



Heriot Watt University

Case Study

Heriot Watt University chooses Oracle Cloud as the platform for its innovative research.

“Higher education and research institutions can procure Oracle cloud IaaS and PaaS credits from Broadpin. In addition to cloud credits, Broadpin also provides value added implementation, consulting, training and onboarding services.”

The client

Heriot-Watt is a specialist, pioneering University with a global presence. Their goal is to create pioneering research which is informed by the global needs of business and industry. The OCRE grant awardees, Dr Ali Ozel (Assistant Prof.), Josh Williams (Carnegie PhD Scholar), Dr Uwe Wolfram (Assistant Prof.) and Jose Manuel Menendez Montes (IT Research Manager) are based in Heriot-Watt University's Institute of Mechanical, Process and Energy Engineering. The department has a thriving research theme of high performance computing for engineering applications. However, current large-scale biomedical engineering problems require ondemand access to larger compute capabilities than on-site resources that are currently available.

The challenge

When the multiphase and biological flows research group in School of Engineering and Physical Sciences at Heriot-Watt University was awarded the OCRE cloud funding for their healthcare application research project, the OCRE framework mini competition mechanism was used to select a cloud platform, and having considered many other vendors, the research team selected Broadpin and Oracle Cloud Infrastructure as the host. Principal investigator Ali Ozel, with support from Josh Williams, Jose Manuel Menendez Montes and Uwe Wolfram, proposed to use

the power of cloud computing platforms to model aerosol drug deposition in patient lung airways. This very intensive particle modelling was not possible without the scalability and compute power of the cloud. A modern performant cloud was required which supported AI/ML tools and analytics, that would be easy to use and be able to offer enough value for money to deliver the required 2 million CPU hours to complete the research project. In addition, the research team needed a cloud-neutral technology stack to ensure open-source friendliness and to reduce cloud-lock-in. The Broadpin service also met the Universities need for a technically flexible and scalable computational platform.



The delivery

To support the 12-month research project a HPC environment was designed and implemented by the Oracle lift team, with support provided by Broadpin. The HPC environment consisted of a Linux compute node cluster. Oracle Data Science service was provided supporting the research team's preferred Jupyter notebooks and Oracle Analytics Cloud was provisioned as a service. The environment was connected via Oracle Fast Connect to the highspeed research network of Geant. "Broadpin ensured the project was executed as a success earlier than expected" A multi-node cluster with opensource computational fluid mechanics software, OpenFOAM. An open-source product to avoid cloud lock in, was provisioned. A software that Broadpin and Oracle were open to, this simplified the move to a cloud environment. The research team was provided with 2 different levels of high performance computing, 1 for development and another for production. The environment makes full use of the flexibility of the cloud. The environment was designed to take advantage of all the different shapes and VM's available at the time and was continuously being revised as new computing shapes were made available, ensuring the best results for the research project.

Of course, like any off-site project, risks throughout the delivery process were involved, such as if any technical issues arose, they could not run large simulations if something was not working from the cluster, resulting in a delay to the research. This meant the research team heavily relied on Broadpin and Oracle's infrastructure to ensure success. They quoted "Broadpin filled us with confidence by ensuring we had the right level of technical support throughout the process, with lead services after that with any technical teams. We were extremely happy with the way they maximize investment allowing us to have as much compute time as possible".



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The result

Oracle's performant bare metal machines provided the required performance and value for money to win the mini competition, with options provided to illustrate the various options the research team had for consuming their budget. The Oracle solution offered a clear exit plan which would allow them to remove the data from the cloud at no extra cost once the research had completed. They also believed strongly in the value of the technical support provided by Broadpin and Oracle. Another key factor in selecting Broadpin's proposal was that Oracle was one of the industry's largest contributors to open source projects. A commitment to open source research community was one of the research team's key perspectives. Broadpin did not fill its proposal with cloud workshops and support costs providing the research team with a proposal that was 100% cloud consumption meaning every penny could be spent on innovative research, providing maximum value for money.



broadpin

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