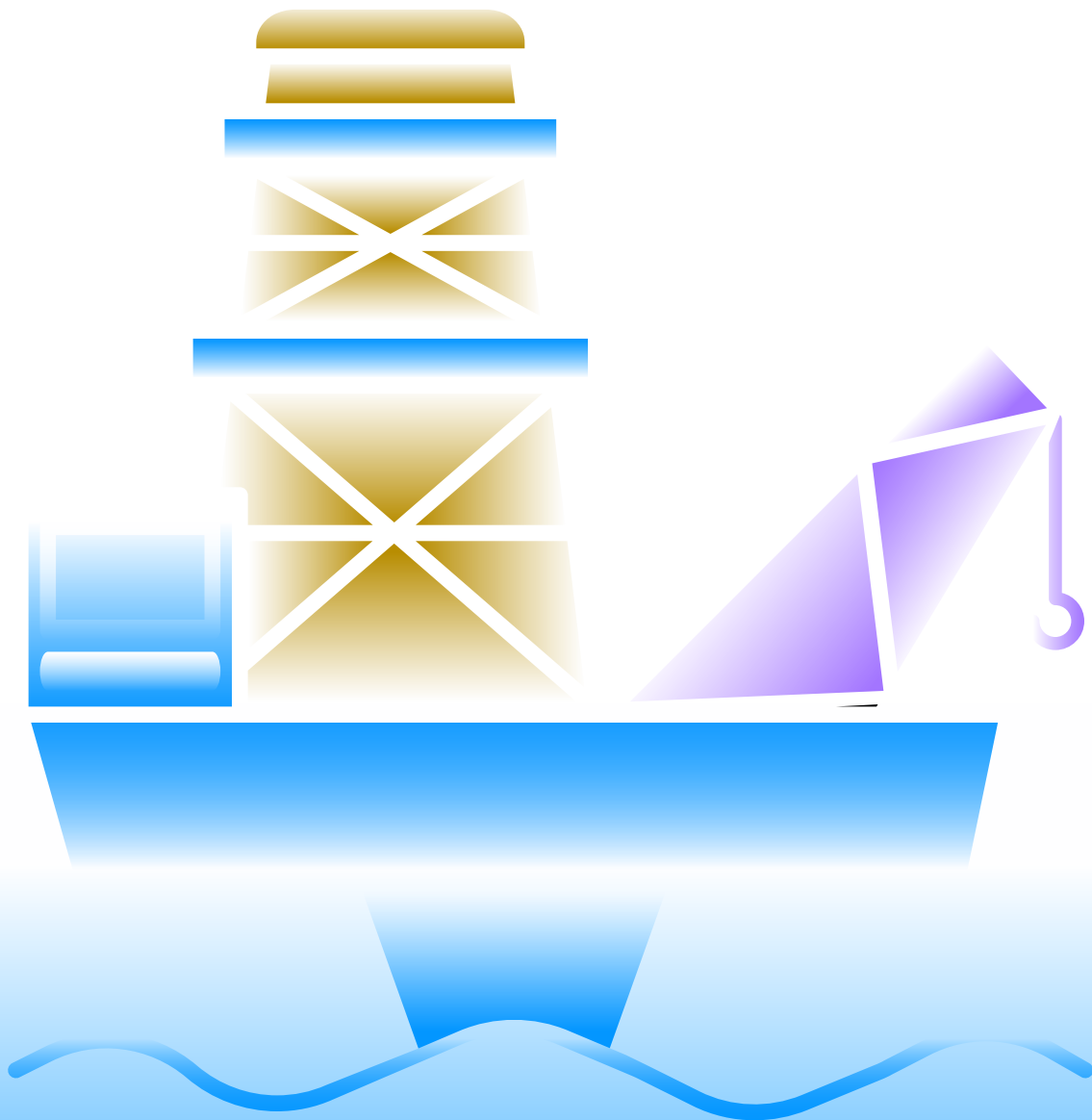


Making a splash in the mature towboat market

Newcomer MiNO Marine used JARVICE™ and the Nimbix Cloud to accelerate analyses and engineer all-new hulls for instant differentiation



Atos

At a glance

US-based MiNO Marine outsourced its HPC infrastructure to the Nimbix Cloud for accelerated engineering analyses that helped the company make waves in a well-established market.

Outcomes

- Designed the world's largest cylindrical lift boat with legs that extend 335 feet.
- Designed and optimized a new class of offshore wind turbine installation ship.
- Designed a 6,000-horsepower towboat with a unique hull design that became a differentiator with ships in production in under a year.



MiNO Marine, LLC (MiNO) is a Louisiana-based naval architecture and marine professional services firm started in 1997, with services ranging from marine vessel concept design to full vessel production drawing packages. Today, it performs full spectrum ship design, primarily for the offshore and oil and gas market. Recently the company has diversified into more specialized crafts including high-speed vessels, self-elevating boats for offshore wind construction and maintenance, and dredging and inland river craft. More at

[MiNO Marine | Naval Architecture & Marine Professional Services.](#)

Entering choppy waters

Engineering design for river towboats hadn't changed much in decades, and the major players had become comfortable. To break into this market, MiNO Marine had to develop a fundamentally different ship design. For that, it needed the resources of an HPC partner like Nimbix.

