# 2013 NERSC User Survey Results
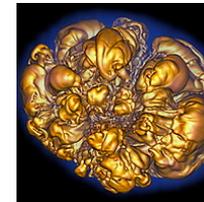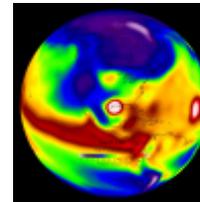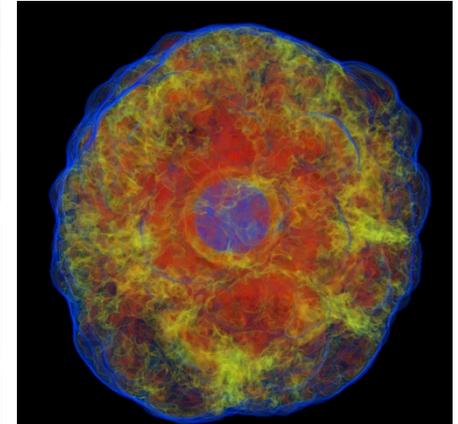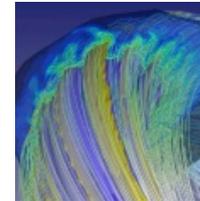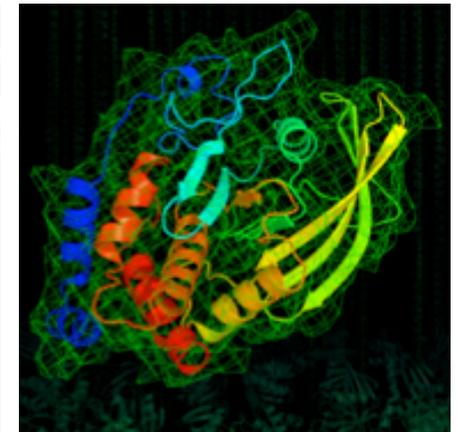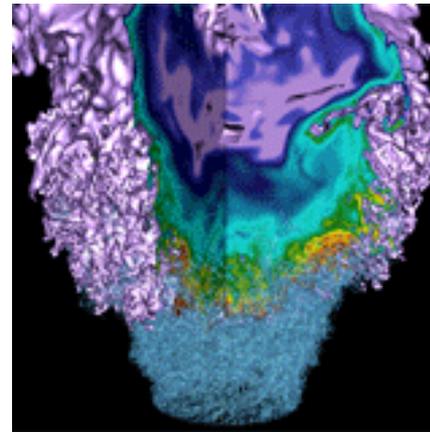


**Francesca Verdier**
**fverdier@lbl.gov**

NUG 2014

# User Satisfaction is Unprecedented!

## Ratings in all 5 overall categories as high or higher than ever



NERSC User Satisfaction

Very Sat.

Mostly Sat.

Satisfaction Score (1-7)

6.37   6.10   6.21   6.31   6.30   6.30   6.40   6.54   6.32   6.52

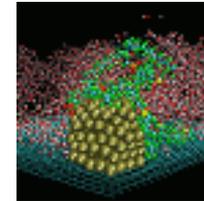Year: 2003, 2004, 2005, 2006, 2007, 2009, 2010, 2011, 2012, 2013

