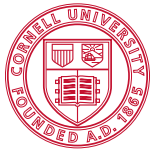




Case Study
High-Performance Computing
Quad-Core Intel® Xeon® processor 7300 series
 Science



“With the Quad-Core Intel® Xeon® processor 7300 series, we have at least four times the processing capability of our previous servers in half the floor space. Our researchers can get more work done, and we have space for future growth.”

Janet Heslop,
 IT Associate Director,
 Cornell Institute for Social and Economic Research,
 Cornell University

Quad-Core Processors Pass the Test at Cornell

The Cornell Institute for Social and Economic Research (CISER) chooses Quad-Core Intel® Xeon® processors to power its worldwide research program

Scientists use the high-performance computing facilities at the Cornell Institute for Social and Economic Research (CISER) to find answers to many of society's most compelling challenges, from disaster recovery to food safety. Some of the research requires analyzing very large data sets—as much as 75 GB of data for a single project. In addition, Cornell scientists conducting field studies often access the facilities remotely from around the world to load data and run their applications.

With dozens of research projects sharing the CISER computing resources, and with research growing ever more complex and compute-intensive, the CISER IT team obtained funding to upgrade to new, more powerful servers. However, the increased processing capacity needed to fit within the existing data center space and electrical power envelope. The new servers would also have to meet the institute's constantly growing research needs for several years.

Faster Research Processing

Before selecting new servers, the IT team needed to know which type of server processors—dual-core or quad-core—would provide faster processing for its specific types of research. Using a scientific application with demanding CPU requirements, the team compared three servers: a legacy server with two single-core processors; a four-socket server with dual-core multithreaded processors, and a four-socket Dell PowerEdge* R900 server with the Quad-Core Intel® Xeon® processor 7300 series.

“It took more than three hours to run the test program on the legacy server,” says Janet Heslop, IT associate director at CISER. “The dual-core server took 2 hours and 16 minutes. And the PowerEdge R900 server with Quad-Core Intel processors took only a little over an hour. The Quad-Core Intel Xeon processor 7300 series outperformed the multithreaded dual-core processors by an impressive margin, running the test in half the time.”

Measures of Success

- CISER needed to increase processing capabilities to keep up with the demands of leading-edge social and economic research, and to allow more scientists to work concurrently.
- The CISER IT staff conducted a proof-of-concept test to measure server processing capabilities.
- New servers based on the Quad-Core Intel Xeon processor 7300 series enable CISER to increase processing capacity while staying within the space, power, and cooling constraints of the data center facility.

The Intel® processors provide 16 cores per server for close to 30,000 MHz of processing power

More Capacity in Less Space

CISER has consolidated eight physical servers down to four since upgrading to Quad-Core Intel processors. At the same time, the IT team doubled the number of processing cores available for research. "With the Quad-Core Intel Xeon processor 7300 series, we have at least four times the processing capacity of our previous servers in half the floor space," says Heslop. "Our researchers can get more work done, and we have space for future growth."

Increased Energy Efficiency, Less Heat

The move to Quad-Core Intel processors also improved the energy efficiency of the CISER servers. "We're staying within our power and cooling envelope while getting a lot more performance per watt," says Heslop. "In fact, the temperature in the data center actually went down when we turned on the new servers."

Enabling More Advanced Research

The new Quad-Core Intel processor-based servers are enabling more advanced research. "Cornell scientists can run research in less time with our new servers, and use larger data sets that yield more precise results," says Heslop. "That helps attract top researchers to our facility and makes it easier for them to obtain funding grants for advanced work."

Return on Investment

- Dell PowerEdge® R900 servers with the Quad-Core Intel® Xeon® processor 7300 series provide four times the processing capability of CISER's previous servers
- The Intel Xeon processors allow the CISER team to consolidate eight servers down to four, reducing data center real estate requirements
- The energy-efficient Intel Xeon processors deliver more performance per watt than the previous servers, allowing CISER to stay within data center power and cooling constraints
- CISER's new Intel technology-based servers enable advanced research with larger data sets, helping to attract top scientific talent and research grants



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