

Red Storm System Raises Bar on Supercomputer Scalability

Sandia National Laboratories and Cray Collaborate

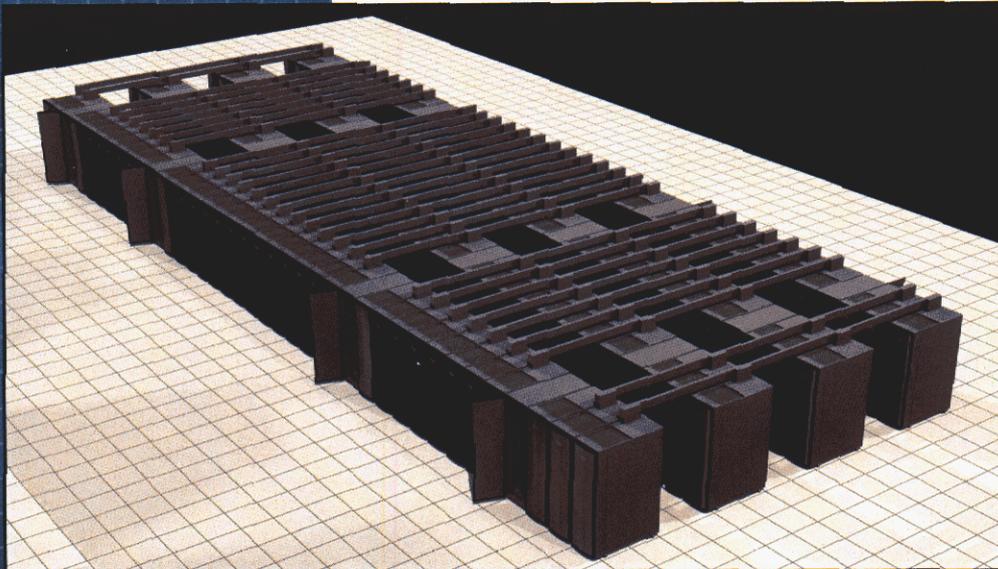
Commissioned by the U.S. Department of Energy and National Nuclear Security Administration to address computing and simulation requirements, Cray and Sandia National Laboratories jointly produced the Red Storm supercomputer system. Red Storm is a massively parallel processing (MPP) supercomputer with distributed memory, multiple instruction, and multiple data (MIMD) architecture to provide exceptional computational power. Not

only one of the world's fastest supercomputers, it offers ease of use, system balance, sustained performance, and reliability.

Unique Architecture

Red Storm can scale from a single cabinet to hundreds of cabinets—ranging up to tens of thousands of processors. The system combines

- High-volume commodity processors



Artist's conception of the Red Storm Supercomputer at Sandia National Laboratories, Albuquerque, New Mexico

- A very high-performance, 3D-mesh interconnect system
- Carefully engineered software to produce high-parallel efficiency on a wide variety of scientific and engineering applications.

Red Storm leverages knowledge gained from years of supercomputing experience with successful systems, such as the ASCI Red and the Cray T3E™ supercomputers.

Performance Goals

In addition to meeting system scalability, reliability, and resiliency requirements, one of Red Storm's main goals is achieving performance balance among the

- Processor speed
- Amount of memory
- Bandwidth to and from memory
- Communications bandwidth between processors
- System bandwidth
- Aggregate I/O bandwidth



Key features

Red Storm system balance includes the following features

- Highly scalable system software that scales up with the hardware
- 40 TeraOps (at two operations per cycle), able to reach 180 TeraOps with expansion and upgrades
- Minimum aggregate system memory bandwidth of 55 TB/s
- High-speed, high-bandwidth, 3D, mesh-based Cray interconnect with minimum sustained aggregate interconnect bandwidth of 100 TB/s
- The ability to run full-system applications for a minimum of 50 hours without failures
- Flexible partitioning for classified and unclassified computing
- High-performance I/O subsystem (minimum sustained file system bandwidth of 100 GB/s to 240 TB of parallel disk storage and sustained external network bandwidth of 50 GB/s).

New Red Storm Facility

The Super Computer Annex (SCA) facility supports the Red Storm system. The 135 ft. x 150 ft. (20,250 sq. ft.) computer room has a clear span of 150 ft. and is designed to allow for expansion to meet future requirements. The computer floor consists of a 36 in. raised floor, providing a large cooling air supply plenum to support the system.

The facility has 3.5 MW of available power via 24 installed 150 KW power-distribution units and two 1,000-ton chillers with up to 40 air handlers for system cooling. The SCA can support doubling both the power and chiller capacity for future expansion.

For more information on the Red Storm System at Sandia National Laboratories, please contact Bill Camp, wjcamp@sandia.gov, 505-845-7655 or Jim Tomkins, jltomki@sandia.gov, 505-845-7249.

For more information from Cray Inc. please contact Jeff Brooks, jpb@cray.com, 651-605-9172

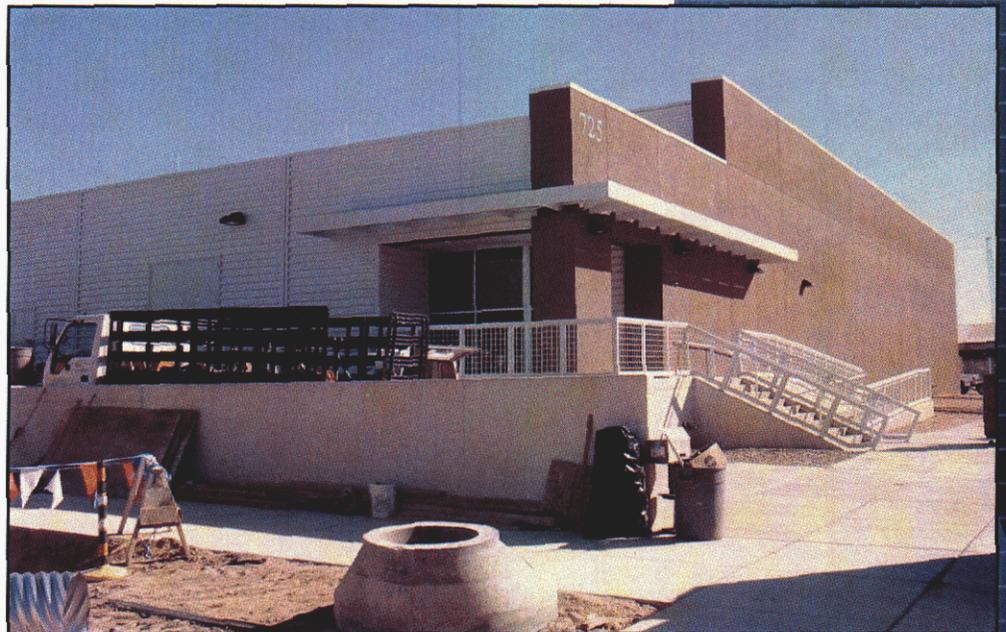


TL0165926

SANDIA NATIONAL
LABORATORIES
TECHNICAL LIBRARY

Sandia is a
States Department of Energy, & National Nuclear Security Administration

Corporation, a Lockheed Martin Company, for the United States Department of Energy, & National Nuclear Security Administration under contract DE-AC04-94AL85000.



*Future home of Red Storm
under construction*