



# PathScale EKOPath Compiler Suite Accelerates Applications Performance and Helps Reduce HPC System Costs at Cambridge University



**“We have recognized an excellent return on investment from the PathScale EKOPath Compiler Suite. Our new PathScale-optimized Opteron cluster is delivering twice the performance per CPU at a fraction of the cost of our older systems.”**

**-- Paul Smith, Manager of Systems Administration**

**Organization:**  
**University of Cambridge High Performance Computing Facility (HPCF)**

**Industry:**  
**Academic and Applied Scientific Research**

**Location:**  
**Cambridge, United Kingdom**

**Applications:**  
**Applied Math, Physics, Chemistry, Quantum Mechanics, Engineering**

**Solution Set:**  
**64-Node Dual-CPU AMD® Opteron™-based Linux Cluster**

**PathScale Products Used:**  
**PathScale EKO Compiler Suite™**



**BUSINESS CHALLENGE:** With 82 Nobel Laureates among their ranks, scientists at Cambridge University pioneer research across a remarkable range of subjects, from the understanding of diseases and the origins of the universe to the creation of modern materials and technologies. Key to these successes is the university’s High Performance Computing Facility in Cambridge, about 90 minutes north of London. The HPCF provides the foundation for world-class research and analysis and fulfills a critical role in supporting advanced computing technology and power.

The facility was created in the 1990’s by a consortium of scientists from different departments who found themselves unable to obtain sufficient computing resources either locally or nationally. The HPCF is maintained by users for users to supply flexible high performance computing resources to researchers in the University to support their scientific work.

**WHY PATHSCALE?** During 2004, the HPCF implemented its first 64-bit Linux cluster to expand research in physics, chemistry, fluid dynamics and areas of applied mathematics and engineering.

“Every researcher naturally wants as much computing power as he or she can possibly achieve,” explained Paul Smith, manager of systems administration at HPCF. “At the same time, our financial resources are not infinite and we must be keenly aware of costs. We have found that AMD Opteron-based Linux clusters are extraordinarily cost effective, and they give us the flexibility to grow while optimizing performance and maximizing usage.”

**A CONSISTENTLY FASTER COMPILER:**  
 “The cost of raw computing power is becoming relatively inexpensive compared to what one had to pay just a few years ago,” Smith related.

“Our new 64-node dual-CPU AMD Opteron-based cluster cost only £150,000 (UK pounds, or roughly \$290,000 US). At the same time, we wanted to be sure that it would perform as well as possible.”

After running comparison benchmarks against other commercial compilers, Smith’s team selected the PathScale EKOPath Compiler for use with their new Opteron cluster. The PathScale compiler has enabled the HPCF to accelerate the speed and efficiency of many different user applications, adding further performance and cost benefits.

“We required the compilers to straightforwardly compile our key applications,” said Smith. “The PathScale compiler was more stable and reliable and was consistently the highest performance compiler, about ten percent faster on average than other compilers we tested.”

Since the HPC facility operates 24x7 throughout the year and the average application runs about 24 hours, the ten percent faster performance advantage delivered by PathScale gives Cambridge researchers the equivalent of one extra month’s worth of supercomputer processing time over the course of a year.

**RESPONSIVE SUPPORT:** Researchers using the new Opteron system at Cambridge are also leveraging the power of the PathScale-optimized AMD Core Math Library (ACML 2.5). This ensures the highest possible math function performance from applications running on AMD64 platforms.

“Users have found it easy to migrate their applications to our new system with PathScale and have experienced very few problems” Smith added. “When we do have an issue, PathScale is quick to resolve it for us. On average, PathScale responds to us about two or three times faster than most other vendors in the HPC industry.”