Consulting   Available Hardware   NERSC Overall

U.S. DEPARTMENT OF ENERGY | Office of Science

BERKELEY LAB
Lawrence Berkeley National Laboratory
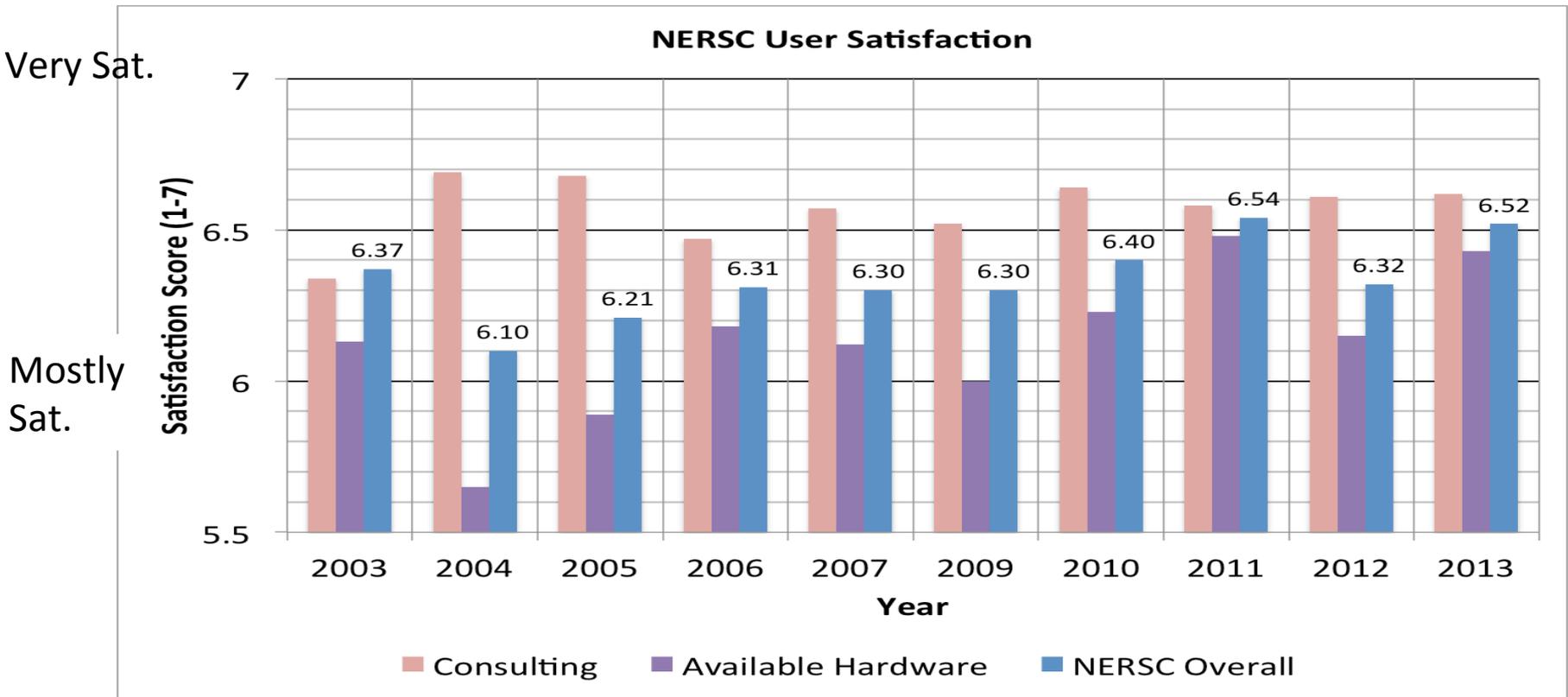
# Overall Satisfaction Scores



| | | | | | | |
|---|---|---|---|---|---|---|
| Very Unsat. | Mostly Unsat. | Somewhat Unsat. | Neutral | Somewhat Sat. | Mostly Sat. | Very Sat. |

Chart categories (top to bottom): Mass storage facilities, Available Software, Available Computing Systems, Overall Satisfaction, Services

# Other Key Scores

| | Satisfaction Score | Change from 2012 |
|---|---|---|
| Consulting | 6.62 | NC |
| PDSF | 6.58 | **+0.43** |
| /project | 6.57 | NC |
| /gscratch | 6.47 | +0.18 |
| Hopper | 6.46 | +0.17 |
| Carver | 6.40 | NC |
| Genepool | 6.20 | **+1.12** |
| Edison | 6.17 | NA |

# Most Improved*

| | Satisfaction Score | Change from 2012 |
|---|---|---|
| Mobile Web | 5.95 | +0.57 |
| Training Presentations on Web | 6.34 | +0.48 |
| Training Videos | 6.22 | +0.48 |
| Hopper Batch Wait Time | 5.30** | +0.41 |
| NX | 5.89 | +0.38 |
| Training Classes | 6.33 | +0.33 |
| Carver Batch Queues | 6.09 | +0.31 |
| Available Compute Systems | 6.42 | +0.27 |

*Excluding Genepool and PDSF questions          ** Lowest rated item in survey!

