

## AGC Unleashes Potential with HPC in the Cloud



AGC is one of the world's largest glass and ceramics producers.

### Background and Challenge

Founded in 1907, AGC is the global leader in glass, ceramic, chemicals and electronics materials manufacturing. Operating 210 companies globally, today AGC complements its core materials business with a focus on strategic industries such as mobility, electronics and life sciences. AGC is united by its forward-looking mission and vision to look beyond—to overcome new challenges—and to continuously drive innovations that improve people's lives everywhere.

AGC turned to Rescale to both look and go beyond what can be done with traditional on-premise enterprise IT and high-performance computing (HPC) resources, by extending HPC to the cloud. The collaboration is transforming the way AGC researchers and engineers work with data, run simulations, use software—and fundamentally design innovation.

Some of AGC's biggest challenges to date relate to workflow and how users actively work with simulation tools and data. According to AGC, sophisticated microstructure geometry designs need to be modeled from the molecular-level up to the system level. Those simulation models are very computationally-intensive and need to be performed continuously and across each step in the design and manufacturing process.

Managing complex processes and workflows is further complicated by software updates. "We use a diverse suite of applications like LAMMPS, STAR-CCM+, and COMSOL Multiphysics® to model different types of physics. It's difficult to keep up with all of the software installation updates and maintenance."

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Atsuto Hashimoto, AGC Inc. - Manager

Moreover, said AGC, as a global enterprise with the highest security standards and requirements, AGC needed the solution to comply with the strictest IT policies, yet also simplify how users work with data and software tools and obtain resources.

Other challenges included:

- **Integrating security** from the on-premise facilities to the cloud. The network, architecture and identity management systems needed to accommodate a hybrid model.
- **Minimizing data movement** across the wide-area network (WAN) for hybrid cloud workflows.

- **Software licensing** needed to adhere to strict policies made by the software vendor and to accommodate IT methodologies and policies utilized by AGC.
- **Accommodating complex, multi-step workflows.** AGC needed to minimize disruption moving to the cloud and simplify working with data for engineers and researchers working in computer-aided engineering (CAE).
- **Administration** of policies, methodologies, software, an management tools needed to be supported in the cloud yet also integrate with deployed resources and methodologies for managing HPC on-premise. Ideally, AGC wanted the system to be easier to administer—i.e., support delegating administrative power to the right people within the organization, irrespective of location, on-premise or cloud.
- **Future compatibility** to enable breakthrough in areas such as machine learning and deep learning: AGC needs a flexible platform for adopting new, potentially transformational technologies and software applications to unlock the benefits of machine learning and deep learning among across diverse business units.

### The Rescale Solution

AGC looked to Rescale to deliver an end-to-end multi-cloud platform for enterprise big compute and HPC that integrates on-premise workflows and technologies and securely extends HPC to their cloud provider of choice. The solution simplifies, optimizes, and enables AGC to control and delegate access to cloud resources—through a single, universal, self-administering interface, the Rescale platform.

The Rescale solution includes:

- **End-to-end Security:** From encryption to cloud, ensuring data is always protected and the right users are accessing the right data. As an example, the solution supports Single Sign On (SSO) with Microsoft Azure Active Directory services, integration with AGC Amazon's VPC (Virtual Private Cloud), delegated administration and secure isolation of compute and storage.
- **Flexible Enterprise Licensing:** The Rescale platform made it possible to use both existing licenses (called Bring Your Own Licensing) through a hosted license server or On demand Licensing.
- **Visualization in the Cloud:** A key capability provided by Rescale is End-to-End Desktops for VDI (Virtual Desktop Infrastructure). AGC users can "remote in" and visualize data through a web browser. This saves time and WAN resources as users can analyze data sets in place without having to download or transfer any data. There's also an option for users to use NICE Software's DCV option to optimize visualization for 2D and 3D remote visualization.
- **Hybrid Cloud Workflow Optimization:** The solution is optimized and integrated to work in a hybrid cloud deployment model for the HEEDS™ and the STAR-CCM+® application packages to simplify and enable using the software packages both on-premise and in the cloud. Very

little data needs to be transferred to-and-from the cloud when using the location- and data-aware APIs offered by the Rescale platform. In typical workflows, only a small amount of data needs to be transferred (under 50KB) between the on-premise and cloud facilities.

