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
BES computational chemistry local density functional
OHER material chemistry partial differential equation
HENP climate research searching, pattern matching
MICS computational biology Monte Carlo technique
QCD accelerator design
accelerator design
particle detection
simulation
combustion
applied mathematics
image processing

IHERSC 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
  (functional programs, distributed computing)
- languages and tools
  (HPF, HPC, SPLIT 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

- 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

Visualization Group

- 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