REAL-WORLD APPLICATIONS

Life sciences innovation with AI and accelerated computing

The Rescale platform on AWS gives scientists and R&D teams instant access to the latest NVIDIA technologies, pre-made AI workflows, and advanced collaboration and data transfer tools. Join the community of researchers using Rescale to support life sciences data management and workflow automation, drug discovery and genomics, and AI-accelerated imaging and diagnostics.

Introduction

HPC and AI are revolutionizing scientific research by dramatically accelerating breakthrough discoveries and enhancing patient care outcomes.

However, many R&D teams face significant barriers to innovation, including limited computational resources, complex technical infrastructure, and time-consuming data processing delays.

Rescale on AWS provides a comprehensive solution that removes traditional R&D obstacles and expands possibilities in modeling and simulation for life sciences research and healthcare applications. By combining AWS's robust infrastructure and services with the latest NVIDIA AI technology, and Rescale's efficient automation and data intelligence platform, researchers gain access to an optimized R&D environment. The platform features over 1000 pre-configured leading high performance computing (HPC) software applications specifically designed for life sciences R&D, backed by industry leading security and compliance standards. Rescale orchestration optimizes resource allocation, minimizes costs, and reduces manual processes freeing up researchers to focus on the work they do best.

Rescale on AWS with NVIDIA unlocks new levels of performance, scalability, and automation across the industry's most data-intensive R&D challenges. This brief covers three real-world applications that help scientists and their organizations streamline research and development in the cloud, decrease costs, and accelerate scientific outcomes.

Three real-world applications

1. Life sciences data management and workflow automation
2. Drug discovery and genomics
3. AI-accelerated imaging and diagnostics

1 Life sciences data management and workflow automation

Transform experiment and research data into actionable insights for accurate decision-making.

Challenges

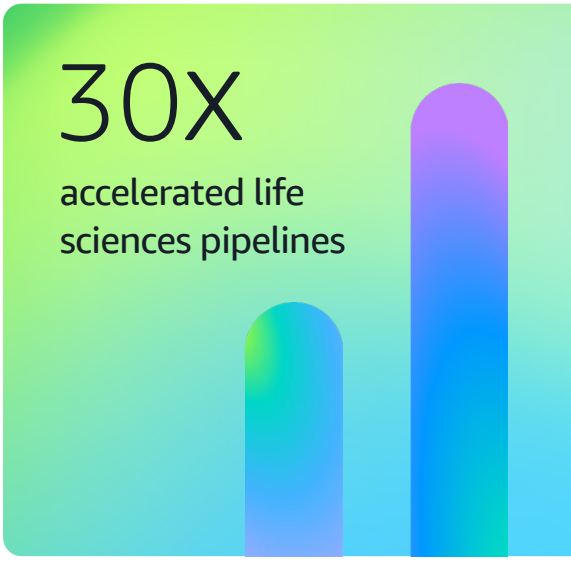
Modern life sciences research generates terabytes of fragmented and unstructured data from experimental, clinical, and real-world sources. Without effective data management, organizations struggle with result reproducibility, workflow tracking, and meeting project deadlines often leading to redundant work and research bottlenecks.

Solution

Rescale provides a R&D data intelligence solution that integrates easily with AWS and NVIDIA and empowers engineering teams to make faster, more accurate decisions, increase productivity, and build the foundation for advanced AI methods. This solution automates quality control and data normalization while identifying patterns and flagging inconsistencies across datasets. Through predictive modeling it enables faster result triage outlier identification and supports adaptive trial designs. It accelerates real-time processing of multi-modal data using NVIDIA GPU-powered Amazon Elastic Compute Cloud (Amazon EC2) instances. The system continuously learns from expanding datasets, creating an increasingly intelligent and efficient research environment that adapts to evolving research needs.

Outcomes

- Unify research workflows with secure, encrypted workspace for simulation, AI, and analytics.
- Accelerate imaging, genomics, and clinical pipelines by up to 30x.
- Enable data-driven decision making with real-time insights.



Key AWS services and NVIDIA technologies

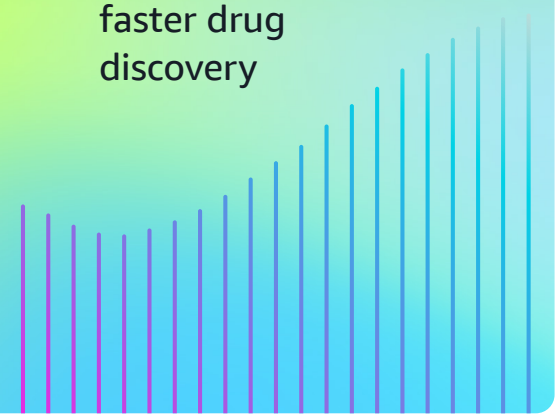
- Amazon Athena
- Amazon EC2
- AWS HealthLake
- NVIDIA H100 Tensor Core GPU
- NVIDIA A100 Tensor Core GPU
- NVIDIA NeMo
- NVIDIA RAPIDS

2 Drug discovery and genomics

Accelerate pharmaceutical breakthroughs, reduce drug development timelines, and enhance genomic processing.

