



CASE STUDY /

## Ansys + Emirates Team New Zealand

“For nearly 25 years, we’ve relied on engineering simulation via Ansys to optimize the performance of our yachts both above and below the water. Today we’re running more and more simulations, and computationally larger simulations, as we look at the yacht as an integrated system and perfect the smallest design details, such as dynamic changes in sail shape. Some of our meshes exceed 50 million cells, which was putting a strain on our internal computing cluster. Recently we made the decision to supplement our cluster with Ansys Gateway powered by AWS. The Emirates Team New Zealand is able to scale up on-demand to many times the simulation throughput when using Ansys Gateway powered by AWS and Amazon EC2 HPC6a instances, when compared to their internal cluster. As a result, we can significantly accelerate our design for the 2024 America’s Cup.”

**Steve Collie**

Aerodynamics Coordinator / Emirates Team New Zealand

Emirates Team New Zealand Sails to Victory with Ansys

With strict limits placed on physical testing by the America's Cup organizers, Emirates Team New Zealand relies on engineering simulation to rapidly, reliably, and affordably test a range of design concepts. Emirates Team New Zealand engineers run comprehensive simulations of fluid dynamics and composite structures using Ansys Fluent and Ansys Mechanical that replicate its yachts' aerodynamics above the water and hydrodynamics below the water. Through countless simulations carried out with Ansys, the team most recently optimized its yacht for the 2021 America's Cup, Te Rehutai, leading to a decisive victory.

Today Emirates Team New Zealand has added the flexible computing capacity of Ansys Gateway powered by AWS, to accelerate its results and enable engineers to tackle even more complex problems in the run-up to the next America's Cup race.

Emirates Team New Zealand used Amazon EC2 HPC6a instances powered by 3rd gen AMD EPYC™ processors



**/ Challenges**

To optimize its America's Cup yacht designs, Emirates Team New Zealand engineers combine a proprietary velocity prediction program with Ansys models and high-performance computing (HPC) resources to create a dynamic simulation of the yacht as it moves across the race course, under diverse wind and weather conditions. This helps the team not only optimize the physical profile of the hull, sails, and other components, but also train sailors to trim the sails in the most aerodynamic manner, creating optimized sail shapes as the race progresses. While this digital prototype minimizes expensive physical wind tunnel and tow tank testing, it is computationally large; some of the resulting meshes can exceed 50 million cells. Emirates Team New Zealand engineers were maxing out their in-house HPC cluster, which limited the numbers of simulations they could run and the number of dynamic racing scenarios they could consider. Because the team is focused on fast, continuous innovation that results in winning performance, Emirates Team New Zealand engineers needed a way to flexibly and affordably scale up their HPC capabilities during critical periods so they could keep the wind in their sails.



**/ Technology Used**

- Ansys Gateway powered by AWS
- Ansys Fluent
- Ansys Mechanical

**/ Engineering Solution**

Powered by Amazon Web Services, Ansys Gateway was the perfect solution for Emirates Team New Zealand's changing computing needs. The team's engineers can choose to submit a given simulation job to the in-house HPC cluster or to the cloud via an easy-to-use Gateway interface.

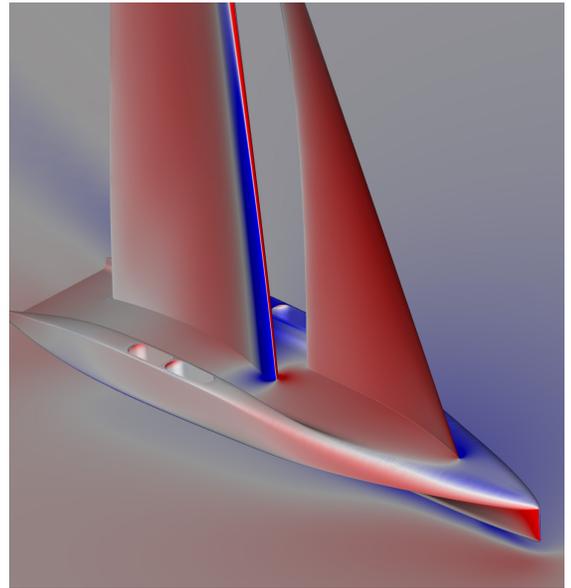
As the internal cluster reaches 100% capacity, Emirates Team New Zealand can quickly shift to the AWS cloud thanks to Ansys Gateway powered by AWS, instead of buying new equipment and making a long-term investment in additional capacity that's only needed during peak periods. While its internal HPC cluster provides Emirates Team New Zealand with a good baseline computing resource, Ansys and AWS provide instant and elastic capacity when engineers are exploring computationally intense problems such as turbulence and cavitation, or running multiple simulations simultaneously.

Ansys Gateway powered by AWS is the solution for developers, designers, and engineers who want to manage their complete Ansys Simulation & CAD/CAE developments in the cloud. Access cloud computing resources from anywhere on virtually any device via your web browser. You can create, customize, and connect cloud applications with minimal technical skills. Manually install your 3rd party applications alongside Ansys applications.

Emirates Team New Zealand used Amazon EC2 Hpc6a instances powered by 3rd Gen AMD EPYC™ processors (96 cores instances). Amazon Hpc6a instances are optimized for tightly coupled, compute-intensive, high performance computing workloads to deliver cost efficient performance. Hpc6a instances are designed for workloads like computational fluid dynamics and other workloads that can take advantage of improved network throughput and packet rate performance.

## / Benefits

The Emirates Team New Zealand is able to scale up on-demand to many times the simulation throughput when using Ansys Gateway powered by AWS, when compared to their internal cluster. Emirates Team New Zealand engineers can specify a cloud-based cluster and always choose the most advanced hardware, effectively upgrading their hardware every day instead of making an investment in new hardware every four years. For an organization that's defined by both speed and innovation, one of the greatest benefits of Ansys Gateway powered by AWS, is that Emirates Team New Zealand engineers can work in a limitless environment, where computing capacity is never an obstacle to their creativity. They can investigate greater numbers of very complex problems. They can minimize their risk of overlooking any single aspect of yacht performance that could ultimately be the difference between winning and losing, because they have the luxury of running as many simulations as they want. They don't need to shortchange investigation or sacrifice analytic rigor as they race to the next design milestone. Emirates Team New Zealand has always been recognized for its sophisticated simulations and its engineering leadership. Now, backed by the speed and power of Ansys Gateway powered by AWS, this team is truly in a class of its own.



“We were surprised by how easy and seamless it is to switch from our internal cluster to the cloud with Ansys Gateway powered by AWS. We can quickly set up a workstation or cluster and select the best hardware. We can replace our hardware every day if we want, instead of replacing physical resources every four years. It's fast and intuitive to switch back and forth from cluster to cloud as our needs change.”

**Steve Collie**  
Aerodynamics Coordinator / Emirates Team New Zealand

## / Company Description

Emirates Team New Zealand is a four-time winner and the defender of the 37th America's Cup, scheduled for 2024. The team represents the Royal New Zealand Yacht Squadron, based in Auckland. In 1995 and 2000, Emirates Team New Zealand became the first team from a country outside the United States to win and successfully defend the America's Cup. Emirates Team New Zealand won the Cup again from the US in 2017 and successfully defended it in 2021. The team has come to typify many of the nation's values — a can-do attitude, teamwork, taking on the “big guy”, accepting a challenge, and striving for excellence.

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