SOLUTION BRIEF
Intel® Server Solutions

Innovative Supercomputing Cluster Design Powers Critical U.S. Infrastructure and Research

Powerful, Next-Generation Cluster Deployment

High performance computing (HPC) is used to solve some of the most complex questions of our day. By using powerful new supercomputers, scientists and engineers can conduct research, simulate designs and model data while quickening the pace of innovation and discovery.

Cray and Intel provide the cutting-edge technology and integrated solutions, making it possible for government and private organizations to tackle difficult problems head on.

U.S. National Laboratories Infrastructure

The U.S. Department of Energy's National Nuclear Security Administration (NNSA) relies on the most innovative, high performance computing for its Advanced Simulation and Computing (ASC) program.

The NNSA funded a contract for approximately $89 million to bolster computing for an ASC stockpile stewardship program at its three national security laboratories, known as the Tri-Lab community: Lawrence Livermore (LLNL), Los Alamos (LANL) and Sandia (SNL). The stockpile stewardship program ensures the safety, security and reliability of the nation's nuclear weapons – without resorting to full-scale underground testing.

The implementation of the Tri-Lab Linux Capacity Cluster Program (TLCC2) simplified the integration and deployment of multiple Linux clusters, and put the needed capacity clusters into production on an accelerated timeline. In addition, it reduced costs through economies of scale, using standardized hardware and software environments at the three labs.

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The entire deployment delivered six petaflops of computing capacity to perform extremely high numbers of technical calculations.

"These computing clusters provide needed computing capacity for NNSA's day-to-day work managing the nation's nuclear deterrent. This Tri-Lab effort helps reduce costs, increase operational efficiencies, and facilitate collaborations that benefit our nation's security, support academia, and promote American competitiveness." says Don Cook, NNSA Deputy Administrator for Defense Programs.

San Diego Supercomputer Center – Data Intensive Cluster Computing

In 2010, the San Diego Supercomputer Center (SDSC) at the University of California, San Diego received a $20 million grant from the National Science Foundation for a new supercomputer for data-intensive applications. The system, named Gordon, enables research and analysis in subjects such as personal genomics to tailor treatments for individual patients; models to improve prediction, such as the impact of earthquakes on buildings; and environmental simulations.

Gordon consists of 1,024 compute nodes and 64 I/O nodes. The compute nodes use dual socket Intel® server boards and Intel® Xeon® E5 processors featuring Intel® Advanced Vector Extensions (AVX) to achieve eight floating point operations/clock cycles. This feature alone provides twice the performance on numerically intensive applications than current processors of the same core count and frequency.

"This SDSC supercomputer is designed to support the needs of a wide range of academic and industrial researchers who require fast, interactive methods to manipulate large volumes of structured and unstructured data," says SDSC director Michael Norman. "Gordon has become a key part of a network of next-generation, high performance computers and is available to the research community through XSEDE, the National Science Foundation's next-generation program for an open access national computing grid."

About Cray the CS300-AC™ Cluster Supercomputer

The Cray CS300-AC™ cluster supercomputer takes advantage of industry-leading technology from Intel that provides the computational power and efficiency needed to solve the most complex computing problems. It is built for HPC applications and optimized for data-intensive and communications-intensive system configurations.

The Cray GreenBlade™ building block server platform is designed specifi cally for the Cray CS300-AC system. This dual socket Intel® Xeon® E5 processor platform features the Intel® Server Board with 1600Mhz of dual in-line memory modules (DIMMs) for maximum memory bandwidth, and advanced hot swap and storage interface options.

Customers can choose from two Cray GreenBlade system form factors: 5U and 8U. The Cray GreenBlade platforms offer support for hybrid server node configurations based on Intel Xeon processors and Intel® Xeon Phi™ coprocessors, providing a modular and flexible architecture that gives customers affordable and easy-to-deploy mix and match compute blade options with integrated console management capabilities. The Cray GreenBlade system's unique design also decreases power consumption per node compared to 1U servers with the use of its platinum-rated power supplies and high-efficiency fans, significantly reducing datacenter energy costs.

Learn more about how Intel and Cray can help solve your supercomputing needs by visiting our web sites.

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