

# *STAMPEDE* Fact Sheet



*“We at NSF are gratified to fund such a powerful combination of system and services for open science research. The technological capacity is important; but even more important is that the scientific community - those on the front lines of cutting edge research on a number of multi-disciplinary areas critical to addressing society’s greatest challenges - have open access in order to push the frontiers of science and engineering.”*

*- Irene Qualters, NSF Program Manager*

In January 2013, the Texas Advanced Computing Center (TACC) at The University of Texas at Austin will launch *Stampede*, a world-class supercomputer with comprehensive simulation and data analysis capabilities, as part of the National Science Foundation (NSF) XSEDE (Extreme Science Engineering and Discovery Environment) grant.

The new system, built by TACC in partnership with Dell and Intel, will be the most powerful system in the NSF XSEDE program, and will support the nation’s scientists in addressing the most challenging scientific and engineering problems. Stampede will have a peak performance of more than 2 petaflops from the base cluster of Intel Xeon® E5 processors and more than 7 petaflops from the Intel® Xeon® Phi™ coprocessors.

## **Base Cluster:**

- 6400 Dell PowerEdge C8220X “Zeus” servers, each of which contains dual 8-core Intel® Xeon® E5-2680 processors and 32 gigabytes of memory.
- More than 2 petaflops of performance using the Intel® Xeon® processors.

## **Innovative Capabilities:**

- The cluster will also include a special pre-release shipment of several thousand Intel® Xeon® Phi™ coprocessors SE10P connected to the compute nodes.
- The Intel coprocessors will use the x86 instruction set and are designed to process highly parallel workloads.
- The Xeon Phi coprocessors will provide more than 7 petaflops of additional performance.
- Future generations of Intel coprocessors will be added when they become available and are expected to increase Stampede’s aggregate peak performance to at least 15 petaflops.





*Massive upgrades in computing power make a significant difference in a researcher's ability to model and simulate complex physical phenomenon. Leading scientists will use Stampede to advance research in all areas of inquiry, including isolating new drug compounds, forecasting the impact of global climate change, and modeling the mantle of the Earth. Stampede will concurrently and continuously run dozens of such projects.*

### Visualization and Data Analysis:

- Stampede will offer 128 next-generation NVIDIA graphics processing units (GPUs) for remote visualization.
- 16 Dell servers with 1 terabyte of shared memory and 2 GPUs each for large data analysis.
- Multiple high-performance Lustre file systems for data-intensive computing.



### System Integration:

- All components – compute nodes, visualization nodes, large shared memory nodes, and file system – will be integrated with an FDR 56 Gb/s InfiniBand network for extreme scalability.

### Additional Stampede Specifications and Requirements:

Number of Racks	182
Weight	500,000 lbs
Data Center Utilization	11,000-square-feet
Power	5 megawatts
Power Density	40KW per cabinet
Cables	75 miles of network cables
Peak Performance	Approaching 10 petaflops (10 quadrillion mathematical calculations per second)
Memory	Over 270 terabytes of RAM
Disk Storage	14 petabytes

### Project Partners:

The four year operational project will include TACC, Dell, Intel, and a team of cyberinfrastructure experts at The University of Texas at Austin, Clemson University, University of Colorado at Boulder, Cornell University, Indiana University, Ohio State University, and The University of Texas at El Paso.

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