# Areas of Decreased Satisfaction

# *NONE*

# Areas of Highest User Satisfaction
## (Scores > 6.5; out of 613 respondents)

| Topic | Num Resp. | Score |
|-------|-----------|-------|
| **HPSS**: reliability, uptime, overall | 227, 231, 238 | 6.74, 6.70, 6.55 |
| **PDSF**: uptime, overall | 33, 33 | 6.73, 6.58 |
| **Global Homes**: reliability, uptime | 335, 338 | 6.70, 6.62 |
| **Global Scratch**: uptime, reliability | 262, 261 | 6.66, 6.52 |
| **Project**: reliability, overall | 206, 216 | 6.66, 6.67 |
| **Security** | 367 | 6.63 |
| **Consulting**: response time, overall, advice, requests | 403, 349, 399, 279 | 6.62, 6.62, 6.57, 6.5 |
| **Account Support** | 463 | 6.62 |
| **Hopper**: uptime | 399 | 6.60 |
| **Web**: system status, accuracy of information | 370, 397 | 6.58, 6.52 |

# Areas of Lowest User Satisfaction
## (Scores < 6; out of 613 respondents)

| Topic | Num Resp. | Score |
|---|---|---|
| **Hopper**: batch wait time; batch queue structure | 391, 367, 378 | 5.30, 5.86, 5.97 |
| **Edison**: uptime, batch wait time, batch queue structure | 224, 220, 213 | 5.36, 5.38, 5.79 |
| **Carver**: batch wait time; batch queue structure | 168, 152, 114 | 5.72, 5.80, 5.95 |
| **Genepool**: file system configuration, data storage | 61, 61 | 5.74, 5.89 |
| **Visualization software** | 222 | 5.77 |
| **NX** overall | 140 | 5.89 |
| **Web**: mobile site; ease of use with mobile devices | 61, 71 | 5.95, 5.99 |

# What's Most Important to You

| | Importance Rating (1-3) |
|---|---|
| Available Compute Hardware | 2.91 |
| NERSC Overall | 2.86 |
| Ability to Perform Data Analysis | 2.76 |
| NERSC Services | 2.69 |
| I/O Bandwidth to /scratch | 2.69 |
| Disk Storage Space | 2.68 |
| Ability to Run Massively \|\| Jobs | 2.67 |
| Software (Apps / Libs / Tools) | 2.59 |
| Mass Storage | 2.57 |
| Ensemble Runs | 2.56 |

# What's Least Important to You

| | Importance Rating (1-3) |
|---|---|
| Analytics & Vis Help | 1.98 |
| Serial Jobs | 2.05 |
| Science Data Gateways | 2.05 |
| Help With Data Management Plan | 2.07 |
| Databases | 2.10 |
| Web Access to Data | 2.14 |
| Data Management Tools | 2.16 |
| Large Shared-Memory System | 2.18 |

# Some Favorite Comments

*"I like how the computing environment is set up for scientists."*

*Support is AMAZING. Systems are rock solid, and software "just works."*

*Very simply, NERSC provides the resources and support we need to do our science.*

*NERSC provides world-class systems and support, with high reliability and a clear focus on delivery of HPC for science.*

*They ask me if they can help; everywhere else I am told what not to do.*

# *Favorite* Comment

*NERSC continues to be the model organization for how to manage large supercomputer resources. I can't think of another organization that manages supercomputers better. The website is extremely well put together, the actual performance on the machines is fantastic, and <span style="color:red">the level of user support is just downright ridiculously awesome</span>. To be honest, NERSC's quality would have to drop by, say, 50% in each of these categories to even have a rival.*

# Not *everything* was perfect

*It is very difficult to get small high-urgency or quick-turnaround jobs done in time at NERSC.*

*The turn-around time to run jobs is so slow that it hurts scientific productivity.*

*I need more disk space that files aren't going to be removed from.*

*NERSC needs to continue to expand its offerings for data-intensive high-throughput computing.*

