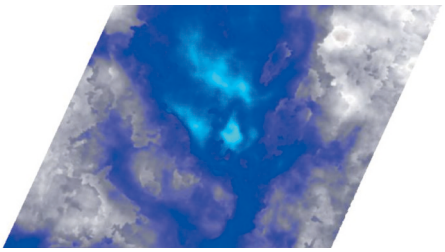
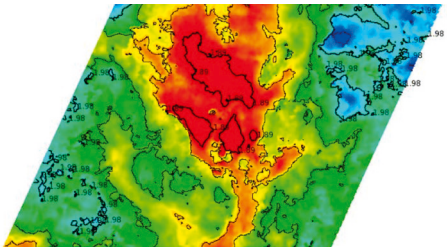
FORTISSIMO

Cloud-based processing of seismic data

Fortissimo Experiment Facts:
- Segment: Oil and Gas
- Application Domain: Geology
- Application: Pre-StackPro





The Company

Seismic Image Processing (SIP) and Sharp Reflections are a premier suppliers of geological and geophysical services, with a strong reputation for integrated processing, depth imaging, and rock physics. SIP and Sharp Reflections offer a wealth of experience and proprietary technologies which provide clients with unique and innovative solutions. SIP and Sharp Reflections are innovative SMEs employing together18 geophysicists who work on processing and imaging, reservoir characterization and rock physics. SIP is the end user of the Pre-StackPRO software tool.

Sharp Reflections is an innovative software company bringing fast, full-survey pre-stack computing to the interpreter's desktop. The application Pre-StackPRO harnesses the power of many-core CPUs to deliver visual, real-time affordable processing via the Cloud. Sharp Reflections defines a leading edge in seismic data analysis.

The Challenge

As the Oil&Gas industry has to deal with more and more complex geological targets, high-resolution processing of seismic data and interpretation of results has become strategically important for most companies in this sector. The Pre-StackPRO software addresses this need for high resolution by taking advantage of innovative and powerful computation and visualization capacities. Pre-StackPRO enables users to work interactively on very large pre-stack data sets. It offers seismic interpreters the possibility to execute complex processing to improve data quality and extract information about sub-surface geology. This software is in production use by SME oil and service companies. These SMEs do not buy HPC clusters for financial reasons, but run the software on up to a few nodes, and therefore do not benefit from the software's full scaling capabilities, one of the main advantages of Pre-StackPRO. The aim of this experiment is to allow small seismic processing companies and small oil and gas exploration companies to analyse their data by using cloud-based HPC systems without the need to buy and maintain a compute cluster themselves.

The Solution

Significant changes to the underlying software architecture of Pre-StackPRO, including fully decoupling Pre-StackPRO from a specific hardware infrastructure, have been made. This way the end-user can freely choose the datacentre and hardware that fits best to their use-case. End-users can now fully exploit the full potential of Pre-StackPRO through the utilization of a cloud-based HPC infrastructure. With the implementation of Pre-StackPRO in the HPC cloud it is now available from any remote location through remote desktop connections, which enables new business models and opportunities for collaboration on seismic datasets. The ISV, Sharp Reflections, has created a new pay-per-use business model and licensing scheme for cloud-based HPC computation, thus gaining access to new markets. The significant cost savings of this new approach can lead to an increased market share and reduced costs.

Fortissimo Experiment Partners:
- SIP and Sharp Reflections (End-user)
- Sharp Reflections (ISV)
- Fraunhofer ITWM (HPC Expert)
- BULL (HPC Provider)

More Information:
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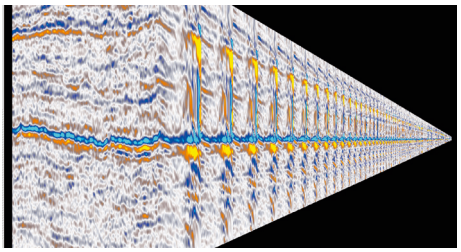

The Benefits

A common configuration for in-house seismic processing by SMEs using Pre-StackPRO comprises a perpetual software licence costing €87k plus 20% annual maintenance. The software runs on a 2-node in-house system costing €40K. Annual hardware maintenance costs are €4K. Amortising over 4 years gives an annual cost of ~€55K regardless of the number of hours of processing on the system. These costs are an obstacle to SMEs to use the advanced capabilities of Pre-StackPRO. Furthermore, the limitations of such a system are clear. When the processing requirements are high, they cannot be met by the in-house system. When the processing requirements are low, expensive hardware and software are not being used.

Based on the outcomes of this experiment, Bull is offering a compute node with Pre-StackPRO installed and licensed as a Cloud-based service. Such nodes can be purchased on a pay-per-use basis ranging from 1 week to 3 years. Clearly the advantage of such an offering is that variable workloads can be easily and cost effectively accommodated. Savings, over the in-house solution, of between €20K to €30K for each SME can be expected. There are around 250 such SMEs in the EU so these savings across the industry are significant. Furthermore, the flexible pay-per-use approach enables much larger data-sets to be processed by scaling up the hardware as needed. It is expected that the provision of such a service will increase Sharp Reflection's total revenues significantly. In a conservative business model SaaS will realise about 1 M€, equivalent to 10% of total revenues in 2017, gradually increasing to 4 M€ and 23% of total revenues in 2022.

In Bull's experience, for this type of application, HPC compute revenues associated with an ISV offering usually account for around 40% of the total amount billed to the customer. The remainder is allocated as 50% ISV licence fees and 10% added services. Taking into account Sharp's SaaS business predictions and assuming eXtreme factory to realise a 50% of Sharp's SaaS activity via the Fortissimo Marketplace, would amount to an increased revenue for BULL of ~200K in 2017 growing to €800K in 2022.

The Fortissimo Project

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves 123 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in 53 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and is part of the I4MS Initiative.

I4MS Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: www.i4ms.eu

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