STFC Hartree Centre

Advances UK business with high-performance computing on NeXtScale System

Overview

The need

The STFC Hartree Centre needed a powerful, flexible server system with maximum usable density that could drive research in energy efficiency as well as economic impact for its clients.

The solution

The centre deployed NeXtScale System™ nx360 M4, designed with intelligent Intel® Xeon® processors for demanding, large-scale environments, as an extension of its System x® iDataPlex® system.

The benefit

The Hartree Centre will use NeXtScale System to support its anticipated growth from petascale to exascale computing, for sustainable energy use and to help its UK-based clients gain competitive advantage.

The Science and Technology Facilities Council (STFC) is a publicly funded research council based in the United Kingdom, and one of the largest multi-disciplinary research organizations in Europe. The STFC Hartree Centre, located in Daresbury, UK, opened in February 2013. Operating as part of the STFC, the Hartree Centre uses its capabilities for high-performance computing and big-data analysis to provide multi-disciplinary software development, simulation and modeling services to a wide variety of academic, commercial, industrial and government clients in the UK.

Whether large, midsized or small, clients bring real-life design challenges, and the Hartree Centre applies real solutions that may have previously existed principally in academic research. Many involve creating prototypes. Instead of mocking up a new product and testing it in an actual wind tunnel, for example, the center can run an advanced modeling simulation on its high-performance computing equipment. This allows them to complete the simulation in hours, rather than the days required with conventional methods.

As Cliff Brereton, director of the Hartree Centre, explains, “We can do more in simulation and modeling than by traditional methods. And because we’re not creating a physical object, we can actually reduce the cost to the client.”

By combining computing power with reduced energy use, the STFC Hartree Centre expects the NeXtScale System to drive its research in energy efficiency. “We anticipate that the NeXtScale System will give us a number of opportunities to tune software code to be more efficient, run faster and consume less energy,” says Cliff Brereton, director of the STFC Hartree Centre.

Solution components

Hardware

- NeXtScale System™ nx360 M4
- System x® GPFS Storage Server
- Intel® Xeon® processors

Software

- IBM® Platform™ Computing
- IBM General Parallel File System (GPFS™)

Bringing big data and computing together

To provide high-performance computing capabilities for its clients, the Hartree Centre requires advanced compute solutions, massive capacity for big data and broad system flexibility. Five petabytes of disk storage and 15 petabytes of tape storage, underpinned by IBM General Parallel File System (GPFS™) for high-performance file management, make this one of the largest data centers in the UK. As Brereton explains, however: "It's not just a challenge of storing data, but of the information we can get from it—which gives us a more valuable output, and our clients a better product by design."

Cliff Brereton, adds, "One of the key issues is bringing big data and compute together." Working with advanced computational programs at UK universities, the Hartree Centre has positioned itself as a leader in this combination of big-data analytics and high-performance computing.

The center has also taken steps toward addressing related issues of energy use that increasingly accompany high-performance computing. "When we look to move these systems from petascale to exascale, which we expect to reach probably within the next five to eight years, current architectures are no longer sustainable," says Brereton. "We're going to be developing software models that bring down that scaling quite considerably."

Integrating with an existing environment

To support its work in meeting these next-generation needs, the Hartree Centre is an early adopter of NeXtScale System, a member of the System x family designed for applications ranging from technical computing to grid deployments, analytics workloads, large-scale cloud and virtualization infrastructures. The Hartree Centre anticipates that the capabilities provided by the NeXtScale System, with its maximum usable density, will help them to drive research in energy efficiency—as well as for economic impact for its clients.

"One of the key issues is bringing big data and compute together."

—Cliff Brereton, director of the STFC Hartree Centre

Designed for data centers that require high performance but are constrained by floor space, the powerful NeXtScale System server provides a dense, flexible solution with increased performance per server. Accompanying it, NeXtScale n1200 Enclosure provides shared, high-efficiency power and cooling for servers, with scalability to meet business needs.

"The NeXtScale System is an extension of our System x iDataPlex system, with integration that extends the capability we have to introduce new architectures," says Brereton.

Meeting client objectives with flexibility

NeXtScale System architecture is flexible supporting traditional cloud, high-performance cloud computing and traditional high-performance computing. "Our clients and their objectives vary greatly so we need to be flexible," explains Brereton. "One day a client will be working a certain code, and the next day on a completely different code, producing a different product altogether."

The Hartree Centre pairs NeXtScale System with IBM Platform™ Computing middleware and infrastructure management software as a foundation for its cloud computing base, enabling users to remotely access systems and schedule jobs.

The center also expects the NeXtScale System design that combines computing power with reduced energy use to help meet its goals for reducing client—and UK—energy use. "We think NeXtScale System will give us a number of opportunities to tune current software codes to this platform and make them more efficient, run faster and consume less energy," Brereton explains. Platform Computing software further enables the center to load jobs onto the system in the most energy-efficient way.

The Hartree Centre expects to move with confidence to the next level of energy efficiency and high-performance computing.

For more information

To learn more about System x contact your Business Partner or visit: **lenovo.com**/systems

For more information about the STFC Hartree Centre, visit: www.stfc.ac.uk/hartree, or follow them on Twitter @HartreeCentre

IBM x86 products are now products of Lenovo in the U.S. and other countries. Learn more at **ibm.com**/lenovo-acquisition

Please Recycle

LYC03167-USEN-00