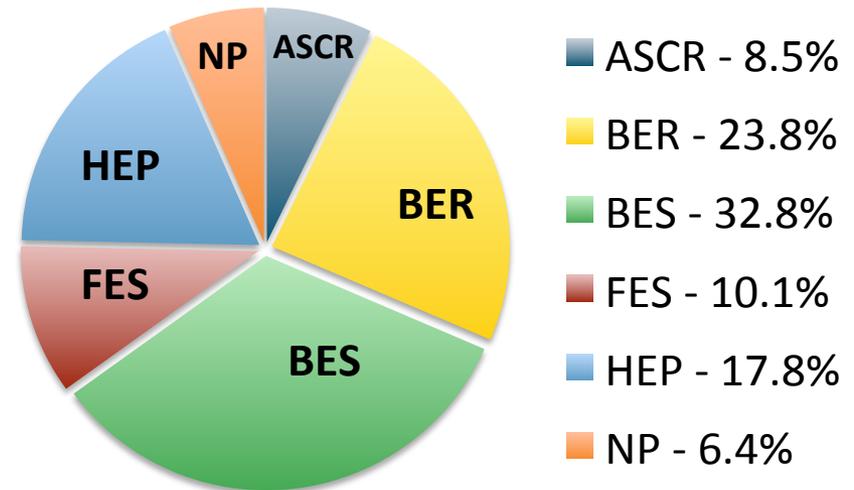*/scratch IO performance (esp. on edison, where we see an order of magnitude variability in run times)*

*The main thing I would want, if I could have my wish, and I already had a pony, would be a queue system wherein the total number of processes, not the total number of jobs, is restricted.*
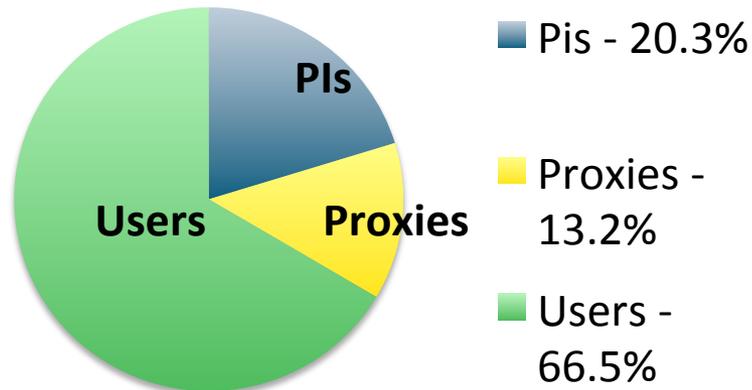
# Response Profile

**612 respondents**
- **77% "big user" response rate**
- **35% "medium user" response rate**
- **11.8% overall response rate**

## Respondants by Office



- ASCR - 8.5%
- BER - 23.8%
- BES - 32.8%
- FES - 10.1%
- HEP - 17.8%
- NP - 6.4%

## Respondants by Role



- Pis - 20.3%
- Proxies - 13.2%
- Users - 66.5%

# 2012 Survey Question & Scores

- 97 satisfaction questions scored on a 7-point scale
- Average score: 6.32 (excludes JGI only)
- Minimum satisfactory score 5.25

| Satisfaction score | meaning | Num times selected |
|---|---|---|
| 7 | Very satisfied | 13,907 (58.1%) |
| 6 | Mostly satisfied | 6,922 (28.9%) |
| 5 | Somewhat satisfied | 1,490 (6.2%) |
| 4 | Neutral | 1,016 (4.2%) |
| 3 | Somewhat dissatisfied | 418 (1.7%) |
| 2 | Mostly dissatisfied | 109 (0.5%) |
| 1 | Very dissatisfied | 93 (0.4%) |
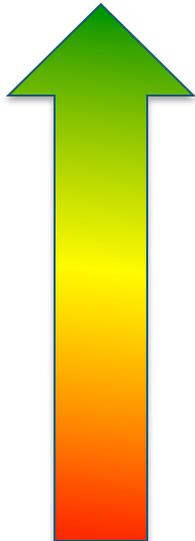
# Response Profile

