

High-performance Computing to Understand Water Movements

Woods Hole Group has increased its capabilities with the introduction of in-house, high-performance computing (HPC) this month. A team of Woods Hole Group engineers built a 'Beowulf', a networked cluster of computers that solves complex problems in a fraction of the time it would take a single system to do so. The computer will allow Woods Hole Group to provide its clients with a more detailed understanding of how water moves in the coastal environment and the complex coastal processes that influence their projects.

The computer allows for more refined models with increased resolution and higher dimensions. The company can now simulate complex waves, currents, tides, and sediment transport processes using high resolution, three-dimensional scales and offer the services at an improved cost and timeframe. Intricate models involving the solution of quadrillions of equations can now be done rapidly. In some cases, it means being able to solve problems that would be intractable with traditional computing resources.

According to Dennis Aubrey, president of Woods Hole Group, the Beowulf is a game-changer for a company of their size. "To have a computer that can provide significantly higher-resolution modeling in a fraction of the time means that we can provide our clients better and faster results for less money. This kind of technology puts us on a playing field with, or ahead of, the largest companies in our industry."

Woods Hole Group's Beowulf is built from a dozen Linux servers, each with a pair of 64-bit quad-core Intel Clovertown processors and 8 gigabytes of RAM. They are connected by a switched gigabit network with separate networks for inter-process communication and storage. It has a theoretical peak performance of 768 GFLOPS. For example, it can theoretically multiply two numbers together 768 billion times in a second.

Woods Hole Group had previously supplemented its own resources with a third party provider for its high-performance computing needs.

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