ExxonMobil, working with the National Center for Supercomputing Applications (NCSA), has achieved a major breakthrough with proprietary software using more than four times the previous number of processors used on complex oil and gas reservoir simulation models to improve exploration and production results.

The breakthrough in parallel simulation used 716,800 processors, the equivalent of harnessing the power of 22,400 computers with 32 processors per computer. ExxonMobil geoscientists and engineers can now make better investment decisions by more efficiently predicting reservoir performance under geological uncertainty to assess a higher volume of alternative development plans in less time.

The record run resulted in data output thousands of times faster than typical oil and gas industry reservoir simulation. It was the largest number of processor counts reported by the oil and gas industry, and one of the largest simulations reported by industry in engineering disciplines such as aerospace and manufacturing.

“This breakthrough has unlocked new potential for ExxonMobil’s geoscientists and engineers to make more informed and timely decisions on the development and management of oil and gas reservoirs,” said Tom Schuessler, president of ExxonMobil Upstream Research Company. “As our industry looks for cost-effective and environmentally responsible ways to find and develop oil and gas fields, we rely on this type of technology to model the complex processes that govern the flow of oil, water and gas in various reservoirs.”

The major breakthrough in parallel simulation results in dramatic reductions in the amount of time previously taken to study oil and gas reservoirs. Reservoir simulation studies are used to guide decisions such as well placement, the design of facilities and development of operational strategies to minimize financial and environmental risk. To model complex processes accurately for the flow of oil, water, and natural gas in the reservoir, simulation software must solve a number of complex equations. Current reservoir management practices in the oil and gas industry are often hampered by the slow speed of reservoir simulation.

ExxonMobil’s scientists worked closely with the NCSA to benchmark a series of multi-million to billion cell models on NCSA’s Blue Waters Super Computer. This new reservoir simulation capability efficiently uses hundreds of thousands of processors simultaneously and will have dramatic impact on reservoir management workflows.

“NCSA’s Blue Waters sustained petascale system, which has benefited the open science community so tremendously, is also helping industry break through barriers in massively parallel computing,” said Bill Gropp, NCSA’s acting director. “NCSA is thrilled to have worked closely with ExxonMobil to achieve the kind of sustained performance that is so critical in advancing science and engineering.”

ExxonMobil’s collaboration with the NCSA required careful planning and optimization of all aspects of the reservoir simulator from input/output to improving communications across hundreds of thousands of processors. These efforts have delivered strong scalability on several processor counts ranging from more than 1,000 to nearly 717,000, the latter being the full capacity of NCSA’s Cray XE6 system.

About ExxonMobil

ExxonMobil, the largest publicly traded international oil and gas company, uses technology and innovation to help meet the world’s growing energy needs. We hold an industry-leading inventory of resources and are one of the largest integrated refiners, marketers of petroleum products and chemical manufacturers. For more information, visit www.exxonmobil.com or follow us on Twitter www.twitter.com/exxonmobil.

Cautionary Statement: Statements of future events or conditions in this release are forward-looking statements. Actual future results, including the results and impact of new technologies, could vary depending on the outcome of further research and testing; the development and competitiveness of alternative technologies; technical and operating factors; and other factors discussed in this release and under the heading “Factors Affecting Future Results” on the Investors page of ExxonMobil’s website at exxonmobil.com.

About the National Center for Supercomputing Applications

The National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign provides supercomputing and advanced digital resources for the nation’s science enterprise. At NCSA, University of Illinois faculty, staff, students, and collaborators from around the globe use advanced digital resources to address research grand challenges for the benefit of science and society. NCSA has been advancing one third of the Fortune 50 for more than 30 years by bringing industry, researchers and students together to solve grand challenges at rapid speed and scale. The Blue Waters Project is supported by the National Science Foundation through awards ACI-0725070 and ACI-1238993.

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