Exascale and Big Data at NERSC

Abstract:

The National Energy Research Scientific Computing (NERSC) Center is the high-end scientific production computing facility for the U.S. Department of Energy's (DOE) Office of Science (SC). With more than 4,500 users from universities, national laboratories, and industry, NERSC supports the largest and most diverse research community of any computing facility within the DOE complex. NERSC provides large-scale, state-of-the-art computing, storage, and networking for DOE's unclassified research programs in high energy physics, biological and environmental sciences, basic energy sciences, nuclear physics, fusion energy sciences, mathematics, and computational and computer science.

The aggregate computing needs of SC science teams at NERSC are well into the exascale regime by the end of the decade. Science teams need to run simulations at hundreds of petaflops, and they need to run thousands to millions of petascale simulations. NERSC will deploy pre-exascale systems in 2016 (NERSC-8) and 2019 (NERSC-9). We anticipate deploying our first exascale system, NERSC-10, in 2022. We will begin enhancing our data capabilities starting in 2014, and we will deploy data systems, storage, advanced networking, and enhanced user services so that current users and DOE experimental facilities can move and process exabytes of data early in the next decade.

In order to meet the future computing and storage needs of our users, NERSC will be moving to the Computational Research and Theory (CRT) facility in early 2015. CRT will be a highly energy-efficient, state-of-the-art computing facility that can provide over 40 MW of power and 30,000 square feet of space for computing and storage.