The Office of Science is the primary source of support for the Physical Sciences.**
  - Provides over 40% of federal support to the physical sciences (e.g. 90% of High Energy & Nuclear Physics, 60% of Catalysis, 25% of Nanoscience)
  - Provides sole support to select sub-fields (e.g. nuclear medicine, heavy element chemistry, magnetic fusion)
  - Manages long term, high risk, multidisciplinary science programs to support DOE missions.
  - Directly supports the research of 15,000 PhDs, PostDocs and Graduate Students.
- **Constructs and operates large scientific facilities for the U.S. scientific community.**
  - Accelerators, light & neutron sources, nanotechnology research centers.
    - Used by more than 19,000 researchers every year.
  - Infrastructure support for ten Science laboratories.

Advanced Scientific Computing Research Program

-- Mission --

Deliver forefront computational and networking capabilities to scientists nationwide that enable them to extend the frontiers of science, answering critical questions that range from the function of living cells to the power of fusion energy.

-- Delivery mechanisms --

- **world-class research portfolio**
- **research collaborations and partnerships**
- **high-performance computing and network resources**

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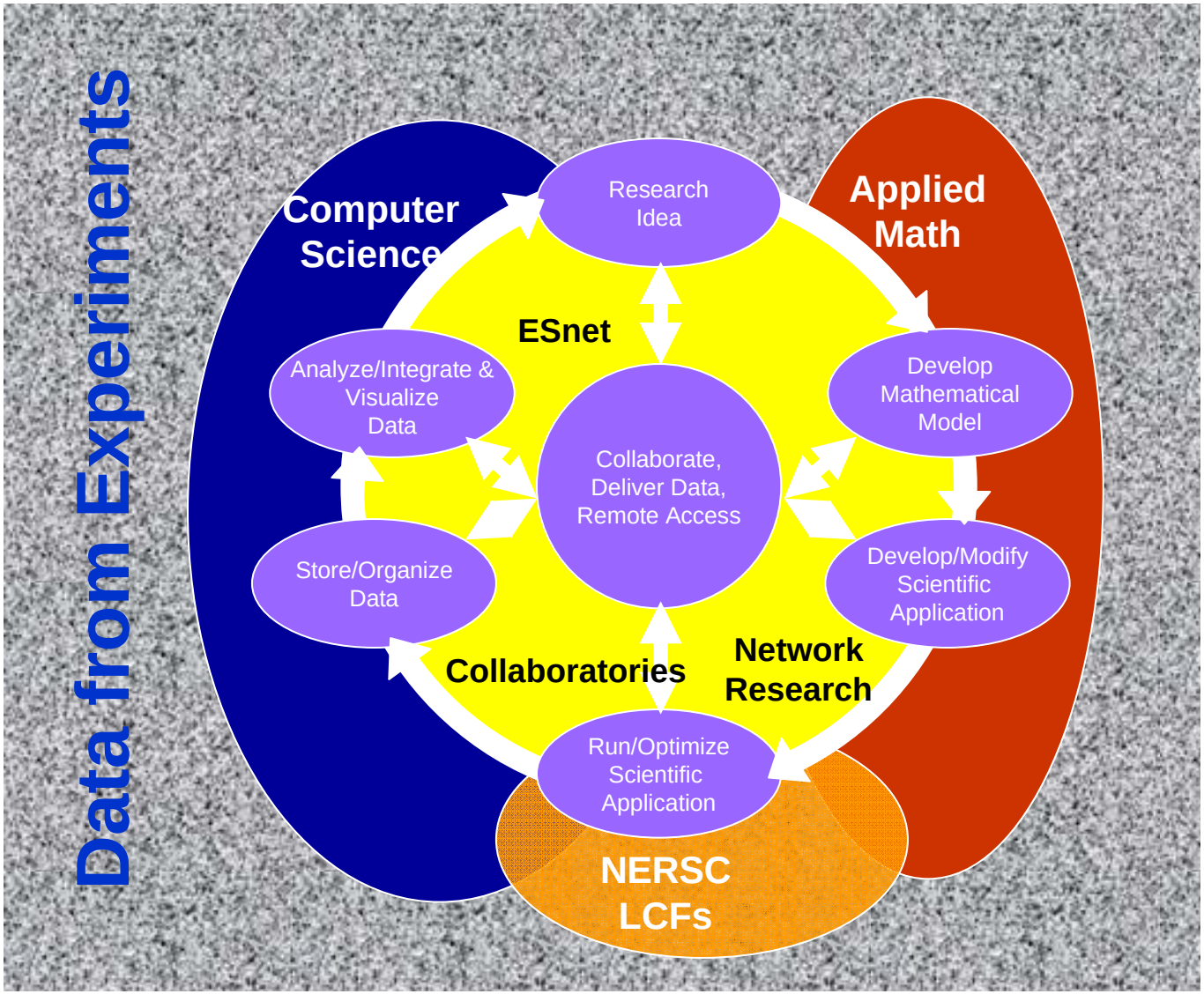
ASCR Supports end-to-end Process of Scientific Discovery



