

GLOBAL DESIGN ENGINEERING FIRM REACHES UNPRECEDENTED NUMBERS WITH HPC CLOUD

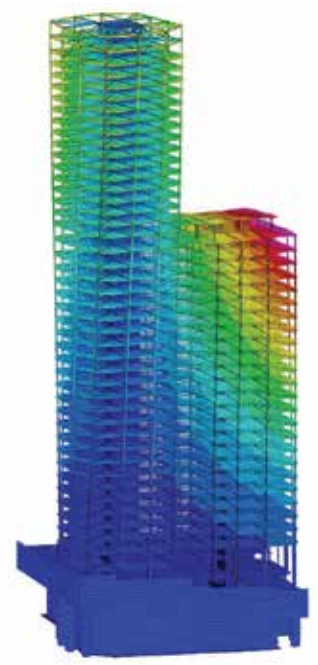
By: Victor Gregorio, Sr. Vice President, Cloud Services



Overview

The Los Angeles office of Arup Group Limited, the engineering firm behind the Sydney Opera House, the Kansai International Airport, and 30 St Mary Axe ("The Gherkin") among other global landmarks, specializes in performance-based seismic engineering and nonlinear time history analysis, two key elements in building structures in earthquake prone areas.

Arup's value to its clients is directly connected to the amount of compute resources available for each design simulation. To support engineering demands beyond their typical use, they needed additional compute resources. However, the idea of building out additional, on-premise computing resources from scratch for the Los Angeles office just to meet occasional, peak demand was not practical. Arup needed more power, but in a way that fit their budget and infrastructure needs. Arup needed a hardware solution that would seamlessly run with LS-DYNA, the software they used to predict the possible effect earthquakes could have on structures.



The Penguin Computing® On-Demand™ team was able to solve Arup's problem with access to our powerful bare metal clusters through the cloud and our deep familiarity with not only the needs of engineering service firms like Arup, but also our experience with Livermore Software Technology Corporation's (LSTC) LS-DYNA. As a result, Arup was able to dramatically increase the number of engineering simulations they ran, achieving an unprecedented number of jobs for the industry, and support the unpredictable nature of their client projects without any disruptions.

Problem

The on-premise resources Arup had could only support the needs of one active LS-DYNA software project at a time, which was not allowing them to keep up with client needs. Because their seismic computations were extremely time-consuming, having such little HPC power available left them with no room to grow, and didn't provide the tools they needed to do their best work. They needed a fully managed on-demand HPC resource that would allow them to execute a high number of analysis runs. Paying for both more on-premise hardware and the staff to manage it didn't make sense.

"We have been able to turn around 50,000 core hour jobs overnight, which is unprecedented for our industry." – Kermin Chok, Arup

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"Without the compression in timescales we achieve with POD, the non-linear time history analysis just simply could not be done in the time scale required to support the fluid design process in which we are typically engaged." – Kermin Chok, Arup

The size of the cluster they would need to gain any significant lead in their computations would simply be too expensive, require too much physical space, and be too much to manage. The computing resources also had to be powerful enough to calculate the complex earthquake simulations they needed and be well-suited to running LS-DYNA.

Solution

Arup searched for a partner that specialized in high-performance computing (HPC) and had experience with the LS-DYNA software they used. After thorough research, Arup choose Penguin Computing. Our Penguin Computing On-Demand (POD) platform offered them the ability to access a variety of HPC clusters, each set up for specific types of jobs, via the cloud.

Unlike general-purpose clouds, POD offers true HPC -- bare metal with InfiniBand -- and is ready-to-run with hundreds of pre-installed applications, including ones with ready-to-run cloud licenses. In fact, Arup's initial performance-based seismic engineering work and nonlinear time history analysis on POD was so impressive, they moved 100% of their LS-DYNA jobs over to POD.

This allowed them to parallelize their LS-DYNA analysis runs, with different calculations on different POD clusters at the same time. As a result, they were able to run simulations in a quantity far beyond what is typical for their industry. The Arup office in Los Angeles has been able to average an impressive 100,000 core-hours in the past few months alone, allowing them to take on and complete more projects than ever before and an HPC advantage that other firms can't match.

And, because we understand the needs of engineering services firms from years of working closely with other engineering clients, we also offer a remote visualization technology that really speeds up the design process. We set Arup up with the ability to view and interact with models in 3D remotely, using Penguin's unique remote visualization system Scyld Cloud Workstation™ (SCW).

This complete remote 3D workspace, accessible from anywhere through just a web browser, allowed multiple users to view and interact simultaneously, enabling collaboration, and accelerating workflows.

The key to this capability is how Scyld Cloud Workstation moves pre- and post-processing to a workstation with direct access to a cluster's data storage -- eliminating the need to download large data files. Users can use the same graphical user interface (GUI) tools as on their local workstations, ensuring continued productivity. As a result, users get performance in a way that is easy to use. This was a huge value to them as it improved their ability to meet deadlines.

Beyond gaining the HPC technology they were initially seeking, Arup was extremely pleased with the ongoing help and quick response time of our Support Engineers. Our HPC experts were able to help Arup get on to HPC on demand quickly and simply. Our team also tailored the POD cluster migration plan to Arup's workloads and scaled it to the size of their business. The outstanding caliber of this included support helped Arup complete even more projects.

In the end, they were able to meet their fluctuating computing needs, save money and space, while also dramatically improving their capacity to quickly complete engineering projects and increase revenue.

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"Scyld Cloud Workstation allows us to post process without downloading our raw results." – Kermin Chok, Arup

Results

With POD and Scyld Cloud Workstation, Arup was able to solve their workflow and computing issues and generate a new HPC advantage that other firms can't match. With Penguin Computing, Arup is able to:

- Reduce the time spent on each LS-DYNA run through
- Support multiple, large-scale, complex seismic design projects simultaneously
- Manage their costs much more efficiently compared with an on-premise cluster
- Minimize the risks associated with building and maintaining a traditional HPC cluster

Solution Components

LS-DYNA, an advanced general-purpose multiphysics simulation software package developed by the Livermore Software Technology Corporation (LSTC)
Public cloud Penguin Computing On-Demand HPC cluster with Intel® Xeon® Scalable processors and Infiniband interconnects
Penguin Computing® Scyld Cloud Workstation™
Optimization and other assistance from the Penguin Computing On-Demand support team

Learn More

See related solutions at www.penguincomputing.com/pod

For pricing on your specific design needs, contact a representative by email at podsales@penguincomputing.com or call 1-888-PENGUIN (736-4846).

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About Penguin Computing, a SMART Global Holdings Company

Penguin Computing, a U.S.-based global provider of high-performance computing (HPC), artificial intelligence (AI), and data center solutions, has been serving industry for over 20 years with more than 2,500 customers in 40 countries across eight major vertical markets. Penguin offers a comprehensive portfolio of hardware and software including solutions based on the Open Compute Project (OCP), as well as extensive services including financing, and top-rated customer support. Penguin Computing products include Linux-based servers, software, integrated turn-key clusters, enterprise-grade storage, and bare metal HPC, all available in hardware or cloud-based solutions via Penguin Computing® On-Demand™ (POD). Penguin Computing is a subsidiary of SMART Global Holdings, Inc., and the cornerstone of SMART's newest business unit, Specialty Compute & Storage Solutions (SCSS).

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