| | Num | Resp. Rate | Avg. Score | % MPP hrs | < 1 year | 1-3 years | > 3 years |
|---|---|---|---|---|---|---|---|
| Big MPP | 97 | 77.0% | 6.42 | 52.6% | 7.4% | 42.1% | **50.5%** |
| Medium MPP | 151 | 35.1% | 6.37 | 13.2% | 10.8% | **45.6%** | 43.6% |
| Small MPP | 230 | | 6.32 | 1.6% | 30.4% | **40.5%** | 29.1% |
| All | 612 | 11.8% | 6.34 | 67.4% | 20.1% | 44.4% | 35.5% |

# Key Ratings

| Topic | Big MPP | Med MPP | Small MPP | All |
|---|---|---|---|---|
| Satisfaction with NERSC | **6.64 (0.32)** | **6.60 (0.28)** | 6.45 (0.13) | 6.50 (0.17) |
| Available Hardware | **6.55 (0.40)** | 6.46 (0.31) | 6.38 (0.23) | 6.42 (0.27) |
| Services | **6.69 (0.27)** | **6.68 (0.26)** | 6.50 (0.08) | 6.58 (0.16) |
| Available Software | 6.26 (0.18) | **6.40 (0.32)** | 6.21 (0.13) | 6.23 (0.13) |
| Hopper Overall | 6.46 (0.18) | 6.45 (0.16) | 6.45 (0.17) | 6.46 (0.17) |
| Edison Overall | 6.18 | **6.32** | 5.96 | 6.17 |
| HPSS Overall | 6.58 (0.16) | **6.71 (0.30)** | 6.53 (0.12) | 6.55 (0.13) |
| Consulting Overall | **6.77 (0.16)** | 6.61 (-0.01) | 6.49 (-0.12) | 6.62 (0.01) |
| Web www.nersc.gov | **6.66 (0.24)** | **6.55 (0.13)** | 6.44 (0.02) | 6.43 (-0.05) |

# Key Ratings

| Topic | Big MPP | Med MPP | Small MPP | All* |
|---|---|---|---|---|
| Satisfaction with NERSC | **6.64** | 6.60 | 6.45 | 6.50 |
| Available Hardware | **6.55** | 6.46 | 6.38 | 6.42 |
| Services | **6.69** | **6.68** | 6.50 | 6.58 |
| Available Software | 6.26 | **6.40** | 6.21 | 6.23 |
| Hopper Overall | 6.46 | 6.45 | 6.45 | 6.46 |
| Edison Overall | 6.18 | **6.32** | 5.96 | 6.17 |
| HPSS Overall | 6.58 | **6.71** | 6.53 | 6.55 |
| Consulting Overall | **6.77** | 6.61 | 6.49 | 6.62 |
| Web www.nersc.gov | **6.66** | 6.55 | 6.44 | 6.43 |

*-All responses, including non-MPP

# Importance of Different Job Types

**Average importance on a scale of 1 (= not important) to 3 (= very important)**

| Job Type | Big MPP | Medium MPP | Small MPP | All |
|---|---|---|---|---|
| Massively parallel | **2.84** | 2.72 | 2.59 | 2.67 |
| Ensembles | 2.51 | **2.57** | **2.56** | 2.56 |
| Interactive | 2.04 | 2.05 | **2.26** | 2.20 |
| Serial | 1.86 | 1.84 | **2.14** | 2.05 |

# Importance of Data Analytics & Vis

**Average importance on a scale of 1 (= not important) to 3 (= very important)**

| Topic | Big MPP | Medium MPP | Small MPP | All |
|---|---|---|---|---|
| Ability to Analyze Data | 2.70 | 2.69 | **2.76** | 2.76 |
| Analytics Assistance | 2.38 | **2.56** | 2.36 | 2.49 |
| Databases | 2.20 | **2.48** | 2.28 | 2.47 |
| Science Gateways | 2.20 | **2.29** | **2.29** | 2.37 |