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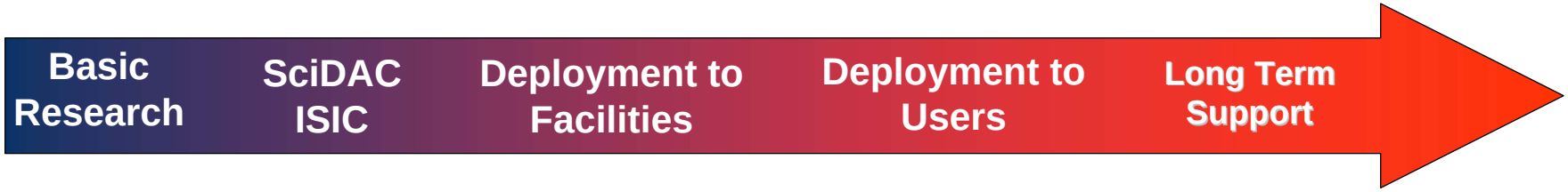
Research to Enable New Frontiers in Science though Simulation

- The mathematics of complex and multiscale systems;
- Ultrascalable algorithms for petascale systems
- The computer science to enable advanced computers; and
- The computer science to transform petabytes of data into knowledge.



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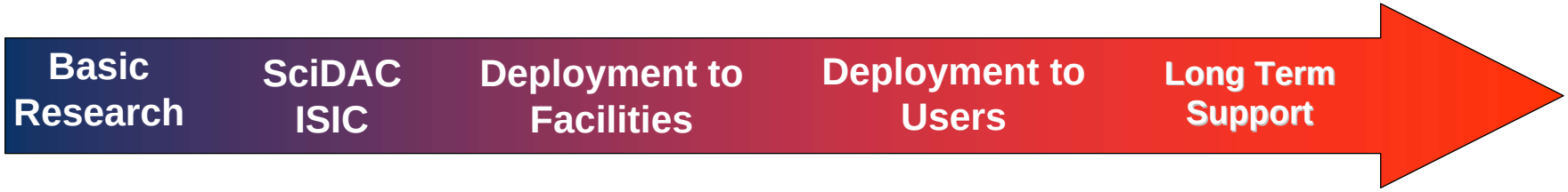
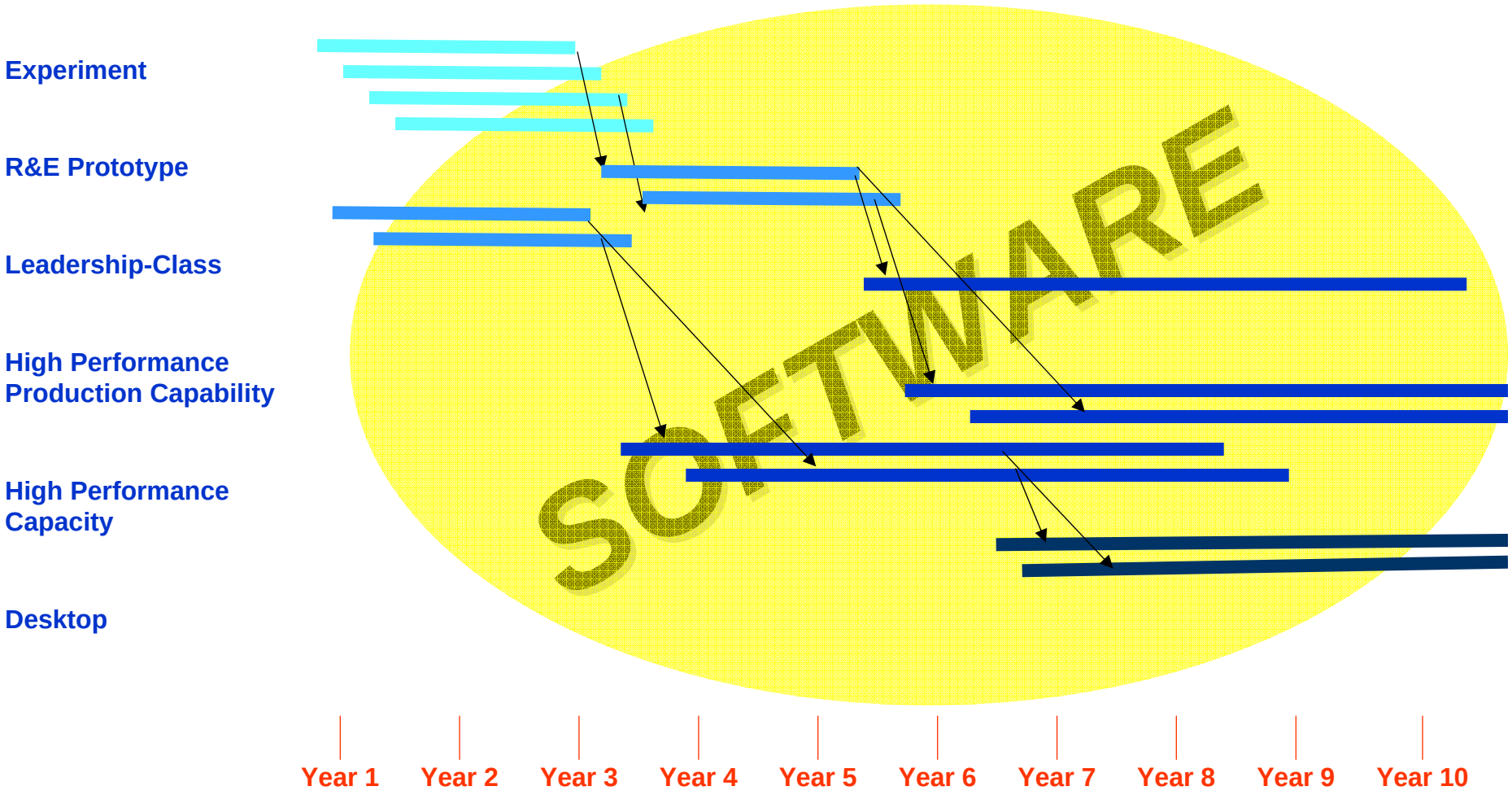
Research to Enable New Frontiers in Science though Networks

