

Unleashing the power of high-performance technical computing

Learn how organizations in research, manufacturing, life sciences, financial services and banking are using IBM solutions to improve business results



1

Introduction

2

Research

- Hartree Centre
- University of East Anglia

3

Manufacturing

- Swift Engineering
- Red Bull Racing

4

Life Sciences

- A*CRC
- Wellcome Trust
Sanger Institute

5

FSS/Banking

- International Financial
Services Company
 - Major Wall Street Firm
-

Introduction



Pushing the boundaries

High-performance technical computing continues to transform the capabilities of organizations across a range of industries—helping them to tackle unprecedented big data analysis, generate competitive business advantage, and expand the limits of science and medicine.

To keep pushing those boundaries, organizations are continually seeking ways to get more out of their technical computing systems. Faced with limited resources, many are looking to better manage tasks and avoid the need to continually purchase new systems as demand increases. Others want to reduce compute times, free up capacity or increase energy efficiency to cut costs and meet sustainability goals.

The following examples show how organizations around the world are using IBM® Platform Computing™ solutions to achieve those objectives and more. Whether it's the Human Genome Project or aerodynamics testing for race cars, these stories demonstrate exciting and effective ways to unleash the power of high-performance technical computing.

2 Hartree Centre

3 University of East Anglia

4 Swift Engineering

5 Red Bull Racing

6 A*CRC

7 Wellcome Trust Sanger Institute

8 International Financial Services

9 Major Wall Street Firm

“For businesses to embrace HPC technology, it needs to be relatively easy to use. The combination of IBM System x iDataPlex and IBM Platform HPC software makes this a reality.”

Hartree Centre

Professor John Bancroft, Project Director at the Hartree Centre

Sharing the benefits

The general-purpose and Big Data cluster at the Hartree Centre has been named Blue Wonder—a homage to both the scientific breakthroughs it will help to achieve, and to Lewis Carroll, the author of *Alice in Wonderland*, who was born in Daresbury. As a platform for Blue Wonder, the Hartree Centre selected an IBM® System x® iDataPlex® dx360 M4 architecture. The cluster is composed of 512 computing nodes, each of which has a minimum of 32 GB of memory and dual eight-core Intel Xeon processors E5-2670. The entire Blue Wonder system is managed using IBM Platform™ HPC, which provides all necessary functions to effectively deploy, manage and support a complex high-performance computing environment. From within the Platform HPC

software, the Hartree Centre can use vSMP software from ScaleMP to dynamically pool processing resources and memory from selected nodes into a single virtual resource pool. With the vSMP software running on 384 of the iDataPlex nodes, this means that a single application could theoretically harness up to 6,144 cores and

48 TB of memory—enabling enormous databases to be loaded into memory and subjected to sophisticated analysis.

Results

- Provides an easy entry point for high-performance computing for UK organisations of all sizes
- Supports the development of business applications capable of taking advantage of HPC architectures
- Complies with “Green IT” objectives and saves on electricity costs with energy-efficient design and energy-aware scheduling of tasks



[Download PDF](#)



University of East Anglia

Extending HPC beyond the sciences

With the dual needs of environmentally friendly, power-efficient computing and the desire to embrace new users across the university in mind, UEA embarked on a project to upgrade its high-performance computing (HPC) resources. UEA more than doubled its HPC core capacity from 900 to more than 2,000 cores to meet its needs. According to Chris Collins, Head of Research and Specialist Computing Support at UEA, the university needed a system that provided more intelligence and features than the previous solutions it already had in place. Key to the decision process to implement IBM® Platform™ HPC management software was the ability to provide a complete solution that offered advanced cluster management and scheduling while



“We don’t have to do as much work when releasing a new application or do as much new coding. Platform’s software was a clear leader from the beginning of the process.”

Chris Collins,
Head of Research and
Specialist Computing Support,
UEA

also lowering the administration burden on the IT department to allow administrators more face time with users to assist them with problems when necessary.

Results

- Compute power increased from 9 to 21.5 teraflops
- Grew cluster size from 900 to more than 2,000 cores
- System hardware now running 20 to 40 percent faster
- Cut power consumption rates and costs

[Download PDF](#)



Swift Engineering



“We wanted a solution where we spent more time solving complex problems than administering the system.”