# Importance of Data Services

**Average importance on a scale of 1 (= not important) to 3 (= very important)**

| Topic | Big MPP | Med MPP | Small MPP | All |
|---|---|---|---|---|
| I/O bandwidth to local disk | 2.69 - 1 | 2.65 - 1 | 2.66 - 1 | 2.69 - 1 |
| Disk space | 2.71 - 1 | 2.68 - 1 | 2.61 - 1 | 2.68 - 1 |
| Long term data retention | 2.70 - 1 | 2.49 - 3 | 2.42 - 3 | 2.53 - 3 |
| Ability to checkpoint | 2.58 - 4 | 2.56 - 3 | 2.40 - 3 | 2.50 - 3 |
| Archival storage | 2.59 - 4 | 2.52 - 3 | 2.30 - 5 | 2.46 - 3 |
| Metadata performance | 2.25 - 6 | 2.20 - 6 | 2.14 - 7 | 2.21 - 6 |
| Shared memory system | 2.13 - 8 | 2.11 - 7 | 2.24 - 6 | 2.18 - 7 |
| Data management tools | 2.14 - 8 | 2.00 - 8 | 2.17 - 7 | 2.16 - 7 |
| Data access over web | 2.26 - 6 | 1.86 - 12 | 2.16 - 7 | 2.14 - 7 |
| Access to databases | 2.05 - 8 | 1.94 - 8 | 2.09 - 10 | 2.10 - 10 |
| Help with data management plan | 2.00 - 11 | 1.97 - 8 | 2.09 - 10 | 2.07 - 10 |
| Science gateways | 2.10 - 8 | 1.96 - 8 | 2.00 - 13 | 2.05 - 10 |
| Analytics & vis assistance | 1.98 - 11 | 1.87 - 12 | 2.06 - 10 | 1.98 - 13 |

# Overall User Satisfaction with NERSC Continues to be High (excludes JGI only)
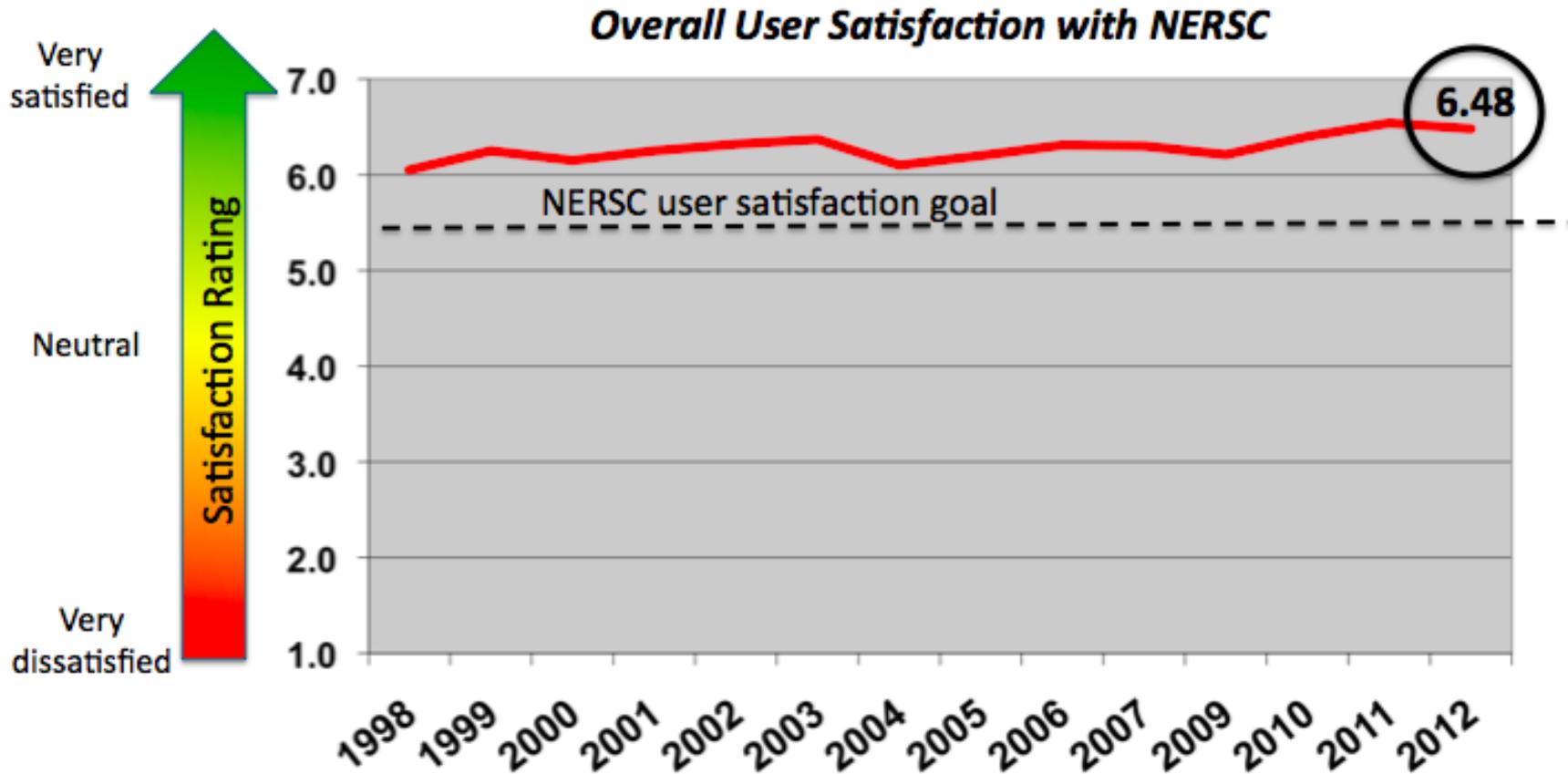
# Areas of Increased Satisfaction 2012 ➔ 2013
## (Scores with significant increases; out of 613 respondents)

