



## ANSYS, Saudi Aramco and KAUST Shatter Supercomputing Record

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PITTSBURGH, July 18, 2017 /PRNewswire/ -- [ANSYS](#) (NASDAQ: ANSS), [Saudi Aramco](#) and [King Abdullah University of Science and Technology \(KAUST\)](#) have set a new supercomputing milestone by scaling ANSYS® Fluent® to nearly 200,000 processor cores – enabling organizations to make critical and cost-effective decisions faster and increase the overall efficiency of oil and gas production facilities.

image

This supercomputing record represents a more than 5x increase over the record set just three years ago, when Fluent first reached the 36,000-core scaling milestone.

The calculations were run on the Shaheen II, a Cray® XC40™ supercomputer, hosted at the KAUST Supercomputing Core Lab (KSL). By leveraging high performance computing (HPC), ANSYS, Saudi Aramco and KSL sped up a complex simulation of a separation vessel from several weeks to an overnight run. This simulation is critical to all oil and gas production facilities – empowering organizations around the world to reduce design development time and better predict equipment performance under varying operational conditions. Saudi Aramco will apply this technology to make more-informed, timely decisions to retrofit separation vessels to optimize operation throughout an oil field's lifetime.

"Today's regulatory requirements and market expectations mean that manufacturers must develop products that are cleaner, safer, more efficient and more reliable," said Wim Slagter, director of HPC and cloud alliances at ANSYS. "To reach such targets, designers and engineers must understand product performance with higher accuracy than ever before – especially for separation technologies, where an improved separation performance can immediately increase the efficiency and profitability of an oil field. The supercomputing collaboration between ANSYS, Saudi Aramco and KSL enabled enhanced insight in complex gas, water and crude-oil flows inside a separation vessel, which include liquid free-surface, phase mixing and droplets settling phenomena."

"Our oil and gas facilities are among the largest in the world. We selected a complex representative application – a multiphase gravity separation vessel – to confirm the value of HPC in reducing turnover time, which is critical to our industry," said Ehab Elsaadawy, computational modeling specialist and oil treatment team leader at Saudi Aramco's Research and Development Center. "By working with strategic partner, KAUST, we can now run these complex simulations in one day instead of weeks."

KSL's Shaheen II supercomputer is a Cray system composed of 6,174 nodes representing 197,568 processor cores tightly integrated with a richly layered memory hierarchy and interconnection network.

"Multiphase problems are complex and require multiple global synchronizations, making them harder to scale than single phase laminar or turbulent flow simulation. Unstructured mesh and complex geometry add further complexity," said Jysoo Lee, director, KAUST Supercomputing Core Lab. "Our scalability tests are not just designed for the sake of obtaining scalability at scale. This was a typical Aramco separation vessel with typical operation conditions, and larger core counts are added to reduce the time to solution. ANSYS provides a viable tool for Saudi Aramco to solve their design and analysis problems at full capacity of Shaheen. And for KAUST-Aramco R&D collaboration, this is our first development work. There are more projects in the pipeline."

### About ANSYS, Inc.

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge, or put on wearable technology, chances are you've used a product where ANSYS software played a critical role in its creation. ANSYS is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and create products limited only by imagination. Founded in 1970, ANSYS employs thousands of professionals, many of whom are expert M.S. and Ph.D.-level engineers in finite element analysis, computational fluid dynamics, electronics, semiconductors, embedded software and design optimization. Headquartered south of Pittsburgh, Pennsylvania, U.S.A., ANSYS has more than 75 strategic sales locations throughout the world with a network of channel partners in 40+ countries. Visit [www.ansys.com](http://www.ansys.com) for more information.

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### About Saudi Aramco

Saudi Aramco is the state-owned oil company of the Kingdom of Saudi Arabia and a fully integrated global petroleum and chemicals enterprise. Over the past 80 years, we have become a world leader in hydrocarbons exploration, production, refining, distribution and marketing. Saudi Aramco's oil and gas production infrastructure leads the industry in scale of production, operational reliability, and technical advances. Our plants and the people who run them make us the world's largest crude oil exporter, producing roughly one in every eight barrels of the world's oil supply.

### About King Abdullah University of Science and Technology (KAUST)

KAUST advances science and technology through distinctive and collaborative research integrated with graduate education. Located on the Red Sea coast in Saudi Arabia, KAUST conducts curiosity-driven and goal-oriented research to address global challenges related to food, water, energy and the environment. Established in 2009, KAUST is a catalyst for innovation, economic development and social prosperity in Saudi Arabia and the world.

The university currently educates and trains over 900 master's and doctoral students, supported by an academic community of 150 faculty members, 400 postdocs and 300 research scientists. With 100 nationalities working and living at KAUST, the university brings together people and ideas from all over the world. [www.kaust.edu.sa](http://www.kaust.edu.sa)

The KAUST Supercomputing Core Lab mission is to inspire and enable scientific, economic and social advances through the development and application of HPC solutions, through collaboration with KAUST researchers and partners, and through the provision of world-class computational systems and services. Visit <https://corelabs.kaust.edu.sa/supercomputing/> for more information.

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