- End-to-end performance
- High-Performance Middleware
- Integrated testbeds and networks



Compute Facilities and Testbeds
Timeline



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ASCR Contact Information

Office of Advanced Scientific Computing Research
Tel: (301) 903-7486
Fax: (301) 903- 4846
Web: www.science.doe.gov/ascr/

Michael Strayer
Associate Director for Advanced Scientific Computing Research
Michael.Strayer@science.doe.gov

Daniel A. Hitchcock
Division Director for Facilities (Acting)
Daniel.Hitchcock@science.doe.gov

Walt Polansky
Division Director Computer Science Research and Partnerships Sciences (Acting)
Walt.Polansky@science.doe.gov

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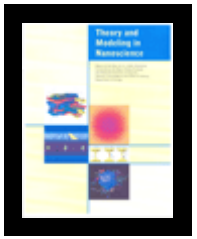
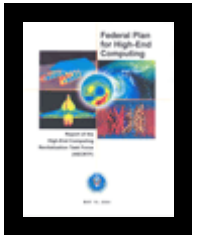
Workshops and Reports

www.sc.doe.gov/ascr/





- High Performance Network Planning Workshop, August 2002
  - http://www.doecollaboratory.org/meetings/hpnpw/
- Blueprint for Future Science Middleware and Grid Research and Infrastructure, August 2002
  - http://www.nsf-middleware.org/MAGIC/default.htm
- DOE Science Network Meeting, June 2003
  - http://gate.hep.anl.gov/may/ScienceNetworkingWorkshop/
- DOE Science Computing Conference, June 2003
  - http://www.doe-sci-comp.info
- Science Case for Large Scale Simulation, June 2003
  - www.pnl.gov/scales/
- Workshop on the Road Map for the Revitalization of High End Computing
  - http://www.cra.org/Activities/workshops/nitrd/
- Cyberinfrastructure Report
  - http://www.cise.nsf.gov/evnt/reports/toc.htm
- ASCR Strategic Planning Workshop
  - http://www.fp-mcs.anl.gov/ascr-july03spw
- ASCR Strategic Plan, July 2003
  - http://www.sc.doe.gov/ascr/ASCRstrategicplan073004final.pdf
- HECRTF Plan, May, 2004
  - http://www.sc.doe.gov/ascr/20040510_hecrtf.pdf
- The Office of Science Data-Management Challenge, Report from the DOE Office of Science Data-Management Workshops, November, 2004
  - http://www.sc.doe.gov/ascr/Final-report-v26.pdf
- Multiscale Mathematics Workshops:
  - May, 2004 – Washington, DC
    - http://www-fp.mcs.anl.gov/multiscale-workshop/
  - July, 2004 – Denver, CO
    - http://www.math.colostate.edu/~estep/doe_multiscale/DOE_Multiscale_2.html
  - September, 2004 – Portland, OR
    - http://multiscalemath.pnl.gov