Dr. John F. Winkler,
Chief Aerodynamicist,
Swift Engineering

Increasing competitive advantage

Maintaining global leadership in design and manufacturing requires Swift to find competitive advantages wherever possible. Two of the key areas of the design cycle that are critical for achieving an advantage are testing and simulation. These are time-intensive processes with each new idea or part requiring a scale prototype and wind tunnel testing. According to Chris Norris, Swift’s Chief Engineer, “The problem is whenever you come up with a new idea or a concept you have to make a part to test on the wind tunnel model. Finding ways to reduce the cycle and expedite testing through computer simulation reduces the time-to-market. IBM® Platform™ HPC is

the ideal solution for Swift to accomplish this. The management software enables Swift to solve bigger problems with more enhanced graphics at real-time speed. Vast amounts of data can be processed 50 times faster.”

Results

- Speed to results—50 times faster
- Solve problems 15 times larger
- Enables more projects with greater efficiency
- HPCWire Award Winner for Best use of HPC application in Automotive 2010

[Download PDF](#)



Red Bull Racing



“The Platform Computing partnership goes from strength to strength year on year.”

Nathan Sykes,
CFD Team Leader,
Red Bull Technology

IBM Platform Computing technology helps make cars go faster

“Our team is always looking for innovation partnerships with companies who can bring to us contemporary and exciting new technologies that ultimately help us to make the car go faster,” says Steve Nevey, Business Development Manager, Red Bull Technology. “Our HPC system is being used for various types of simulation, primarily for aerodynamic simulation with computational fluid dynamics (CFD). We’d known about IBM® Platform™ LSF®, but it wasn’t until our HPC cluster started to really expand that it became obvious that we needed a tool like this. Platform LSF enables us to schedule some of the big analysis computation so that our engineers don’t have to wait around for

an analysis to finish before starting another. They can also run analyses in parallel with each other. The Platform LSF environment has allowed us to increase the number of virtual engineering simulations needed to build the fastest and most aerodynamically efficient car possible.”

Results

- More than 20 percent increase in performance and throughput
- Reporting tools keep senior executives updated on progress
- Ability to optimize license scheduling means priority jobs can always run without needing to over-provision licenses

[Download PDF](#)



“Platform LSF was the perfect fit for our user community. Not only did it make it incredibly easy to move and schedule jobs, but it also meant that we could very quickly increase the utilization of new resources as and when they were needed. This could be up to as much as 100 percent in just five or six weeks.”

Dr. Marek Michalewicz, Director of Computational Research Centre, A*CRC

A*CRC

Approaching 100 percent utilization

With IBM® Platform™ LSF® acting as the single unifying workload scheduler across its computing platforms, A*CRC very rapidly saw an increase in terms of resource utilization. “Platform LSF was the perfect fit for our user community,” continues Dr. Marek Michalewicz. “Not only did it make it incredibly easy to move and schedule jobs, but it also meant that we could very quickly increase the utilization of new resources as and when they were needed. This could be up to as much as 100 percent in just five or six weeks.” With Platform LSF, Dr. Michalewicz and his team were able to ensure that the right

resources were allocated to the right users for maximum efficiency. Similarly, simplified job submission equated to a significant reduction in setup time and far fewer operation errors, meaning less time spent on administration, more on research.

Results

- Platform LSF enabled A*CRC’s systems to maximize compute resources and reach 100 percent utilization.
- A*CRC was able to run a single workload scheduler across its entire computing platform, making it easier for users to schedule jobs and move them between machines, addressing user discontent.



[Download PDF](#)



Wellcome Trust Sanger Institute

Accelerating genomic research

The Sanger Institute was a key player in the Human Genome Project, delivering almost one-third of the work involved. Since the mid-1990s, IBM® Platform™ LSF® has improved workload management, researchers' efficiency and time-to-results for the Human Genome Project by allowing the Institute to run up to half a million sequence matching jobs a day. "The Human Genome Project used enormous, scalable compute power to market the data available throughout the project. The Project was as much an exercise in IT and systems needs as in lab science," says Phil Butcher, Head of IT at the Sanger Institute. According to Butcher, the Institute was able to finish sequencing



"The genomics industry as a whole has realized that what we need to do would be ludicrously expensive without cluster computing."

