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Exponent Expands HPC Capabilities With Rescale to Drive the Future Of Computational Engineering

Case Study

Exponent

Location: HQ in USA, 20+ Offices Globally

Focus: Engineering & Scientific Consulting

Founded: 1967

10x Acceleration of engineering and scienctific computing solve speed

10x Increase in simulation fidelity to meet growing job complexity

"Technological complexity in our clients needs is growing so we need to have the compuational capabilities to support them."

Case Study Overview

Exponent provides a wide variety of engineering and scientific consulting services to the world's largest innovators. As increasing technological complexity carries both great advantages and risks, Exponent's clients often rely on their simulation and testing expertise which require the latest high performance computing (HPC) capabilities available. With growth in the number of clients, projects, and consultants requiring HPC, Exponent selected Rescale to provide a scalable and easy-to-uses solution to drive project efficiency and improve client results.

Conquering computation to understand the real world

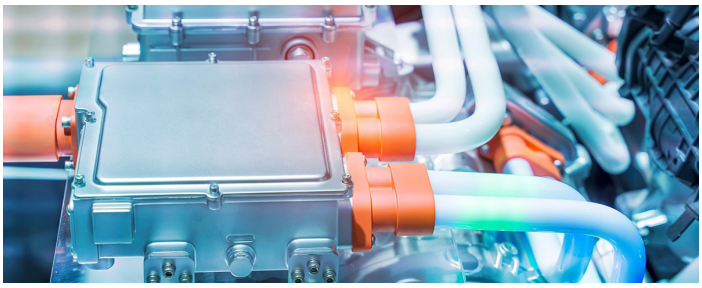
From its early years focused on high-profile profile failures in aerospace, Exponent has built a strong reputation for being among the best in technology testing and quality assurance. The engineers and scientists at Exponent span over 90 different disciplines which provides their clients with independent expertise to solve design challenges or investigate product performance to a high degree of real-world accuracy. A key ingredient to these services is the use of HPC-driven design iteration and simulation, the resources. Managing Engineer Zachary Owens explains that "technological complexity in our clients demands is growing so we need to have the compuational capabilities to support them." Some disciplines in particular at Exponent, Thermodynamics and Fluid Dynamics, have seen growth in client work request for projects focused on the next generation of consumer electronics, energy, healthcare, and automotive products.

Staying ahead of mounting complexity

The needs of these teams' projects quickly outpaced the computational capacity of Exponent's internal HPC hardware so the team evaluated Rescale as solution that could be right-sized for each client and simple enough for new engineers joining the team to learn and use quickly. After evaluation in 2017, Exponent began utilizing Rescale for solving it's most challenging HPC jobs, enabling various consulting teams to expand the scope of work and new possibilities for solving client challenges. With Rescale any Exponent consultant, anywhere in the world can instantly access the latest HPC hardware and software for each clients needs.

Streamlining productivity from the first interaction

From the first login, consultants were able to get started with the software they were already familiar with and run them on cloud-based HPC infrastructured optimized for parallel or serial computing based on the job requirement or their objectives like speeding up solve time. Lindsey Gilman, a fluid dynamics specialist at Exponent says that "Having the software already installed on Rescale including various versions I need saves me a lot of time. And being able to opimtize the software to run on specific hardware helps to reach my job results as much as 10x faster." With virtually-infinite capability in the cloud optimized for efficiency, the Exponent team has also been able to increase the fidelity of their simulations with higher cell counts as high as 25 million cells. Collaborating teams can easily manage data on job configurations and large output files to be shared, searched, and secured.



Pictured: Exponent simulates the thermal conditions of consumer products from automotive to wearables technology

Business Optimized, Client Customized Computing

In an effort to increase business value from its HPC activities, Exponent leverages Rescale to keep productivity high and standardize best practices like optimal hardware/software combinations based on requirements. This ensures strict data access and security, increased resource efficiency, and granular tracking for accounting purposes. These efficiencies have enabled Exponent to triple the number of CFD consultants, giving them a seamless HPC experience from day one. After overseeing the roll out and mangagement of Rescale, Owens describes it as a "Gamechanger. Now we can take on more and larger client projects and don't have to make compromises to meet client demands."

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TensorFlow SCHRÖDINGER. Mentor Graphics ALTAIR jupyter KEYSIGHT TECHNOLOGIES ROCKY
EDEM esi SIEMENS SIMULIA ABAQUS COMSOL F cadence
MOLDFLOW RECURDYN HEXAGON MSC Software Ansys DASSAULT SYSTEMES ABAQUS MATLAB
orcina blender GROMACS STAR-CCM+ CONVERGE CFD SOFTWARE OpenMC

Rescale optimizes 800+ HPC applications on any AWS cloud architecture

"One of my favorite things about Rescale is that I don't have to worry about waiting in a queue or wondering if or when my job is going to run. I can also tailor the computational resources for the client problem at hand, enabling me to run job 10x faster or explore 10x more design parameters."

— **Michael Acton, Senior Associate Consultant, Thermal Science**

Rescale Integrates Best-in-Class Tools For Streamlined Computational Engineering and Science

Define HPC and R&D Goals:

- » Accelerate Simulation Results
- » Increase Consultant Productivity
- » Standardize Best Practices
- » Reduce Overhead and IT Burden

rescale

Modern R&D Software
Computational Fluid Dynamics, Finite Element Analysis, Electromagnetics, and more...

R&D Workflow Automation

IT / HPC Operations Automation

Policy-Based Reporting & Controls

Latest Cloud Hardware
Scale, global coverage, and broad optionality across cloud architectures.

Software Lifecycle Automation & License Management

Full Stack Cost & Performance Optimization

Full Stack Security & Compliance

Strategic Business Outcomes

- » Faster, easier engineer onboarding
- » Improved Simulation Fidelity
- » End-to-End Automation
- » Decreased Capital Expenditures

Exponent®

Exponent is a multi-disciplinary engineering and scientific consulting firm that brings together more than 90 different disciplines to solve engineering, science, regulatory, and business issues facing our clients.

Areas of Focus

- » Accident & Failure Investigation
- » Environmental & Health Consulting
- » Internal Arbitration
- » Regulatory Compliance
- » Design & Process Evaluation
- » Climate Change Consulting
- » Product Performance, Safety, & Recall
- » Industrial & Occupational Safety
- » Research & Technology Development
- » Setting a Course Through the Coronavirus

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