Repsol's Kaleidoscope (December 2006)

3DGeo's reverse time migration seismic package is to run on the Barcelona Supercomputing Center's MareNostrum calculator, leveraging IBM's Cell BE technology as in the Sony Playstation III.

Repsol YPF has just announced a geophysical supercomputing project to leverage technology from Houston-based seismic boutique 3DGeo. The Kaleidoscope project is a long-term joint development program of novel seismic imaging technologies including compute intensive reverse time migration (RTM). The high-end processing techniques will be used, inter-alia, to image complex tectonics in Repsol's Gulf of Mexico exploration portfolio. The new models and algorithms will run on what is described as one of the world's most powerful supercomputers, the MareNostrum, operated by the Barcelona Supercomputing Center (BSC).

Ortigosa

Francisco Ortigosa, Repsol's head of geophysical operations, said 'This project will accelerating the roll-out of next generation imaging technologies and will leverage our position as sponsors of both the Stanford Exploration Project (SEP) and the Barcelona Supercomputing Center (BSC). We selected 3DGeo because of its track record, being the first processing house to demonstrate commercially feasible 3-D wave-equation migration.'

Biondi

Biondo Biondi, 3DGeo co-founder and CTO who is also an associate professor at Stanford, added, 'The program will build on our existing high-end imaging applications to realize so far unimplemented cutting-edge, full wavefield imaging techniques. Testing the new algorithms will benefit from BSC's experience of computer architecture and parallelization.'

MareNostrum

MareNostrum resulted from a partnership between IBM and the Spanish Government. The original design targeted a 40 TFlop bandwidth and the No. 4 spot on the TOP500 list in 2005. MareNostrum was originally designed as a Linux cluster of 2,282 IBM BladeCenter with dual 64-bit IBM Power processors and 140 TB of storage.

Cell BE

The architecture is to be extended to test the new IBM Cell BE, as used in the Sony Playstation III. The new solution will speed processing time by 'several orders of magnitude.'

Shared memory

One of the big issues in HPC is the difficulty of scientific programming across the complex memory models of multi-core, clustered machines (see our HPC report from the SEG on page 7 of this issue).

Bevc

3DGeo president Dimitri Bevc told Oil IT Journal, 'We are working with our partners to make the programming model more straightforward. CBE is still a distributed model, but it has potential to perhaps better handle some of the issues with which competing technologies (GPUs & FPGAs) have had trouble. Eventually, we may see commodity priced large memory machines.' 3DGeo is to open a new office in Barcelona.

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