15X

faster drug discovery



Key AWS services and NVIDIA technologies

- Amazon EC2
- AWS HealthOmics
- NVIDIA H100 Tensor Core GPU
- NVIDIA A100 Tensor Core GPU
- NVIDIA Parabricks
- NVIDIA BioNeMo
- NVIDIA DGX Cloud
- NVIDIA RAPIDS

Challenges

Pharmaceutical R&D demands massive computational power for screening millions of compounds and analyzing complex omics data. Traditional approaches to candidate molecule selection and genome analysis are resource intensive and time-consuming.

Solution

Rescale's platform integrates with NVIDIA-accelerated Amazon EC2 instances offering a powerful solution for drug discovery and genomics research. This integration speeds up genomics pipelines up to sixty times for efficient variant, pattern, and biomarker detection. Scientists gain intuitive access to advanced modeling tools through simplified workflows enabling protein folding simulations and generative drug modeling. The platform also supports regulatory compliance with accurate documentation and audit trails.

Leveraging AI capabilities, research teams can identify viable drug targets faster, detect potential failures earlier, simulate molecular interactions efficiently, and significantly reduce the need for wet lab testing. This approach streamlines the drug discovery process, allowing researchers to explore more possibilities in less time and with greater precision.

Outcomes

- Accelerate training and inference of generative drug models and protein folding simulations by up to 15x with NVIDIA GPUs.
- Scale drug candidate assessment from hundreds to thousands with AI simulation while dramatically reducing wet lab testing time.
- Reduce traditional drug-development cycles by 1-2 years with AI-driven target prioritization.
- Reduce protein folding runtimes from days to hours.

3 AI-accelerated imaging and diagnostics

Automate key imaging tasks while improving accuracy and reproducibility of diagnostics thanks to AI-powered workflows.

Challenges

Imaging is the foundation of diagnostics across radiology, pathology, and digital cell screening. As imaging technology rapidly advances, increased resolutions and image volumes are driving demand for high throughput and high performance computing and automated triage processes.

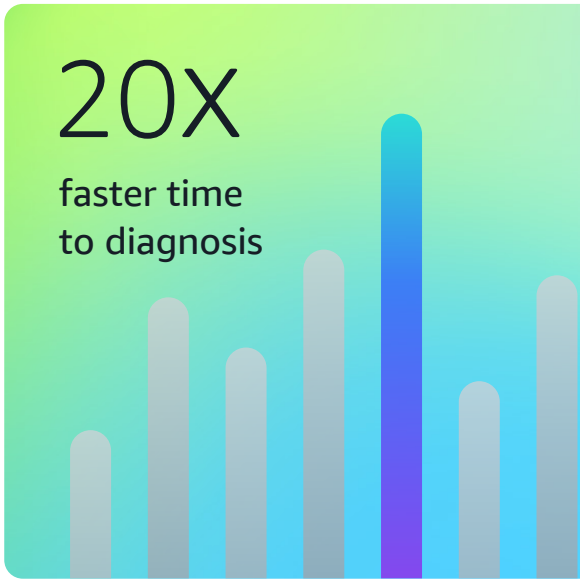
Solution

Rescale's platform, featuring tools like NVIDIA nvImageCodec, can accelerate image decode time by five to twenty times faster. The comprehensive software stack and AI tools enable clinicians and researchers to automate classification, segmentation, and anomaly-detection while accelerating complex dataset inference.

Rescale can dynamically allocate infrastructure as AI model-driven workloads evolve, improving diagnostic accuracy and reproducibility. This empowers laboratories and hospitals to seamlessly integrate AI capabilities at the point of care.

Outcomes

- Accelerate Digital Imaging and Communications in Medicine (DICOM) medical image processing by up to 15x.
- Reduce time to diagnosis by up to 20x with full image processing and AI inferencing completed in less than 5 minutes.
- Eliminate tens or even hundreds of hours of manual triage monthly, freeing up valuable clinical time.



Key AWS services and NVIDIA technologies

- Amazon EC2
- Amazon SageMaker AI
- AWS HealthLake
- NVIDIA H100 Tensor Core GPU
- NVIDIA A100 Tensor Core GPU
- MONAI
- NVIDIA nvImageCodec

Unlock the future of scientific discovery with Rescale on AWS and NVIDIA

Join leading researchers who are transforming life sciences with next-generation AI, HPC, and cloud-powered workflows.

Rescale, powered by AWS and NVIDIA, offers an innovative, secure and scalable environment that addresses common R&D challenges and accelerates breakthroughs in diagnostics, drug discovery, and genomics.

Learn more →

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