



# HPC competition on a shared resource

The Computing Insight United Kingdom (CIUK) Conference puts UK-based student teams to the test by creating real-world scenarios in High Performance Computing (HPC).

## Customer Profile



<b>Company</b>	Computing Insight UK
<b>Industry</b>	Educational Conferencing
<b>Country</b>	United Kingdom
<b>Website</b>	<a href="http://www.stfc.ac.uk/CIUK">www.stfc.ac.uk/CIUK</a>



## Business Need

The CIUK Conference Series is working to develop authentic educational opportunities through its annual Student Cluster Challenge. As a Challenge Partner, Alces Flight deployed a Private Research Cloud environment to best emulate modern working methods. In order to succeed, student teams needed to collaborate using a shared cloud compute platform, reflecting real-world HPC usage seen in many institutions today.

## Solution

Alces Flight Private Research Clouds are designed to create flexible, secure, and scalable environments for HPC workloads. By enabling each student team to work in a separate contained environment, Alces' solution ensures that a limited set of hardware resources can be shared securely - while at the same time enabling bare-metal performance for competitors to demonstrate their HPC skills. The Flight team devised a set of challenges for CIUK that focused on the performance, cost and carbon output of the resources chosen by the students.

## Benefits

- Secure isolation between teams in the multi-tenant, private-cloud platform
- Bare-metal, virtual-machine and container orchestration
- On-demand scaling of CPU, GPU and storage resources
- Ability to view usage, determine power utilisation and overall cost
- Simple, secure connectivity between multiple on-premise locations and research environments

“To get the right skills to work in supercomputing you need hands-on experience. Thanks to CIUK and student cluster partners like Alces Flight, our students have access to some of the latest tools available, as well as challenges that immerse them in the competencies needed to start their careers.”

Laura Morgenstern  
Assistant Professor of Computer Science  
Durham University

## Solution at a glance

- Alces Private Research Cloud
- Alces OpenFlightHPC
- Multi-Platform/Hybrid Solutions

Launched in 2020, the CIUK Student Cluster Competition hosts teams that, each December, tackle tasks that are set to test their knowledge of HPC. With a need to foster future talent in supercomputing, the conference committee's assignments are to ensure a level playing field for all the teams; develop more practical trials; and foster cross-team cooperation.

"When we launched the Student Cluster Challenge in 2020 our aim was to bring education and insight to university pupils who were considering a career in HPC," said Damian Jones, Lead Organiser for CIUK, "What we found is that the students have a desire to dig in and find out what it is really like working in the field. To offer more realistic work experiences we need to give students consistency and encourage cooperation. Thankfully, our vendor partnerships like the one we have with Alces Flight recognise this. Our big assignment now is to ensure the students are getting valuable practical experience in a secure space that they can apply to building their careers."

In order to deliver a successful Cluster Challenge, CIUK depends on the expertise of commercial partners, each delivering a research environment for both the ten-day online challenge and the two-day on-premises conference. As CIUK has grown in developing this event, so has the need for providing platforms that are reliable, secure, and can simulate what working in HPC is really like.

#### Fostering Collaboration

"While it is good to study computational theory, there is nothing quite as great as seeing theory in practice," said Damian, "We want the students to be really engaged in the cluster challenge, so we encourage them to be creative in how they solve problems. We also know in the real world that companies, researchers, and institutions often will collaborate with one another to find solutions. So why not add that element into the cluster challenge as well?"

#### Ready for flight

The team at Alces took the initiative to add private cloud to this year's challenge with the purpose of creating a task which could only succeed fully if the teams worked together.

"By utilising private cloud for this challenge we were able to give students the same experience they would likely have on their home cluster," said Michael Rudgyard, CEO at Alces Flight, "For CIUK, we built each team a separate, contained environment.

Attached to these secure environments were a set of resources that they had to share in order to achieve the challenge goals. These included both virtualised and bare-metal resources, so the students had the opportunity to optimise their workloads on the latest CPU and GPU hardware."

Alces wanted to ensure that the student teams were collaborating while not competing for resources. To achieve this, some instance types were configured for exclusive access so that in order to successfully complete the challenge they had to release resources back to the other teams. Finally, the teams needed to make assessments of the energy used and carbon output during their period of allocation. "The HPC community is very aware of the energy consumption and CO<sub>2</sub> footprint of its computations," Michael noted. "So we purposefully had the teams report on these in order to earn points."

With teams now having access to the many diverse platforms HPC has to offer, CIUK feels confident that future challenges will offer even bigger opportunities to students. "It's great to see just how capable the teams are," said Michael, "Alces is proud to be part of the Student Cluster Challenge for CIUK as it encourages young professionals to develop their skills and hopefully set out on a career in HPC."

"Ensuring a level playing field for all the teams is essential to the process - Alces Private Research Cloud guarantees all of the teams access to state-of-the-art capabilities across multiple bare-metal and virtualised resources."

Michael Rudgyard  
CEO  
Alces Flight

#### Resources Utilised

##### Products

Alces Flight Private Research Cloud

OpenFlightHPC Software Environment

##### Resources

Dell EMC, HPE, and Lenovo servers

Cornelis and NVIDIA networking

NVIDIA GPU accelerators