



High performance data processing, management and storage

## Eddie Gets Power Boost, Goes Green

The University of Edinburgh, founded in 1583, is an internationally renowned centre for teaching and research. The University's information services department provides central high-performance computational and data services via the Edinburgh Compute and Data Facility (ECDF), known as Eddie.

### Business Impact Summary

#### Challenge:

The University of Edinburgh first launched its high performance server cluster "Eddie Mark I" in 2007. The University continually upgrades Eddie to ensure it keeps pace with the compute-intensive demands of researchers. In 2010 the University wanted to make further significant upgrades to Eddie.

#### Solution:

A new server cluster, Eddie Mark II, was operational from July 2010. Designed and built by OCF, the server cluster includes the first UK deployment of Intel's Westmere E5620 Quad Core processors in IBM iDataPlex servers.

#### Result:

The University of Edinburgh's latest high performance server cluster doubles compute power available to researchers, requires less cooling than its predecessor and uses less energy. The University will benefit from £135k energy savings over three years. Some researchers at the University have seen a five times speed increase for their application code.

"The new Eddie will deliver double the compute power with significantly reduced heat and energy consumption"

Tony Weir, University of Edinburgh

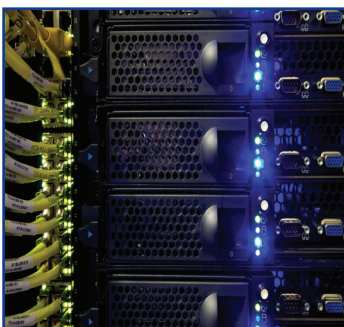
### Demanding Computing Requirements

The University of Edinburgh first launched its high performance server cluster "Eddie Mark I" an IBM-based system, in 2007. It was upgraded again in 2008 to ensure it kept pace with the increasingly compute-intensive demands of researchers. By 2010, the University wanted to make further significant upgrades to Eddie to enable researchers to undertake more complex and in-depth research now and in the future.

### Solution

A new server cluster, Eddie Mark II, was operational from July 2010. The bespoke design from OCF plc incorporates a range of industry-leading technologies taken from OCF's partner eco-system:

- IBM System x™ iDataPlex™ servers, running Intel's latest CPU Westmere E5620 Quad Core processors
- 40 TB of high performance data storage using IBM System Storage™ DS5100 and a combination of fibre channel and solid state drives, fully integrated with an existing 90 TB of SATA storage using IBM's General Parallel File System (GPFS)
- a combination of BLADE Network Technologies GB8124R 24-port 10Gb Ethernet switches and Qlogic 12300 36-port QDR InfiniBand switches, also BLADE Network Technologies G8000 1Gb Ethernet switches



## Seamless access to client information

The server cluster was deployed successfully, firstly, because OCF has the largest server cluster delivery team in the UK and, second, because that same team has successfully installed more server clusters using the industry-leading IBM iDataPlex Server than any other UK integrator.

### Benefits

Multi-disciplinary researchers from across the University – working in areas including bioinformatics, speech processing, particle physics, material physics, chemistry, cosmology, medical imaging and psychiatry – now benefit from double the compute power (than was available previously) enabling them to run more complex computer simulations and scenarios, and obtain research results more quickly.

Despite immediately doubling the compute power available, the server cluster generates less heat and consumes less energy than its predecessor. Julian Fielden, Managing Director OCF Plc cites several reasons for this: “Firstly, there are efficiency improvements contained in Intel’s Westmere platform. Second, heat emissions are reduced by the server cluster’s use of IBM System x™ iDataPlex™ servers, which are custom engineered for excellent energy efficiency. In addition, the University’s system is fitted with iDataplex water-cooling features to remove 100 per cent of heat generated by the system close to the source, which when combined with the use of Scottish air to cool the water, provides almost free cooling for much of the year.”

### Results

The bespoke design from OCF was chosen for three main reasons:

- The server cluster has a full power ‘draw’ per node of just 271.86 watts (versus 312.5 watts for other solutions proposed). Subsequently, the University will benefit from £135k energy savings over three years (compared to cost of energy usage by Eddie’s predecessor). Using ‘free Scottish air’ to cool water filled pipes, the University can use that to cool hot air from the system to around room temperature. This cooling process will work 90 per cent of the year and saves money. As a central, shared system (not devolved down to groups), utilisation of the HPC system is much higher. Currently, utilisation is around 95 per cent. In essence, the more consolidation, the higher the utilisation, which means power usage is having a greater effect
- The server cluster’s low power consumption helps to support the University’s sustainability policy
- The IBM GPFS policy engine means the University can integrate very fast solid state disk with fast fibre channel with slower SATA storage, ensuring optimum performance of data on the system
- Alongside low power usage, meeting users’ requirements was key. Every user wanted more compute power – so Eddie will double and re-double again over a 3 year period. Currently, some researchers have seen a five times speed increase for their application code, compared to Eddie’s predecessor.

“The design put forward by OCF provides both an increase in compute power for the benefit of researchers and a reduction in the University’s running costs due to the innovative technologies in use,” says Tony Weir, Edinburgh Compute Data Facility Service Director, the University of Edinburgh. “The new Eddie will deliver double the compute power with significantly reduced heat and energy consumption.”

The whole server cluster is supported by OCF, using its SLA-driven remote and on-site support.

To learn more about the topics covered here visit: <http://www.ed.ac.uk/schools-departments/information-services/services/research-support/research-computing/ecdf/> and to see how OCF can help you visit: [www.ocf.co.uk](http://www.ocf.co.uk)

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