CASE STUDY

Intel® Xeon® Processor E5 and E7 Families

Manufacturing
High-Performance Computing

Accelerating the pace of enhanced crop development

BASF Plant Science refreshes R&D computing resources with Intel® Xeon® processor E5 and E7 families, resulting in a faster and more flexible infrastructure

BASF Plant Sciences - a BASF group company - is one of the world's leading providers of innovative plant biotechnology solutions for agriculture. It has developed an unparalleled gene discovery platform focusing on yield and quality traits in crops such as corn, soybean and rice. The global plant biotechnology market segment is highly competitive, and BASF Plant Science relies on the output of its research and development (R&D) to ensure its offering remains up-to-date. With this in mind, it recently updated the computing resources available to its researchers with the Intel® Xeon® processor E5 and E7 families, running on Cisco Unified Computing System* (Cisco UCS*) blade servers. Internal benchmarking tests supported by Intel comparing the time it took different processor configurations to complete basic local alignment search tool (BLAST) commands, indicated that the new processing hardware could perform these processes 1.6 times faster than the previous infrastructure. The new hardware also supports a wider range of applications, helping BASF Plant Science accelerate its research efforts and will eventually reduce time-to-market for new products.

In cooperation with BASF:

BASF
The Chemical Company

"The enhanced performance we have seen with the Intel® Xeon® processor E5 and E7 families has helped us accelerate the pace of the research that feeds into our product development while minimizing the cost of running our IT resources."

Frank-Michael Spangenberg
Global IS Operations,
BASF Plant Science Company GmbH

CHALLENGES

- **Maintaining lead:** With commercial success depending on its research output, BASF Plant Science must ensure its bioinformatics tools can deliver up-to-date performance
- **Hardware refresh:** Its existing computing resources had been in place for several years and needed replacing with newer, higher-performing technology
- **Operating efficiency:** BASF Plant Science was also interested in taking advantage of the lower energy consumption of newer processors to make its operations more efficient

SOLUTIONS

- **Performance enhancement:** After initial tests, BASF Plant Science decided to base its new infrastructure on the Intel Xeon processor E5 and E7 families after determining they offered a cost-effective way to improve its processing resources
- **Server deployment:** It deployed the Intel Xeon processor E5 family in 21 Cisco UCS B230 blade servers and Intel Xeon processor E7 family in four Cisco UCS B440 blade servers

TECHNOLOGY RESULTS

- **Faster computing:** Compared to its old technology, the new processing infrastructure can run BLAST queries 1.6 times faster, based on BASF Plant Science's internal benchmarking
- **Greater range:** The new hardware is also compatible with more applications as a result of greater memory availability compared to the processors in the previous deployment, potentially extending the tools available to researchers
- **Energy savings:** The improved energy performance of the Intel Xeon processor E5 and E7 families means the company's research computing resources consume less power than before

BUSINESS VALUE

- **Faster insights:** By improving the speed at which its computing resources can support researchers, BASF Plant Science has been able to increase the pace of innovation
- **Commercial advantage:** This supports its strategy of acting as a Trait Technology Partner for seed companies by allowing more efficient research activities. Higher processing power speeds the development of agricultural products with leading seed industry partners
- **Operational savings:** The superior energy performance of the new hardware will help BASF Plant Science reduce the cost of supporting its research IT per year

Using technology to maintain commercial advantage

In the global biotechnology industry, there is a strong link between the technology available to an organization and its commercial success. The insights researchers gain into the source of potentially beneficial genetic traits using bioinformatics tools, such as BLAST, feed directly into the development of new seed traits for commercialization.

BASF Plant Science improves the processing performance of BLAST tools while enhancing energy performance

As one of the world's leading players in the field of genetically-enhanced plant crops, BASF Plant Science understands the relationship between the performance of the IT resources available to its researchers and the success of its offering. To ensure its R&D processes can continue to support product development, it regularly refreshes the high-performance computing resources available to researchers.

Until recently, BASF Plant Science relied on a system based on older Intel® Xeon processors, offering a total of 496 processing cores. Since it was a few years old, the company wanted to see if newer processing technology could better support its research processes.

Evaluating new technology

As part of its long-standing relationship with Intel, BASF Plant Science receives regular updates on developments in the company's processor line-up. To assess how the latest technology could help enhance its research resources, BASF Plant Science, with collaboration from Intel, conducted internal benchmarking tests measuring the performance of a range of current Intel Xeon processor E5 and E7 families when running BLAST processes to determine the processing, memory, data handling and energy performance improvements they offered. As part of the tests, they also recorded the performance of the same processes when running on BASF Plant Science's existing hardware, to enable a comparison.

The results of the company's performance tests indicated that replacing existing processor technology with a similar-sized deployment based on new Intel® processors could increase the processing performance of the servers powering its BLAST tools by a factor of 1.6 and lead to a 30 to 40 percent increase in data throughput for applications. In particular, BASF Plant Science noted the increased performance of a single processor node occupying two sockets based on the newer technology, compared to that of its existing processor nodes that required four sockets. This offered better power efficiency by halving the power draw for each node.

After successful trials, BASF Plant Science decided on a total refresh of its data center hardware. It sent out a request for proposal (RFP) to hardware vendors specifying a solution based on the Intel Xeon processor E5 and E7 families.

Following this, BASF Plant Science chose to deploy a total of 21 Cisco UCS B230 blade servers powered by the Intel Xeon processor E5 family, along with four Cisco UCS B440 blade servers based on the Intel Xeon processor E7 family.

Enhanced research

Since deploying the new hardware, BASF Plant Science's researchers have cut processing time for the BLAST searches they rely on for their research. With the new Intel Xeon processor E5 and E7 families, its system can potentially run BLAST 1.6 times faster than on the previous architecture, making the outcome of genetic studies faster than before.

The continuity between the new processors and the previous Intel® architecture-based solution has meant that there was no need for BASF Plant Science to modify its research software to ensure compatibility with the new hardware. With researchers relying on a variety of applications running within the Metalife* framework, this has avoided the need to deploy additional resources to update its software tools.

The greater memory-handling capacity of the Intel Xeon processors E5 and E7 families and Cisco* blade servers also opens up the potential for BASF Plant Science researchers to add new applications to their toolkit that could not previously be run on the old technology.

Lessons learned

By upgrading its data center hardware with Intel Xeon processor E5 and E7 families, BASF Plant Science was able to upgrade the performance of its technical resources while maintaining a consistent operating environment for its bioinformatics applications. Internal benchmarking tests comparing the performance of BLAST workloads on the new processors indicated that with the same number of processor cores as before, BASF Plant Science could double processing performance and raise data throughput for its applications by 30 to 40 percent while reducing hardware energy consumption.

The new server hardware delivers more efficient performance and more raw processing power. Socket by socket, the new processors provide a three-fold rise in performance while consuming less power overall, based on the results of the comparative internal benchmarking tests conducted earlier. This has enabled BASF Plant Science to reduce the running costs of its research resources and improve its environmental performance.

More agile product development

Improved BLAST application performance with the new hardware means that researchers at BASF Plant Science are better supported in their efforts to identify beneficial traits that provide the basis for developing new crop products.

Faster access to this technical information paves the way for improved research processes that can eventually speed up final product development for BASF Plant Science and its partners. This will help the company keep its competitive edge in the global plant biotechnology solutions sector by supporting the highly efficient development of improved products that can be commercialized.

Find the solution that's right for your organization. Contact your Intel representative, visit Intel's Business Success Stories for IT Managers (**www.intel.co.uk/Itcasestudies**) or explore the Intel.co.uk IT Center (**www.intel.co.uk/itcenter**).

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