

N8 High Performance Computing Facility

Eight universities in the N8 Research Partnership are sharing a [High Performance Computing \(HPC\)](#) facility - a larger and higher specification machine than could be afforded or fully utilised by any one institution. It is a world-class facility of interest to blue-chip companies and SMEs which empowers new multi-disciplinary science and knowledge transfer, and supports problem-solving in priority areas such as environment and disease planning.

Benefits to institutions

- Business engagement – a world-class facility which has attracted enquiries from 25 companies, including Unilever, Rolls-Royce and Syngenta in the first quarter of operation. Sector applications include: aerospace, nuclear, automotive and power electronics. The service also offers modelling and research opportunities to SMEs.
- Multi-disciplinary research community – enabling research not possible at smaller scale and improving multi-disciplinary research such as modelling atmospheric, materials and financial data.
- Knowledge exchange – new knowledge within partners can be leveraged across the community in areas such as extreme modelling and new architectures.
- Flexibility to tackle urgent research problems – the facility can tackle urgent computing problems in areas such as flooding, environment and disease.
- Skills and career development – training of academics and industry partners in the use of the HPC and e-Infrastructure, helping to embed computational science in PhDs, and providing a career path for HPC specialists.
- Cost savings – collective marginal saving of £735k capital cost plus a saving of £1.2m revenue cost when compared to eight discrete institutions' facilities.

Benefits to industry and research partners

Two examples are given to illustrate the benefits of the N8 HPC to industry and research partners.

1. Power Electronics Modelling

The UK leadership in power electronics is vital for Rolls Royce, Siemens and other companies in aerospace, energy, automotive and renewable sectors. At present, the scale of power electronic simulations carried out by leading UK power electronic groups is

constrained by the computing power they can access. Porting these simulations to the new N8 HPC facility will enable more efficient power modules, significant potential energy savings, and smaller products for aerospace and other applications.

2. BBC R&D High Throughput Data Analytics

BBC R&D worked with the University of Manchester using the N8 HPC to analyse very high volumes of music files in order to build a system that could automatically substitute music tracks to comply with licensing arrangements with rights owners. The team at Manchester used the N8 HPC to process 175 day's worth of music files using 53 algorithms. 'The entire dataset was processed in only 12 hours, creating the world's largest time-varying musical feature database,' commented Chris Baume of BBC R&D, saying of the University of Manchester that, 'their combination of cutting-edge facilities and outstanding support was of huge benefit in getting the project completed and we look forward to working with them again.'

Cost comparison

	Shared case	Base case	Difference
Capital Costs	£2,600,000	£3,500,000	-£900,000
Staff Setup Costs	£165,000	£400,000	-£235,000
Accom. & Facilities	£800,000	£400,000	£400,000
TOTAL SETUP COSTS	£3,565,000	£4,300,000	-£735,000
Staff for 1 year	£260,000	£420,000	
Energy for 1 year	£180,000	£260,000	
Staff for 5 years	£1,300,000	£2,100,000	-£800,000
Energy for 5 years	£900,000	£1,300,000	-£400,000
RECURRING COSTS TO YEAR	£2,200,000	£3,400,000	-£1,200,000

About the N8 Research Partnership

The N8 Research Partnership is a collaboration of the eight most research intensive universities in the North of England: Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York.

Contact

For more information about the N8 HPC please contact: enquiries@n8hpc.org.uk

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