Tim Cutts,
Platform LSF Administrator,
Sanger Institute

the human genome two years ahead of schedule partly because of the investments in flexible systems and software.

Results

- Researchers can make rapid advances in science by quickly comparing similar genomic structures
- Ability to perform massive, regular updates to the genome browser
- Excellent support from IBM Platform Computing™ allows the Institute to deal with the unique issues that any business faces in running a heterogeneous HPC infrastructure

[Download PDF](#)



International Financial Services Company

“The ability to scale out so quickly with Platform Symphony is very beneficial.”

Head of Actuarial Systems and Modeling, Major European Insurance Firm



IBM Platform Computing enables quick “up-scaling” of compute resources

The firm uses IBM® Platform™ Symphony to accelerate financial modeling using one of the leading applications for actuarial modeling tools in the life insurance sector—MoSes from Towers Perrin. Though MoSes was the ideal application for the company’s modeling needs, it could not scale well past 100 nodes. As the demands for ever more models with ever greater granularity grew, the company needed to find ways to scale the solution across more and more CPUs. Currently the firm has a total of 1,000 CPUs spread across two data centers. According to the Head of Actuarial Systems and Modeling, with Platform Symphony in place to orchestrate the MoSes workload, they can now run up to 10 times the number of models as

before, with 5 to 6 times more data, in a comparable time frame. Processes that took 14 hours in the past can now be completed in less than 3 hours. Now, instead of waiting for results to come in overnight, decision makers can have actionable information during the course of the day.

Results

- Ability to run up to 10 times more scenario models at once
- Reduced time to run complex stochastic simulations from overnight to same day
- Capability to run MoSes on 1,000 CPUs simultaneously, without performance degradation, with the potential to scale further and meet any future rise in demand

[Download PDF](#)



Major Wall Street Firm

“First, IBM went toe-to-toe with our two most demanding groups. IBM then proved its approach, taking an existing job that required two hours on 20,000 cores and running it in one hour on 10,000 cores. Achieving twice the performance on half the infrastructure was absolutely compelling for us.”

CIO, Wall Street-based Investment Bank

Enterprise grid from IBM

A major Wall Street-based investment bank wanted to drive down the cost, simplify the management and increase the agility and scalability of its existing grid infrastructure. The bank was uncertain that its existing infrastructure would handle the workload demanded by more compute-intensive risk analytics, specifically counterparty credit risk and Credit Value Adjustment (CVA). The bank’s existing grid had grown in an unplanned manner, resulting in inconsistent architecture consisting of multiple homegrown and commercial grid technology solutions. The ad hoc nature of the infrastructure made it hard to share IT resources between systems, and to manage upgrades and changes. “With

IBM® Platform™ Symphony and IBM System x® iDataPlex®, we have a single grid for both computation and big data,” says the bank’s CIO. “Instead of expanding internal silos, we now have one shared enterprise grid that provides much better server utilization, simpler manageability, greater agility and higher scalability.”

Results

- Matched previous performance with expectation to cut hardware by 25 to 50 percent
- Projected tens of millions in savings from CAPEX/OPEX reduction
- Simplified procurement, deployment and support with IBM as a single vendor



[Download PDF](#)



Resources

Watch [this whiteboard video](#) to learn more about IBM Platform Computing products

For more detailed product information, take the [IBM Platform Computing Product Tour](#)



© Copyright IBM Corporation 2013

IBM Corporation
Systems and Technology Group
Route 100
Somers, NY 10589

Produced in the United States of America
June 2013

IBM, the IBM logo, [ibm.com](#), iDataPlex, Platform Computing, Platform HPC, Platform LSF and System x are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at [ibm.com/legal/copytrade.shtml](#)

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

The performance data discussed herein is presented as derived under specific operating conditions. Actual results may vary. THE INFORMATION IN THIS DOCUMENT IS PROVIDED “AS IS” WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.



Please Recycle