FUJITSU

Case Study
HPC Wales

» Fujitsu has been fundamental to the success of HPC Wales. This is a technical undertaking unlike anything we have ever done in Wales and Fujitsu's experience, commitment and understanding have ensured that we deliver excellent services to researchers and innovators «

Professor Martyn Guest, Technical Director, HPC Wales

THE CUSTOMER

Country: United Kingdom
Industry: Technology
Founded: 2010
Website: www.hpcwales.co.uk

HPC WALES · CYMRU

THE CHALLENGE

The Welsh government wanted to create a unified HPC platform that would encompass multiple academic organisations, allowing them to offer on-demand intensive computational capacity to local businesses of any size.

THE SOLUTION

Two hubs at Cardiff and Swansea are complemented with a number of spoke sites around Wales, each of which has access to thousands of Intel cores, linked by a dedicated network delivered via the Public Sector Broadband Aggregation.

THE BENEFIT

- HPC Wales can now offer HPC capabilities to SMEs around the country, enabling them to become more competitive and bring products to market faster
- SynfiniWay middleware provides an intuitive, user-friendly interface making it easy for anyone at Fujitsu to use
- HPC Wales is helping speed innovation, bolstering the local economy and promoting academic resources

The customer

High Performance Computing (HPC) Wales is Wales' national supercomputing service, benefitting both public and related private sector institutions. As host to the UK's largest national distributed supercomputing network, it provides businesses and researchers with local access to world-class technology and the support to fully exploit it.

This supercomputing infrastructure and service is unique in the UK and recognised as an innovative approach across Europe. With Welsh universities, Government and Fujitsu, it offers the supercomputing power, high level skills training and customised support necessary to help address global challenges such as extreme weather, development of new materials as well as new approaches to medical science. The service is designed to accelerate scientific breakthroughs and answer long-standing questions.

The challenge

Traditionally universities in Wales, as in most of the world's academic institutions, operated in a standalone fashion, with each responsible for its own computing resources. Such an approach led to significant duplication of effort. The Welsh government and academic bodies, led by the Advanced Research Computing division at Cardiff University, realised that a broader, more inclusive and coherent method would enable it to deploy HPC capability across multiple organisations.

By making HPC available on a nationwide basis, the principle objective was to offer it to local businesses, especially SMEs, in order to support economic growth and academic excellence.

Previous efforts to provide a shared service across universities had failed. *"It made us realise that we had to take an inclusive approach that gave every institution an equal share of the responsibility and potential,"* explains Professor Martyn Guest, Technical Director, HPC Wales. *"The guiding idea behind HPC Wales was not to enable academic research for its own sake but to develop a commercial solution that would introduce HPC capability to companies of all sizes across the country."*

HPC Wales invited several major technology vendors to propose a computing platform that would enable the delivery of HPC functionality. Fujitsu demonstrated the best understanding of the project objectives while drawing on its extensive HPC experience in its Japanese and European laboratories.

"Fujitsu made a real effort to grasp what we wanted to achieve," adds Guest. *"It had the range of competencies and experience that were needed to make the project a success."*

The solution
The contract was awarded in 2010, since then Fujitsu has collaborated closely with HPC Wales to put the initial distributed infrastructure in place. It follows a hub and spoke model with Cardiff and Swansea universities acting as the main hubs while Glamorgan, Aberystwyth and Bangor universities are the tier one spokes. Glyndwr and Swansea Metropolitan and a number of other installations across Wales constitute the second tier spokes.

Currently, there are 6,000 Intel core processors at each of the hubs; by the time the project is fully deployed there will be 23,000 cores. To complement this enormous computing power, each of the spokes includes 54 BX922 dual-processor nodes. They are all interlinked by a dedicated network delivered via the Public Sector Broadband Aggregation (PSBA), featuring a 10GBit/sec link between the two hub sites, 1GBit/sec links for the tier one sites, and 100MBit/sec links for the tier two sites.

At the heart of the infrastructure is Fujitsu's SynfiniWay middleware. SynfiniWay is used to create the virtualised IT framework for the HPC cloud. It provides a complete integrated set of capabilities: leading workflow technology to orchestrate service execution, a global meta-scheduler for optimising resource utilisation, and robust data movement of large-volume files.

"SynfiniWay is really the crown jewel of this project as it allows any user to access data and processing power via a simple point and click interface," continues Guest. *"There is no need for Linux knowledge or a command line interface which makes users more productive from the outset."*

The benefit
Most production is now being driven by academic researchers in collaboration with industry partners. Around forty projects have already been undertaken and this number is set to rise as the project matures. The core focus is on a number of different sectors including Life Sciences, Energy and Environment, Creative, Advanced Materials and Manufacturing and Financial and Professional Services. Companies of any size can now pay to have access to the phenomenal computing power available. There is a range of billing options, allowing customers the flexibility to purchase exactly how much core processing, storage and other services they need.

For Calon Cardio, HPC Wales provided access to the software and the computing power it needed to refine the design of its implantable pumps, speeding up the research process tenfold and enabling it to carry out product trials within a competitive timeframe. Knowtra, an SME delivering oceanographic consultancy to international projects, relies on modern computing to undertake simulations and data processing for clients. HPC Wales has allowed Knowtra to enhance the quality of its simulations considerably.

"Speed of innovation is critical to business growth and profitability but many SMEs don't understand the impact high performance computing can have. These projects are proving the value HPC can add to even the smallest SME," comments Guest. *"From simulating nano-particle catalysts to comparative genomics to rheological modelling, HPC is providing a critical new service that will help boost the local economy and keep local businesses at the leading edge of research."*

HPC Wales is currently in its second phase, involving the deployment of additional Intel Sandy Bridge cores at Cardiff and Swansea. It is on track to complete the entire installation by 2013 by which time it is expected that over 100 projects will have gone live on the system, 80 per cent of which will be for SMEs.

"Fujitsu has been fundamental to the success of HPC Wales. This is a technical undertaking unlike anything we have ever done in Wales and Fujitsu's experience, commitment and understanding have ensured that, despite some challenges along the way, the process has been successful."

About Fujitsu
Fujitsu is the leading Japanese information and communication technology (ICT) company offering a full range of technology products, solutions and services. Over 170,000 Fujitsu people support customers in more than 100 countries. We use our experience and the power of ICT to shape the future of society with our customers. Fujitsu Limited (TSE:6702) reported consolidated revenues of 4.5 trillion yen (US$54 billion) for the fiscal year ended March 31, 2012. For more information, please see www.fujitsu.com