Vessel design and engineering at MiNO requires advanced high-end analysis involving simulations of hydrodynamics, seakeeping analyses, and resistance and power analyses. MiNO leveraged a computational fluid dynamics software, Star-CCM+, to help with ship hull design, allowing it to optimize hull forms for resistance, minimize power required to push the vessel through the water, and solve even more difficult problems like seakeeping and estimating the massive forces generated by impacting waves.

However, David M. Bourg, Founder and Managing Partner, knew that the sheer computing resources needed to run these simulations far exceeded that of the firm's desktop computers. The simulations would run for days, lengthening the time required to complete and deliver their clients' projects. In addition, MiNO didn't want to invest in its own HPC cluster, as HPC servers were cost prohibitive for a company of its size.

Plus, the MiNO team were scientists and engineers, not infrastructure experts, and keeping such a costly investment up to date wasn't something they were equipped for. To deliver real value to its customers, MiNO needed a cost-effective, high-performance computing platform to speed up its simulations and analyses, without the burden of having to maintain it on its own.

Full steam ahead!

MiNO Marine used the Nimbix Cloud powered by JARVICE to accelerate the execution of simulations using the Star-CCM+ program and then analyze the results of its simulations. This HPC application accurately simulates the behavior of fluids, liquids, and gases as they interact with solid boundaries — such as the hull of a ship or an offshore drilling platform — as well as modeling heat transfer and other physics. Running Star-CCM+ within the Nimbix platform, MiNO can simulate the flow of water around a ship as it moves through both seawater and fresh water, as well as the pressure and impact of waves of differing intensities. This allows MiNO's engineers-designers to model the ship accurately and geometrically, accounting for variable properties like mass/weight, shape, and center of gravity without the need to create potentially hundreds of physical prototypes.

The result is the accurate assessment of pressures that are acting on the ship under different conditions, as well as how much force is required to drive a ship through the water at a certain speed. From there, the team can alter the design geometry of the ship to improve its performance, maximize safety, and minimize the power required to propel it forward.

Emerging top of the class

Since outsourcing its HPC computing infrastructure to the Nimbix Cloud, MiNO has been able to accomplish ship design feats that rival competitors many times its size. Nimbix allows MiNO engineers to focus their attention on what they do best — ship design — rather than on maintaining an HPC infrastructure that can provide the speed, ease-of-use, and cost effectiveness they need to run its complex simulations and analyses. Some of the resulting solutions include:

- First-in-class design of specialized self-elevating boats that lift themselves completely out of the water. MiNO designed the world's largest cylindrical lift boat, with legs that extend 335 feet.
- Design and optimization of a new class of offshore wind turbine installation ship leveraging MiNO's experience with participation in the first U.S. implementation of an offshore wind farm.
- Rapid penetration into the mature, inland towboat market, designing a 6,000-horsepower towboat with a unique all-new hull design that instantly became a sales differentiator — multiple ships were in production in under a year.

JARVICE and the Nimbix Cloud now allow MiNO to perform simulations and analyses that used to take days in a few hours. The company's workstations would often run full throttle for days at a time, even those equipped with eight cores. "Depending on its complexity, we could let a Star-CCM+ simulation run for several days, but Nimbix cuts the time down to mere hours," says Bourg. "The only other option to get the run times down was to invest in our own cluster, and then we'd be faced with the cost and burden of operating and maintaining that system."

In addition, unlike desktop workstations, Nimbix allows MiNO to run simulations in parallel, giving it greater bandwidth to complete clients' design analyses in a fraction of the time and at a lower cost. "We pay Nimbix for the processor time, plus clock time on our Star-CCM+ licenses," says Bourg. "We can upload dozens of these scenarios and run them simultaneously on hundreds of cores, letting us analyze a whole matrix of design cases in a day or two. That's a huge benefit for us in terms of schedule and a big plus for our clients."

Why Atos?

The Nimbix Supercomputing Suite is a set of flexible and secure as-a-service high-performance computing (HPC) solutions. This as-a-service model for HPC, AI and Quantum in the cloud provides customers with access to one of the broadest HPC and supercomputing portfolios. It ranges from hardware to bare metal-as-a-service to the democratization of advanced computing in the cloud across public and private data centers.

JARVICE XE brings industry-leading supercomputing cloud technology into your data center to support advanced computing workflows. Learn more about the Nimbix Supercomputing Suite.

Learn more about the [Nimbix Supercomputing Suite](#).

"MiNO Marine's diversification strategy required penetrating a mature market of well-respected ship designers and builders, so we needed to design more than just another towboat. JARVICE™ and the Nimbix Cloud accelerated our analysis capabilities in computational fluid dynamics, allowing us to deliver an all-new hull design based on modern engineering techniques. Ultimately, that differentiator sold our design to the market, and we had these new boats under construction inside a year".

David M. Bourg,
PhD PE,

Senior Director of Engineering
IDEX Biometrics

About Atos

Atos is a global leader in digital transformation with 107,000 employees and annual revenue of over € 11 billion. European number one in cybersecurity, cloud and high performance computing, the Group provides tailored end-to-end solutions for all industries in 71 countries. A pioneer in decarbonization services and products, Atos is committed to a secure and decarbonized digital for its clients. Atos is a SE (Societas Europaea), listed on Euronext Paris and included in the CAC 40 ESG and Next 20 Paris Stock indexes.

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For more information: Cristina.white@atos.net

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