State of NERSC Address

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NERSC Accomplishments in 1996

Horst Simon - 1/28/97
http://www.nersc.gov/research/whitepaper/whitepaper.html

NERSC Mission Statement

Provide reliable, high quality, state of the art computing resources and client support in a timely manner--independent of client location--while wisely advancing the state of computational and computer science.

Major Milestones

Feb 96	**Four NERSC employees in Berkeley**
April 96	**First J90 in Berkeley**
May 96	**C90 and storage move**
May 96	**User Services move**
May 96	**PDSF arrives**
June 96	**Staff move complete - ERSUG meeting**
Aug 96	**new ERCAP process complete**
Aug 96	**Cray 2's turned off**
Sep 96	**T3E and two additional J90s installed**
Oct 96	**Grand Opening**
Nov 96	**Supercomputing '96**
Dec 96	**NERSC budget "White Paper"**
Jan 97	**T3E "inching" toward acceptance**

FY 1996 - Transition to new NERSC

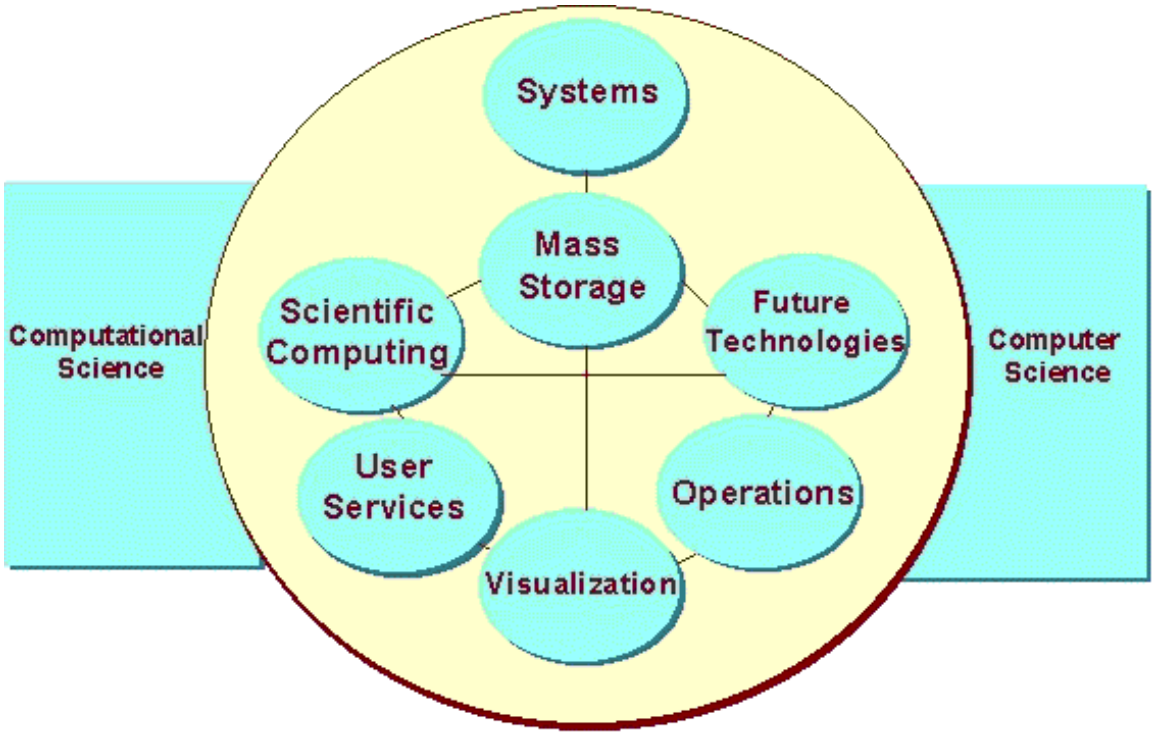
FY 1996 Accomplishments

- **physical move to LBNL**
- **installation of J90s and T3E**
- **recruited more than 50 new staff members**
- **20% budget cut vs. LLNL**

FY 1997 Major Goals

- **transition to new operational principles and models**
- **integration of T3E, J90 cluster, new mass storage**
- **build team, new culture, intellectual infrastructure**
- **build new programs/projects**

The Intellectual Home of NERSC



Computational Science Competency

ER	MAPS TO	Discipline	MAPS TO	Computational technology
OFE		magnetic fusion		particle in cell
		computational chemistry		local density functional
BES		material sciences		partial differential equation
	→	climate research		searching, pattern matching
OHER		computational biology		Monte Carlo technique
HENP		QCD		image processing
		accelerator design		
MICS		particle detection simulation		
		combustion		
		applied mathematics		

