

Capability

High Performance Computing

Research Capabilities:

- Design, management, and optimization of scalable, global, parallel storage and infrastructure
 - Management of data storage with multiple, massively parallel clusters that use a single data storage system and multiple switches
- Throughput optimization
 - Checkpointing
 - File system bandwidth
 - Mean time to interrupt
- Networks and interconnects
- Systems integration
 - Streaming processing
- Parallel hardware assisted image compositing
- Visualization
 - Interactive immersive environments: RAVE, CAVE, Power Wall
 - Real-time techniques
 - Human-computer interactions in real time
 - Visualization on hybrid systems

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Summary:

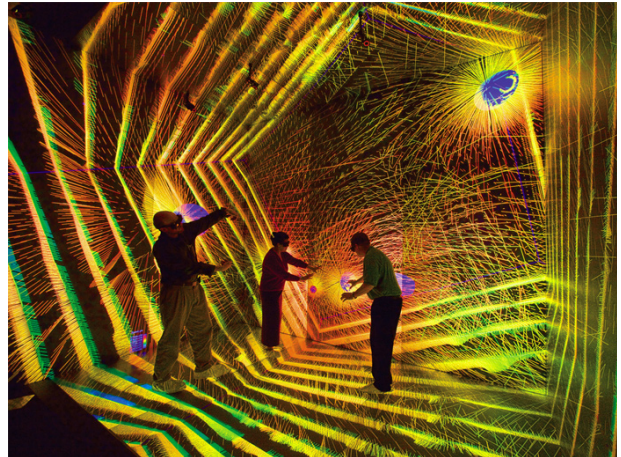
Los Alamos National Laboratory has been a leader in high performance massively parallel computing since the birth of supercomputing in the 1970s. With the world's largest supercomputer, "Roadrunner," under development, Los Alamos will usher in the petaFLOP computing era.

The Laboratory's new Roadrunner supercomputer will be designed to sustain 1-petaFLOP. The magnitude of Roadrunner has introduced new complexities into the world of supercomputing and introduced new areas of research.

Status:

Los Alamos is seeking collaborators on the management and programming of hybrid architecture machines. We are also currently seeking research partners in the academic, government, and commercial sectors to collaborate on streaming-oriented projects in the following areas:

- Active storage/active disk
 - Processing data on the fly while it is being stored
 - Mine data as it is stored
 - On the fly mining and indexing
 - Scalable query and mining on query
- Processing data with correlated streams
 - Process, analyze and/or mine data as it is transferred on the networks
 - Scalable and on the fly correlation of data for numerous sensors
- Multidimensional hashed indexing/storage
 - Multidimensional Index/metadata system integrated inside a parallel file system
 - Parallel indexing during parallel data ingest
- Visualization and analysis of streaming data



The CAVE is a five-surface (left, front, right walls with floor and ceiling) display with 33 projectors lighting 43 million pixels in a 15 x 12 x 10-ft display area where researchers can work in a 3-D environment.



The Roadrunner Project: www.lanl.gov/orgs/hpc/roadrunner

www.lanl.gov/partnerships

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