

Cloud HPC for a Living Laboratory

The Department of Biological and Environmental Sciences at the University of Stirling is transitioning satellite data modelling focused on the water quality of the Firth of Forth into High Performance Computing (HPC) as part of a project to inform and help develop plans for a green monitoring platform for Scotland's International Environment Centre (SIEC).



“In order to take the next step in understanding and improving our knowledge around water quality in the Forth Valley we needed to transition processing from workstation to HPC. Thanks to the Alces Flight team we've taken intelligent steps towards scaling and automating our workloads through the use of managed services and public cloud. This way our team is able to focus on the research and not worry about managing compute capacity and costs.”

Dr. Peter Hunter, Senior Lecturer
University of Stirling

Customer Profile



Company University of Stirling
Industry Education & Research
Country United Kingdom
Website www.stir.ac.uk

Business Need

The University of Stirling has secured multi-million pound funding to develop a cross-disciplinary platform focused on capturing and sharing environmental data across the Forth Valley of Scotland. To move to a project of this scale, teams at the university require partners who are well-versed in building, managing, and transitioning workloads and environments to HPC. To take that first step the university wished to engage in a collaboration focused on the capabilities offered in public cloud.

Solution

The University of Stirling turned to Alces Flight to build and manage their public cloud HPC cluster environment to streamline their transition into HPC. Keeping their goal of green recovery in mind, the team at the university focused on building an environment where they could not only deliver their workload, but where they could also adopt working methods that would enable the team to transition other, related workloads, as well as explore novel ideas, without requiring an immediate purchase of hardware. Using the Flight Cloud Cost Visualiser (Flight Control) tool the team was able to intelligently scale, forecast and control their budgetary spend on public cloud, allowing them to get the most from the time on the platform.

Benefits

- Centralized management of the workstation to HPC transition.
- Ability to control use, scalability and spend as well as forecast future costs on public cloud.
- Transition current working practices to facilitate long-term, sustainable HPC practices.

Solution at a glance

- Managed HPC Services
- HPC Budget Control
- Public Cloud HPC

With an aim to deliver on the Scottish government’s commitment to Net Zero, the Department of Biological and Environmental Sciences at the University of Stirling are taking two decades of development in remote sensing technology and transforming it to meet the needs of the Forth Valley’s Green Recovery Programme. To scale and automate their Machine Learning tool sets, the team looked to explore the advantages presented by cloud-based HPC.

The University of Stirling is transitioning work with sensors, satellite data, and artificial intelligence into a powerful environmental monitoring toolset covering the Forth Valley. Focusing on water quality and quantity the project looks at all available ground and radio data and addresses data gaps. Once complete, the commercial toolset will include real-time, state-of-the-art modelling utilising Machine Learning.

“There are currently two factors to consider when you want to get a complete environmental picture of an area,” says Dr. Peter Hunter, Senior Lecturer at the University of Stirling, “What you see on the ground and what you can detect from the space around and above. Our team is focused on the latter, with a specific aim to transform what we do into a flexible, scalable HPC process. Together, with the related data and workloads, we hope to create a robust investigative toolset for the Forth Valley.”

With the goal of looking at environmental impact, the University of Stirling looked to start this transition on public cloud, choosing the Microsoft Azure platform as a means to build and test the resources that could potentially make up the final solution. Their cloud HPC environment, built through a partnership with Phoenix Software and Alces Flight, features a persistent infrastructure core containing high-performance networking and storage along with on-demand compute resources. Jobs can be scheduled to run on right-sized AMD EPYC or Intel Xeon powered compute instances launched dynamically and accessed via the Slurm batch-job scheduler.

Planning for Sustainable HPC

“Historically, the work we’ve done in the past has been workstation-based, so making the transition to HPC was definitely a learning curve,” said Dr. Adam Varley, Data Scientist at the University of Stirling. “However, because we were working with Alces Flight we didn’t have to worry about building and managing the environment itself - we focused on creating a sustainable HPC plan

and leveraged the tools and services offered under a Flight Center subscription. This gave us the blueprint we needed for not only our part of the project, but a plan to help the other components make the transition to HPC.”

Ready for flight

The team at Alces built and managed a HPC cluster environment on public cloud, leveraging a standardised Alces Flight environment and providing the Flight Control toolset to enable the team to forecast and manage the budget and size of the environment itself.

“We wanted to make the team’s move from workstation to HPC as easy as possible,” said Cristin Merritt, Program Manager at Alces Flight. “We centralised their HPC environment information into an Alces Flight Center subscription and deployed the Flight Control toolset to allow the team to regulate the size and scope of the environment itself. Working with the researchers we undertook a 12-week analysis of how the system was utilised - from time spent, to cost accrued, to how the transition would impact their carbon footprint. This information is helping to feed the whole of the project and their focus on green computing. Overall, the team has built a sustainable plan forward and we are looking forward to watching their platform develop and grow for Scotland and beyond.”

“Thanks to Alces we were quickly able to build a scalable instance of our processing chain for water quality retrieval across the UK. Their tools and services gave us the business intelligence, costing and even the understanding of our carbon impact to aid us as we continue to move forward on our HPC transition.”

Dr. Adam Varley,
Data Scientist
University of Stirling

Products & Cloud Platform

Products

Alces Flight Center

OpenFlightHPC

Flight Control

IT Aggregators

Phoenix Software

Cloud Platform

Microsoft Azure