NERSC has or will build competency in all computational technology areas of relevance to ER research

Computer Science Competency

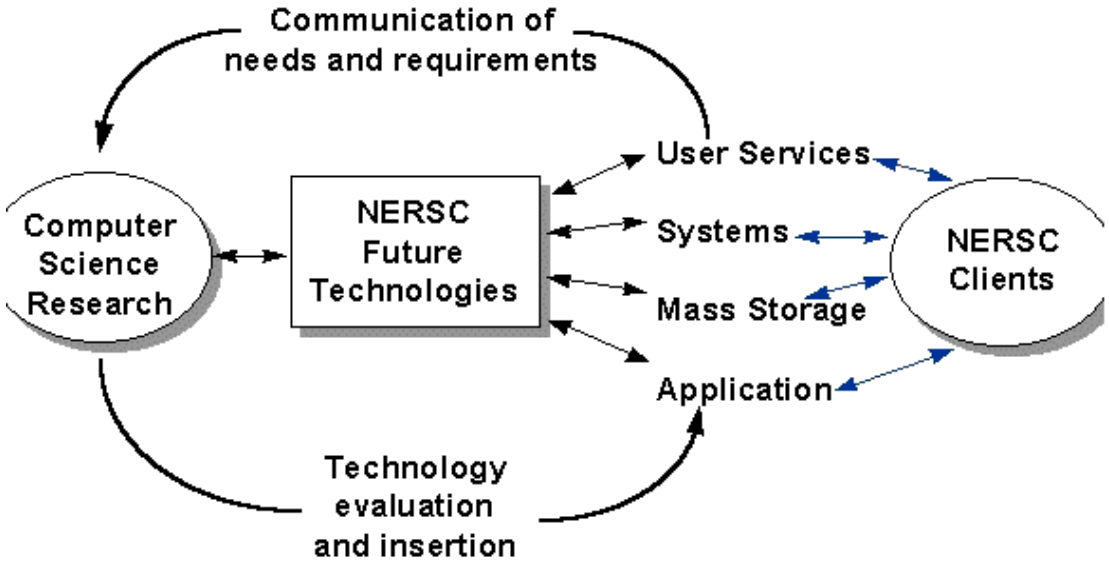
Hardware (evaluation)	**RISC architectures** **hierarchical memory systems** **interconnection networks** **parallel I/O** **emerging architectures** **systems performance evaluation**

Software	**software engineering** ***(00, functional programs, distributed computing)*** **languages and tools** ***(HPF, HPC, spl;it C, PVM, MPI, ... , debugger, performance monitoring tools, libraries)***
CS Applications	**scientific database** **load balancing and scheduling** **visualization and graphics algorithms**

The Challenge

- Computer technology continues to evolve rapidly
- The new NERSC must be more proactive in adopting computer science technology
- NERSC can only afford a small amount of research FTE's

Future Technology Mission



Visualization Group

- Work closely with NERSC researchers
- Provide generic visualization tools for use in applications
- Develop strategies and tools to allow remote NERSC users to utilize our visualization resources
- Maintain a variety of visualization software packages on different platforms
- Educate and consult with researchers on the various visualization tools available

NERSC Enhancements and Initiatives

- Grand Challenge Proposals - FY1997
  - Expect 6 GCAs to work closely with NERSC staff
  - Integrated teams with user services, visualization, scientific computing, and future technology staff
  - No incremental funding for supporting GCAs
- LDRD
  - Berkeley Lab approved computational LDRDs in collaboration with NERSC/CSD
  - Total funding is more than $3M
  - About 20 postdocs and students will work on these projects

- Additional 2-3 FTEs for NERSC

Computational Science Program with:

- Joint appointments for computational science training
- Training classes developed for NERSC users
- Seminar series broadcast via MBone
- Results from small group projects posted on WWW

All will directly benefit the NERSC community at large

- Bay Area

  Berkeley provides an intellectually rich environment, many informal interactions, e.g., with:
  - ICSI, Berkeley (International Computer Science Institute)
    J. Feldman (pSather parallelization tool)
  - MSRI, Berkeley (Mathematical Sciences Research Institute)
    D. Hoffman (minimal surfaces)
  - Corporate headquarters for three of the five major computer vendors
  - NERSC has benefitted through close collaboration with SGI/Cray and Sun
- Benchmarking
- Architecture Evaluation/Tera
- NERSC Parallel Algorithm Prototypes

Summary

National/International Impact

- NERSC made top 25 list in Nov. 1996
- NERSC tutorial and booth at SC '96
- NERSC is ahead of intellectual competition because of:
  - re-engineering the center
  - focus on computational science
  - focus on computer science
- . . . and all this with a reduced budget