- **Maximum Scalability and Flexibility for HPC:** Users choose where to run their jobs, either on-premise or in the cloud. In cases where users run in the cloud, they are immediately able to obtain massive scalability for reduce time to results for simulation runs and improve accuracy and simulation quality.

### The Results and Benefits

Engineers and researchers are now able to quickly and rapidly run simulations faster—reducing time to results with improved accuracy. AGC users process more data and adapt and refine models to adapt to new scenarios. For example, a user may need to refine meshes, or consider how certain chemicals will react, or change a turbulence model; the scenarios are endless. Moreover, users now have the flexibility to simply get the job done with the right tool, whether that be on-premise or in the cloud.

AGC uses the Rescale platform to give users the ability to create and innovate in ways never imagined. It's now possible to understand materials structure and manufacturing process in greater detail. The research and engineering teams are adopting new ways to solve major challenges across a broad range of science. In turn, the Rescale platform enables the AGC administrative team greater control to ensure resources are allocated most optimally and to the right users.

Benefits also include:

- **Getting More Accurate Results Faster**
  - 3X performance speed-up compared to AGC's in-house hardware
  - STAR-CCM+ runs went from taking 40 hours on local workstations to 10 minutes with Rescale
- **On-demand Resource Allocation—that's Controlled and Monitored in real-time**
  - Single sign on (SSO) to Microsoft Azure Active Directory Services simplifies access to resources anywhere
  - Researchers enjoy the flexibility of immediately being able to run jobs in the cloud; an alternative to submitting jobs locally in a job queue, waiting for local resources to free up, on-premise.
  - Engineers enjoy the faster time-to-results and turn-around time, providing insights into the product faster.
- **Simplicity and Control for IT**
  - Administrators can easily control, monitor, visualize and delegate administration based on project or group.

### About Rescale

Rescale™ is the global leader for enterprise big compute. Trusted by the Global Fortune 500, Rescale empowers the world's top executives, IT leaders, engineers and scientists to securely manage product innovation and perform groundbreaking research and development faster at a lower cost. Rescale's ScaleX platform solutions transform traditional fixed IT resources into flexible hybrid, private, and public cloud resources—built on the largest and most powerful high-performance computing infrastructure network in the world. Rescale offers hundreds of turnkey software applications on the platform which are instantly cloud-enabled for the enterprise. For more information on Rescale, visit [www.rescale.com](http://www.rescale.com).

It's now easy for the AGC team to control who uses what resource and to report on how those resources from storage to compute to budgets—are being consumed in real-time.

- **Application Optimization**
  - Rescale supports, ports, optimizes, and tunes business critical applications for the cloud provider environment and works directly with ISVs to continuously improve performance.
- **Top Tier Support Team**
  - The Rescale team of experts work directly with AGC users and administrators to educate and support the platform and ensure advanced optimization workflows can take full advantage of the cloud.
- **Machine Learning and Deep Learning – Container Ready Architecture**
  - AGC envisions using containers to broadly support taking advantage of ML and DL capabilities and using their cloud provider of choice to do so. Rescale provides a container-ready architecture to take advantage of these scenarios as needed by AGC. This will also help AGC with compatibility and portability—to utilize custom in-house codes and run those across the most optimal environment. Finally, there is a great benefit in reproducibility and the ability for AGC researchers and engineers to broadly collaborate and re-use experiments.

In summary, by using Rescale's multi-cloud platform for enterprise big compute and HPC, AGC was able to integrate their on-premise HPC environment with the cloud provider of their choice. AGC intends to drive innovations that bring new value to communities, while also meeting the needs of customers and helping resolve the grandest challenges faced in the least amount of time possible.

What is the future of cloud computing at AGC? The cloud offers the possibility of *unleashing potential*.

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said Atsuto Hashimoto, the manager of Innovative Technology Research Center. In the long-term, AGC is looking forward to the possibilities: creating new innovations using simulation and machine learning.

**“Rescale is making this possible.”**

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