

NCCS Snapshot

The Week of May 12, 2008

NATIONAL CENTER
FOR COMPUTATIONAL SCIENCES



Oak Ridge National Laboratory
U.S. Department of Energy

Jaguar Upgrade Brings ORNL Closer to Petascale Computing

The Jaguar XT4

- Upgrades to ORNL's Jaguar supercomputer have more than doubled its performance
- The system completed acceptance testing on May 13, running applications in multiple areas such as climate science and astrophysics
- The Jaguar system, a Cray XT4 located at the NCCS, now uses more than 31,000 processing cores to deliver up to 263 trillion calculations a second (or 263 teraflops)

"The Department of Energy's Leadership Computing Facility is putting unprecedented computing power in the hands of leading scientists to enable the next breakthroughs in science and technology."

Thom Mason, ORNL Director

NCCS supercomputer doubles peak performance

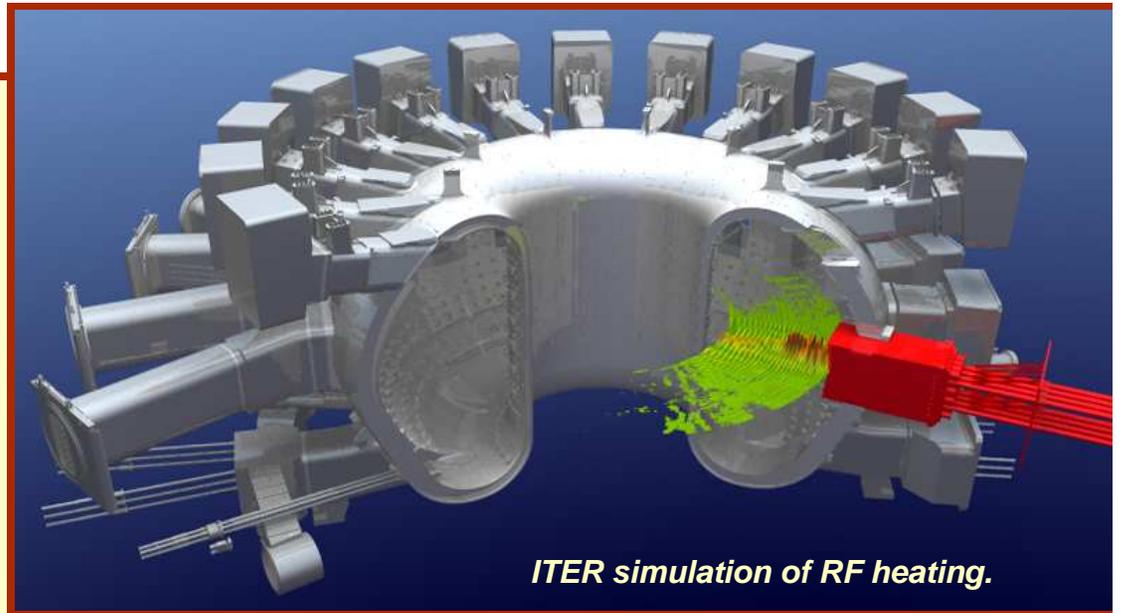
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Radio Waves Will Make Reactor Hotter Than the Sun

- A fusion research team led by Fred Jaeger and Lee Berry of ORNL achieved a performance of more than 152 teraflops on the Cray XT4 Jaguar supercomputer at the NCCS
- Jaeger's simulations will contribute to understanding how to make the most of the wave power in both heating and controlling the plasma, or fuel, to be used in ITER, an experimental fusion reactor expected to go online in 2016



ITER simulation of RF heating.

"We need to know which types of waves are present because different waves can interact differently with the plasma."

Fred Jaeger, ORNL researcher

Simulation provides insight into fusion power possibilities

Cray/ORNL Collaboration Strengthens Science

*Center of Excellence
optimizes codes, libraries*



- Cray, Inc. has established a Center of Excellence (COE) on the ORNL campus to help researchers optimize their codes to the Cray architecture
- Headed by John Levesque, the COE has helped increase the performance of AORSA, GTC, and POP to name a few, and is currently optimizing S3D for the upcoming quad-core implementation
- COE also provides workshops to users, such as the upcoming 3-day workshop for Office of Science and NSF users who will be using the system at ORNL

“This close interaction between Cray and Oak Ridge has been so successful.”

John Levesque, COE Director

NCCS Hosts Series of Workshops

Users Meeting, Cray, Lustre on agenda

- The NCCS recently hosted a series of workshops aimed at informing the wider HPC community
- A total of three workshops, held at ORNL, were hosted in mid-April, beginning with the NCCS Cray XT workshop on April 14–16, followed by the Lustre file system workshop, held April 16
- Closing out the series was the Users Meeting on April 17–18, where researchers gathered with NCCS staff and vendors to discuss challenges and solutions in areas such as porting and scaling of applications on the systems

“These workshops are very helpful for the researchers. By helping them profile their applications, we can immediately identify and often actually fix the problems before the end of the workshop.”

John Levesque, CRAY COE Director



Poster session at the 2008 NCCS Users Meeting.

R.I.P. Cheetah

- A former ORNL supercomputing heavyweight, an IBM Power4 system dubbed Cheetah, has recently been retired
- Cheetah is perhaps best known for providing 40% of the cycles for the U.S. contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, which in 2008 shared the Nobel Peace Prize with former Vice President Al Gore



- Ranked as the eighth fastest computer in the world in 2002, Cheetah had a peak performance of almost 4.5 teraflops

“Cheetah came in as an extremely stable, well-tested system. Almost from day one, we were doing productive science.”

John Drake, ORNL computational scientist

ORNL supercomputer has left the building