Dell/Cambridge HPC Solution Centre.

Accelerate research by tackling unresolved challenges in HPC.

With High Performance Computing (HPC) now a fundamental enabler for the research capabilities of many institutions, and with the shift from closed proprietary HPC infrastructures to open commodity-based components, there is a growing demand from the community for help in addressing some of the practical challenges associated with delivering a fit-for-purpose HPC service.

Now, Dell is responding to this global need by joining forces with the University of Cambridge and investing in a European HPC Solution Centre. With the objective of helping to develop and disseminate "real world" HPC solutions and expertise, the Centre tackles the HPC challenges identified as important by the community, resolves them and gifts them back to the community.

By actively forging collaboration between the HPC community, technology vendors and the University of Cambridge, the Solution Centre delivers operational best practice and market-ready solutions based on the wide-ranging know-how and experience of both technology developers and end-users.

How to use the Centre

Based in the HPC Service building at the University of Cambridge, the Centre provides academic and private sector research organisations with practical resources and guidance, including:

- The opportunity to engage with Solution Centre engineers for guidance, help and advice in resolving your own HPC challenges

- Testing your solution in the Centre's large scale HPC environment – either on site or via a cloud delivery model

- Access to presentations, updates and detailed technical white papers which enable researchers to easily replicate the deployment of a validated solution stack

- Meetings and consultations with the engineers responsible for researching and developing the Centre's published solutions

- A vehicle for the community to raise unresolved HPC challenges that could be addressed by the Centre

The Dell/Cambridge HPC Solution Centre at a glance

The Centre combines the proven operational expertise of the University of Cambridge in providing HPC Services to its world-leading teaching and research institutions with the technical expertise of Dell and a network of best-of-breed partners. The Centre incorporates powerful HPC technology, including Dell PowerEdge™ servers equipped with the latest in Intel® multi-core architecture with a combined output of over 35 teraflops, plus over 850TB of storage capacity.

Lowering barriers. Accelerating research.

Focus areas

As part of its support for the HPC community, the Solution Centre is developing a range of guides and detailed 'how-to' white papers that will enable users to replicate solutions in real world research situations.

Benchmarking and optimisation

Often one of the first challenges facing an HPC customer is choosing the right technology, then maximising productivity. Cambridge and Dell have many years experience running hundreds of HPC applications on a large range of HPC technologies. The Centre has formed an expert benchmarking and optimisation capability to help ensure the right technology is deployed and that maximum productivity is obtained.

HPC storage

Storage is one of the most challenging problems facing the HPC community. Dell and Cambridge have created an HPC storage lab with a range of storage technologies configured within a production HPC environment. Particular focus has been given to the Lustre parallel file system. This HPC storage facility will produce optimised, tested and characterised HPC storage solutions ready for deployment by the HPC community.

GPU computing

The University of Cambridge is focused on exploiting GPU technologies within the HPC environment and the Centre has a large GPU-enabled Dell cluster to allow users to test their applications. Expert guidance can also be provided in GPU system integration, GPU cluster administration and GPU application exploitation.

Commodity visualisation

HPC users often need to visualise the complex data sets they produce to aid the research discovery process. Traditional visualisation technologies have been expensive and have required the use of specialist viz-rooms. The Centre has created a range of low cost 3D and remote visualisation solutions that can provide high powered visual computing solutions right to the desktop, even if the data and the viz-server is at a remote location.

Dell/Cambridge HPC Solution Centre areas of expertise

The Solution Centre brings together the HPC operational excellence of Cambridge with Dell technology leadership to form a world-class centre of excellence in HPC solution development.

HPC operational experience

The Solution Centre team have in-depth experience in the operation of large central (multi department) HPC systems with particular emphasis on resource scheduling and cloud computing HPC models. The team has developed the comprehensive set of operating procedures, usage policies and software tools that are needed to transform a vanilla turnkey HPC system into a production HPC cloud computing service.

Application performance tuning and benchmarking

The Solution Centre team has a dedicated resource focused on application performance analysis, optimisation and benchmarking and has developed a deep understanding of a wide range of HPC hardware technologies. This knowledge is deployed to ensure that we use the right technology for the right application and that application performance on a given platform is optimised.

HPC storage expertise

The Solution Centre team has developed in-depth expertise in HPC storage design, implementation and operation. Much experience has been gained on storage performance bottlenecks, power and cooling, reliability and resilience issues together with monitoring and I/O benchmarking Particular experience has been gained with the Lustre parallel file system and its use with commodity storage arrays.

GPU computing

The Solution Centre has a large GPU Dell cluster and is also the only NVIDIA CUDA centre of excellence in the UK with experience in the deployment, running and utilisation of large-scale GPU-enabled clusters. In addition, the University of Cambridge has an active many-core computing community that is developing a range of GPU computing applications.

HPC visualisation

The Solution Centre team has developed the use of low cost commodity graphics technologies to produce a range of visualisation solutions that allow HPC users to perform advanced visualisation of large data sets at their local desktop without the need for specialised viz-rooms or expensive proprietary technology. This ability to perform remote visualisation using remote data and remote high-end viz-servers widens the access to visualisation capabilities and helps drive the research discovery process.

Scientific user support

The Solution Centre team have many years experience providing in-depth technical support to a large and varied user community, helping to ensure that our users gain maximum benefit from using the HPC systems provided.

Find out more.

To learn more about how you can take advantage of the Dell/Cambridge HPC Solution Centre, please contact your Dell Account Manager or visit **www.dell.co.uk/research**

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