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RESEARCH
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BEDE PROVIDES THE N8 NORTHERN UNIVERSITIES WITH HIGH-PERFORMANCE COMPUTING POWER

Advanced problems require advanced solutions. As the various challenges facing researchers become more complex, more powerful machines are needed to solve them. As High-Performance Computing experts, OCF were able to deliver a new supercomputer to cater to several northern universities that met those needs and allowed them to possess the computing power capable of carrying out their research tasks quickly and efficiently.

The Challenge

Universities in the North of England were left in need of a supercomputer to assist in their research tasks after their previous supercomputer, the University of Leeds-based Polaris, was decommissioned in 2018. Polaris had previously been utilised by the N8 Research Partnership, a collaboration between eight of the most research-intensive universities in Northern England: York, Sheffield, Newcastle, Manchester, Liverpool, Leeds, Lancaster and Durham. The loss of their supercomputer meant research tasks across these universities were under threat of slowing down, as personal computers simply cannot come close to matching the speed and processing power offered by supercomputers.

The Solution

To replace Polaris, the N8 hired OCF to design, install and maintain a new supercomputer, which they named Bede, at the University of Durham. The computer is named after the Benedictine monk from the 7th century, a recognised scholar and historian, who, for a time, was buried at Durham Cathedral.

Despite being built on a smaller scale, in terms of power, this tier 2 supercomputer's capability matches the leading supercomputers around the world. The build is designed to have the same architecture as the US Government's supercomputers, Summit and Sierra, the fourth and fifth fastest supercomputers in the world (formerly the fastest).

The build comprises of 32 IBM Power 9 Dual-CPU nodes, with 3 NVIDIA V100 GPUs and high-performance interconnect. Bede is also the UK's first supercomputer to use IBM's Power IC922 server and 6 additional nodes with NVIDIA T4 Tensor Core GPU Accelerators to improve AI inference.

All this raw power has a wide range of benefits. Dr Alan Real, N8's Technical Director and Director of Advanced Research Computing at Durham commented:

"Bede enables us to deal with data at a scale that other machines can't. It's not just far faster, it enables us to tackle problems that were simply beyond our capabilities before."

Bede's first big success came about when Dr Chris Jewell, a Senior Lecturer in Epidemiology at Lancaster University was able to use the system to model the spread of COVID-19 around the UK. The power of Bede allowed the use of Bayesian statistics to calibrate Jewell's models in real-time, and as a result, Jewell and his team were able to provide up-to-date information on disease risk, reproduction numbers, and the effect of COVID-19 Alert Levels for SAGE.

Bede was also able to run simulations that could characterise the structural changes in the spike of new strains of COVID-19 and help combat the evolving threat of the virus. On this, Professor Michele Vendruscolo of the University of Cambridge said:

"We expect that these simulations will enable the development of a structure-based antibody discovery strategy for this strain, as well as for possible new strains that may arise in the future."