| Topic | Num Resp. | Score | Change |
|---|---|---|---|
| **Genepool:** uptime, overall, file system, batch queues, batch wait, interactive | 63, 64, 61, 56, 58, 61 | 6.46, 6.20, 5.74, 6.09, 6.03, 6.25 | +1.50, +1.12, +1.12, +1.06, +1.06, +1.04 |
| **Projectb** (JGI): I/O bandwidth, reliability, file operations, overall | 83, 82, 79, 89 | 6.42, 6.56, 6.04, 6.30 | +1.32, +1.03, +0.93, +0.92 |
| **Web:** mobile site, ease with mobile, system status | 61, 71, 370 | 5.95, 5.99, 6.58 | +0.57, +0.46, +0.15 |
| **PDSF:** uptime, overall | 33, 33 | 6.73, 6.58 | +0.49, +0.43 |
| **Training:** presentations on web, video tutorials, NERSC classes, web tutorials | 152, 85, 132, 200 | 6.34, 6.22, 6.33, 6.50 | +0.48, +0.48, +0.33, +0.24 |
| **Hopper:** batch wait time, overall | 391, 404 | 5.30, 6.46 | + 0.41, +0.17 |
| **NX:** overall | 140 | 5.89 | +0.38 |
| **Carver:** batch queue structure, interactive, uptime | 164, 141, 179 | 6.09, 6.21, 6.58 | +0.31, +0.28, +0.21 |
| **Overall:** hardware, mass storage, NERSC, services, software | 589, 494, 603, 574, 479 | 6.42, 6.24, 6.50, 6.58, 6.23 | +0.27, +0.21, +0.17, +0.16, +0.15 |
| **HPSS:** user interface, reliability | 221, 227 | 6.07, 6.74 | + 0.26, +0.16 |
| **Global scratch:** file operations, I/O bandwidth, uptime, overall | 247, 255, 262, 272 | 6.39, 6.32, 6.66, 6.47 | +0.24, +0.23, +0.19, +0.18 |
| **Project:** uptime | 206 | 6.65 | +0.18 |
| **Network** performance within NERSC | 338 | 6.56 | +0.12 |
| **Software:** programming libraries | 449 | 6.42 | +0.11 |

