Case Study

Cloud HPC with Torpenhow
An integrated solution for the adoption of cloud
high-performance computing for your simulation workflow

As a start-up specialised in fluid dynamics and requiring access to huge amounts of computational power to develop its projects, cloud high-performance computing (HPC) was an obvious choice for Sabe Fluid Dynamics.

Our own journey highlighted a very convoluted cloud environment, with multiple paths available to be taken and far from straightforward integration across services. We also found that the skillset required to develop a cloud-based simulation workflow is very unique, it requires knowledge in traditional IT, cloud-specific knowhow and deep knowledge of the simulation software to be used.

The above-described challenges are major barriers for cloud adoption, particularly for small and medium-sized businesses. Paradoxically, those types of companies are the ones to benefit the most from the cloud.

Sabe developed **Torpenhow** to address our own needs for reliable, integrated and cheap cloud HPC, while compatible with a long-term view for cloud data storage. Torpenhow offers full integration between storage instances, virtual workstations and our 13000 cores cluster.

Because all the instances work alongside within the same datacentre, we removed the need for the upload and download of large files. We develop all the resource-intensive steps of our simulation workflows directly on the cloud, we use our cluster to perform multiple batch processes with different hardware (meshing, solve, post-processing), we launch powerful cloud workstations to manually inspect models, debug issues and perform manual post-processing, and we keep our data in our storage instances long-term.

Summary

Background Application:
Engineering simulation workflows which require significant high-performance computing (HPC) resources.

Engineering Challenge:
Cloud computing is an incredibly powerful resource for engineering companies, allowing them to access additional resources on-demand.

The cloud environment currently is still very convoluted, its adoption for simulation workflows requires a specific mix of skills which are not easily found in the market.

Technology and Value Proposition:
Sabe has developed an integrated solution across three key components for simulation workflows: storage, virtual workstations and clusters.

Torpenhow provides a user-friendly interface operating over an API, thus allowing full workflow automation.

It significantly facilitates the adoption of a primary cloud HPC provider, returning a "fully in the cloud" experience, significant cost savings and long-term planning for data storage.
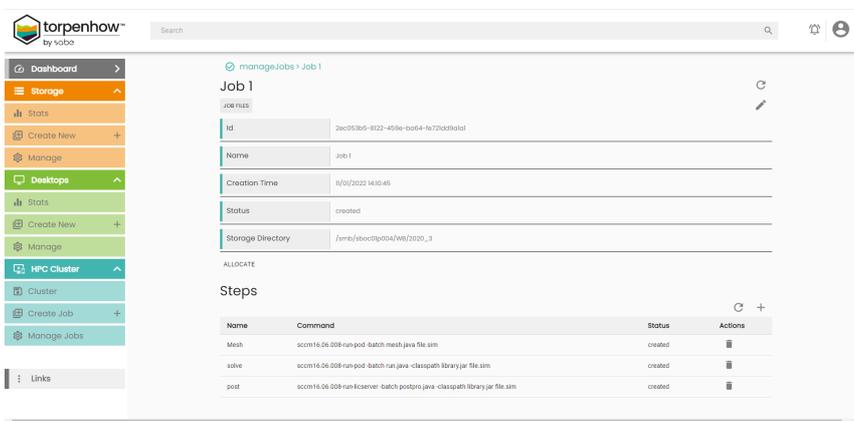
Our files are initially stored within a "transaction optimised" tier, meaning high-performance access at a higher cost. Once a given project or stage of the project is finished, we switch the instance to a "cold" tier which results in a lower speed access but at a cheaper storage cost. And finally, a few months after the project is finished, the instance is switched to "archive" tier, which returns a drastic reduction in the cost of storage.

"Torpenhow democratises the use of cloud HPC within Sabe, most of us can focus on being engineers and delivering the best possible outcome to our clients' engineering challenges, without the need for deep knowledge in cloud systems or high-performance computing", says Gerson Garsed-Brand, Sabe's Managing Director.

In addition to the user-friendly interface, Torpenhow operates through an API (Application Programming Interface). This means straightforward automation and integration to other components of a company's workflow. Examples could include database management or data analysis tools.

A few third-party multi-cloud platforms are available in the market and are useful alternatives for companies which require to "burst" into the cloud at specific periods of high demand. These platforms act as another layer between the user and the primary providers (i.e. MS Azure, AWS, Google Cloud). Their services, however, either provide methodology constraints (they are software-specific or act as a black box with little control by the user) or come at significantly higher price. They are also not well positioned to allow for long-term data storage.

Torpenhow is different because it is not a multi-cloud platform, it focuses on connecting the user directly to their own account with a primary provider. This approach returns many benefits, including significantly lower costs, higher levels of integration and customisation with other cloud-based tools and long-term data storage planning.

We advocate that if your company is considering switching to cloud HPC, it will benefit hugely by moving most of your workflow directly to a primary cloud provider. This approach is cheaper, safer, more robust and more sustainable in the long-term regarding data storage.

Torpenhow is here to smoothly enable your transition to the cloud. Contact Fluid Dynamics to discuss your needs and plans.

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