

Trek Bicycle Uses Rescale To Run Cutting Edge Coupled Optimization Analysis

Background

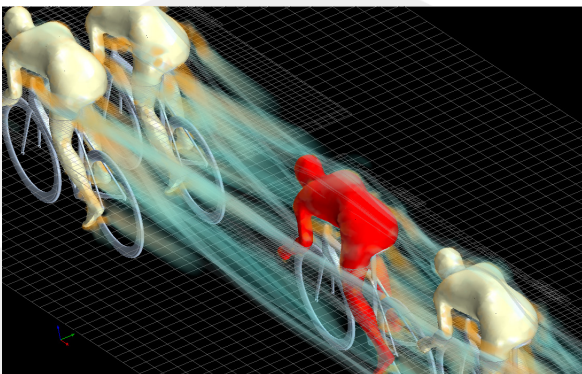
For almost 40 years, Trek Bicycle has believed in a simple mission: build the best bikes in the world. An efficient form of travel, environmentally green, and used by athletes, recreationists, and commuters alike, Trek carries a big responsibility to deliver the quality and durability that is associated with the name. Engineering the latest in transportation technology requires significant computing power. Trek leverages Rescale's cloud simulation platform to build and design competitive and world-changing bicycles.

Customer Challenge

Engineering world-renowned transportation requires high powered computing resources and access to industry-leading software. When internal capacity is reached, and there are tight project deadlines, Trek turns to Rescale to instantly expand their resources.

In a recent analysis, Trek engineers ran a complex simulation using the CFD tool Star-CCM+ by CD-adapco and the optimizer HEEDS by Red Cedar Technology in a coupled analysis on Rescale's cloud simulation platform. The goal was to study varying bicycle drafting methods to introduce new angles to the existing analysis method.

Using Rescale's predefined optimization workflow, Trek coupled Star-CCM+ and HEEDS software in one simulation and enabled the job to run on 64 high performance computing cores instantly. The initial simulation uses a steady-state Reynolds-averaged Navier-Stokes (RANS) turbulence model to study the aerodynamic impact between several riders.

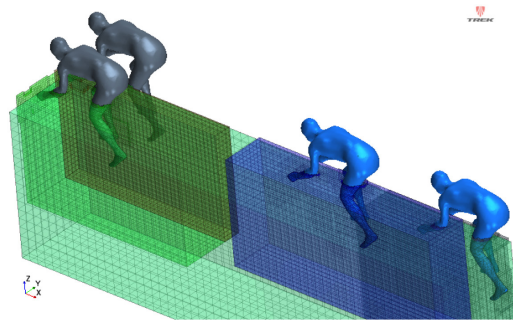


Star-CCM+ volume rendering of drafting bicycle rider simulation

Benefits / Results Achieved

Using Rescale, Trek Bicycle:

- **Instantly accessed over 2TB SSD disk storage** using a high performance hardware configuration
- Ran a **complex coupled optimization analysis** using Star-CCM+ and HEEDS software
- **Leveraged existing software licenses** to reduce simulation costs



Geometry and mesh set up of drafting bicycle rider simulation

Simulation Solution

Accessing Rescale's simulation environment, Trek Bicycle is able to :

- Significantly reduce simulation runtime by using the latest HPC resources available in Rescale's 30+ advanced, global data centers
- Combine simulation software tools without wasting crucial IT personnel and resources
- Execute multiple simulations in parallel to gain important runtime advantages
- Fully explore the experiment to make informed decisions about drafting techniques related to competitive bicycling
- End-to-end data encryption and private, isolated clusters ensure the highest level of job security

Summary

Trek Bicycle entrusts Rescale to provide a secure, financially-competitive, and efficient computing system capable of handling even their most challenging analyses. Using existing Star-CCM+ and HEEDS licenses combined with the natively integrated solvers, Trek was able to easily couple their complex optimizations on Rescale's cloud simulation platform faster than using internal compute resources. Trek Bicycle continues to expand their simulation capabilities and further push the limits of bicycle design.

“With Rescale's platform, we can build complex Star-CCM+ and HEEDS simulations and run analyses much faster than we can internally - drastically reducing our simulation process.
-Chad Manuell, Director of Engineering”

Rescale

Rescale offers a software platform and hardware infrastructure for companies to perform scientific and engineering simulation. Rescale's mission is to provide a highly powerful simulation platform that empowers the world's engineers and scientists to develop the most innovative products and perform groundbreaking research and development.

For more information:

www.rescale.com



CD-adapco

CD-adapco is the world's largest independent CFD-focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation. The scope of our activities extends well beyond software development to encompass a wide range of CAE engineering services in both CFD and FEA.

For more information:

www.cd-adapco.com



Red Cedar Technology

Red Cedar Technology improves and accelerates design processes for companies facing complex product design challenges. Our process automation and design exploration software and services provide engineers with the expertise and technology to reduce product development time and achieve significant productivity gains. Product development teams worldwide use our expertise to design safer cars, engineer life-saving biomedical devices, and develop innovative structures for air travel and space exploration, among many other groundbreaking applications. Red Cedar Technology is a wholly owned subsidiary of CD-adapco.

For more information:

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2015
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