# Areas of Most Importance to Users

(as shown by number of responses > 400; out of 612 respondents)

| Topic | Num Resp. | Score | Change |
|---|---|---|---|
| Overall satisfaction with NERSC | 603 | 6.50 | + 0.17 |
| Available computing hardware | 589 | 6.42 | + 0.27 |
| Services overall | 574 | 6.58 | + 0.16 |
| Mass storage facilities overall | 494 | 6.24 | + 0.21 |
| Available Software | 479 | 6.23 | + 0.15 |
| Software environment | 466 | 6.41 | - |
| Account support | 463 | 6.62 | - |
| NIM – nim.nersc.gov | 452 | 6.43 | - |
| Programming libraries, applications software | 449, 427 | 6.42 | + 0.11, - |
| Web - www.nersc.gov overall, finding info | 441, 417 | 6.49, 6.29 | - |
| Networking within NERSC | 408 | 6.32 | - |
| Hopper overall | 404 | 6.46 | + 0.17 |
| Consulting overall & response time | 403 | 6.62 | - |

# Advanced Architectures & Programming Models Experience

| Architecture | GPUs | Multi Threaded | MIC | IBM Cell |
|---|---|---|---|---|
| Big MPP | 22.4% | 9.2% | 5.1% | 3.1% |
| Medium MPP | 20.3% | 14.2% | 3.6% | 2.5% |
| Small MPP | 22.8% | 17.4% | 6.0% | 2.7% |

| Program. Model | OpenMP | CUDA | Pthreads | CUDA Fortran | OpenCL | OpenACC | UPC |
|---|---|---|---|---|---|---|---|
| Big MPP | 49.0% | 12.2% | 3.1% | 7.1% | 1.0% | 5.1% | 0.0% |
| Medium MPP | 42.1% | 16.8% | 10.7% | 8.1% | 5.6% | 1.5% | 1.0% |
| Small MPP | 38.3% | 19.5% | 14.1% | 3.4% | 6.7% | 3.4% | 4.7% |

# What additional services or information would you like to have on the NERSC web site? – Sample Responses

> Some sort of disk space explorer for large projectdirs would be great. Would be nice to have a pie chart showing which root directories on my projectdirs are taking up a lot space, then click that root dir to see which subdir is offending. …

> Live status should be updated MUCH more frequently.

> I'd like to see continued development of "interactive" web-based analysis elements, like the new Rstudio service. For example, to quickly plot an output file, I would personally like to be able to do this via the web, rather than having to scp data or remotely using an X11-based graphing program redirected to my local display.

> More technical information on designing parallel applications would be useful -- for instance, what kind of consistency guarantees do the file systems offer, or what kinds of interprocess communication are supported.
> Additionally, workflow management (eg. with Oozie) and web-based management of those workflows could be a useful feature -- SLAC has something similar with its pipeline infrastructure.

# What Does NERSC Do Well – Sample Comments

Support. High marks in many categories, including providing many channels for getting knowledge, providing fast knowledgeable and friendly responses, and providing many channels (email, help desk, phone) for getting in touch with support.

Seriously capable hardware, configured well, administered well, great support, great classes learning about new infrastructure, easy access, great communication with the users. Seriously accommodating.

In 20 years of scientific computing (and I'm only 33) I've been to centers all over the world. I'm currently actively using 5 centers on three continents. NERSC is by far the best, from coaching beginners to data management to uptime to just the overall professional appeal. Keep up the good work!

So far I'm most impressed by the website (excellent beginner documentation) the friendly and helpful attitude of the consultants, and the frequent appearance of improvements.

Manage and run these crazy systems.

I LOVE the broad choice of compilers, rapid response to issues, and excellent documentation. NERSC also does a great job with versioning of software executables and libraries.

I received a letter from the Editor of Physical Review A. They plan to post one of our figures in our recent papers on their webpage. We never had this chance before. NERSC makes a big difference in our research.

# What Else Do You Need? – Sample Comments

| |
|---|
| Training to escape from 1970s/80s/90s modes of running and to enter the world of workflow tools, databases etc. |
| What I need for scaling my science problem is the same architecture as Edison but with 8x the core count. |
| Although not an easy task, I/O disk performance is still the biggest bottleneck users feel in my area. |
| Decrease wait times: 9 |
| More GPUs: 9 |