Using Cloud HPC to fight Coronavirus

Owing to the foresight of creating a rapid-deployment cloud environment as part of their Barkla HPC service, the Advanced Research Computing team at the University of Liverpool were able to accelerate AI imaging diagnosis modelling methods for COVID-19.

"Thanks to our work in creating a mission-critical version of our on-premises HPC services on cloud we were able to take our knowledge and immediately apply it to fighting COVID-19. Being able to quickly pivot to a powerful GPU-backed cluster environment and having a process up and running for our researchers shows how beneficial public cloud can be in a complete HPC services design."

Cliff Addison, Advanced Research Computing Manager (ARC)

Customer Profile

Company	University of Liverpool
Industry	Education & Research
Country	United Kingdom
Website	www.liverpool.ac.uk

Business Need

The Advanced Research Computing (ARC) team needed to pivot their cloud HPC environment to work with research focused on AI imaging diagnosis of coronavirus. Their established environment needed access to significant GPU instance-types, as well as strict resource monitoring.

Solution

Thanks to the AWS COVID-19 Global Disaster Fund for Researchers the ARC team was able to secure access to a complete range of GPU instance types for their researchers. Working with Alces Flight's managed services and cloud HPC programs the team was able to transform their environment to run a series of scaled testing models to accelerate the COVID-19 researchers' work towards peer reviewed outcomes.

Benefits

- End-to-end cloud cluster environment management through Alces Flight Center
- Managed services package focused on intelligent use of resources
- Reuse of prior knowledge and toolsets to meet unplanned challenges

Solution at a glance

- Alces Flight Managed Services
- Alces Flight Center
- High Performance Computing
- GPUs for Artificial Intelligence

As part of their HPC services design, the ARC team at the University of Liverpool created a cloud-based extension for users of their on-premises cluster, Barkla, designed to provide dynamic capacity for mission-critical research projects and to offer continued HPC service should it be required during a disaster recovery scenario.

> "The team was able to swap out GPU instance types at each stage of the modelling test runs to optimise the use of the budget made available to them. Alces Flight made the process seamless and enabled the researchers to get more data to report back to their peers."
>
> Cliff Addison,
> Advanced Research Computing Manager (ARC)

Having just completed a £2 million data centre renovation and verified the viability of operating a cloud cluster environment for mission-critical research use, the ARC team were uniquely prepared to swing into action when the COVID-19 pandemic struck.

"We were a few months into settling in from our move of the Barkla HPC cluster and the establishment of the Cloud Barkla service when coronavirus hit," said Cliff Addison, ARC Manager. "For us having Cloud Barkla was fortunate because we knew straight away that we had a resource that could be deployed to help in researching anything from diagnosis to treatment of the virus. When Amazon Web Services (AWS) opened up funding opportunities that would allow researchers access to their most powerful Nvidia V100 quad GPU instance types we leapt at the opportunity to apply. Dr. Yalin Zheng and his two lead researchers, Joshua Bridge and Yanda Meng of the Department of Eye and Vision Science had promising work on AI imaging diagnosis models utilising CT scans. By securing the AWS funding we could work together to pivot Cloud Barkla to run the testing models they needed to quickly move their work towards peer review and eventually into the public domain."

Rapid pivot, rapid deployment

With a very real need for research on COVID-19 to be prioritised and accelerated Dr. Zheng and his lead researchers worked with ARC, Alces Flight, and AWS to ensure their modelling tests were ready to run.

"We needed to maintain an extremely efficient project," Addison said, "The team were on a strict deadline and working with patient data. We had to tailor the cloud environment to meet GDPR requirements, ensure that the testing models were optimised to the instance types available on AWS, and make sure the flow of data for analysis moved seamlessly between our on-premises Barkla cluster and the cloud. Thankfully, ARC and Alces Flight had tested this only a few months prior in production so now it was down to pivoting our knowledge to tackle this project's needs."

Ready for flight

The team at Alces Flight took the advancements made from the original Cloud Barkla HPC environment and tailored it to match the aims of the project and the strengths of AWS.

"We already had a template for success with the Cloud Barkla HPC environment held within ARC's Alces Flight Center subscription, all we needed to do now was take that template and reconfigure it to the project needs," said Cristin Merritt, Cloud HPC Programs Manager at Alces Flight. "The research team identified a set of tests they wished to run on images gathered across targeted global locations and then refined their modelling process to speed their time towards peer review. We retained the core infrastructure of Cloud Barkla, adjusting storage location and security to meet with GDPR regulations. Then we identified and optimised their GPU-instance access to meet the time and budget constraints laid out in the funding. Because Cloud Barkla had already had so much work invested in it from the ARC team we were able to put in an additional refinement run to get that extra bit of data needed to get their AI model closer to clinical use."

"We were happy that Alces Flight was able to take our work and redeploy it to such an important project," said Addison. "This goes to show how quickly efforts can pay off when creating a hybrid HPC service that can be flexible and scalable for research needs."

Products & Technologies

Products & Services

Alces Flight Managed Services

Alces Flight Center

Cloud Service Provider

Amazon Web Services

HPC Environment

OpenFlightHPC