

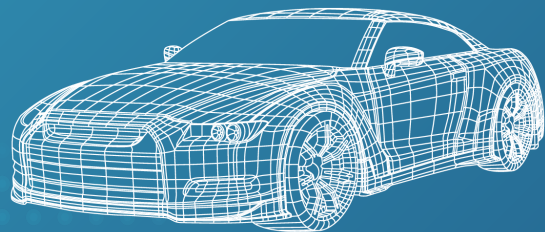


High Performance Computing Built for the Cloud

Secure & automated IT operations to empower engineering innovation



Commercializing new engineering breakthroughs is increasingly difficult

A collage of various engineering breakthroughs represented by wireframe models: a DNA double helix, a wind turbine, a jet airplane, a microchip, a satellite, a space station, and an offshore oil rig. These are arranged in a grid-like pattern on the right side of the slide.

90%

Of R&D leaders find accelerating new technologies difficult, despite being a top priority

Gartner R&D Leadership Council 2021

Computing Drives Our Future



Sustainable Manufacturing



Efficient Transportation



Healthier Lives



Space Exploration



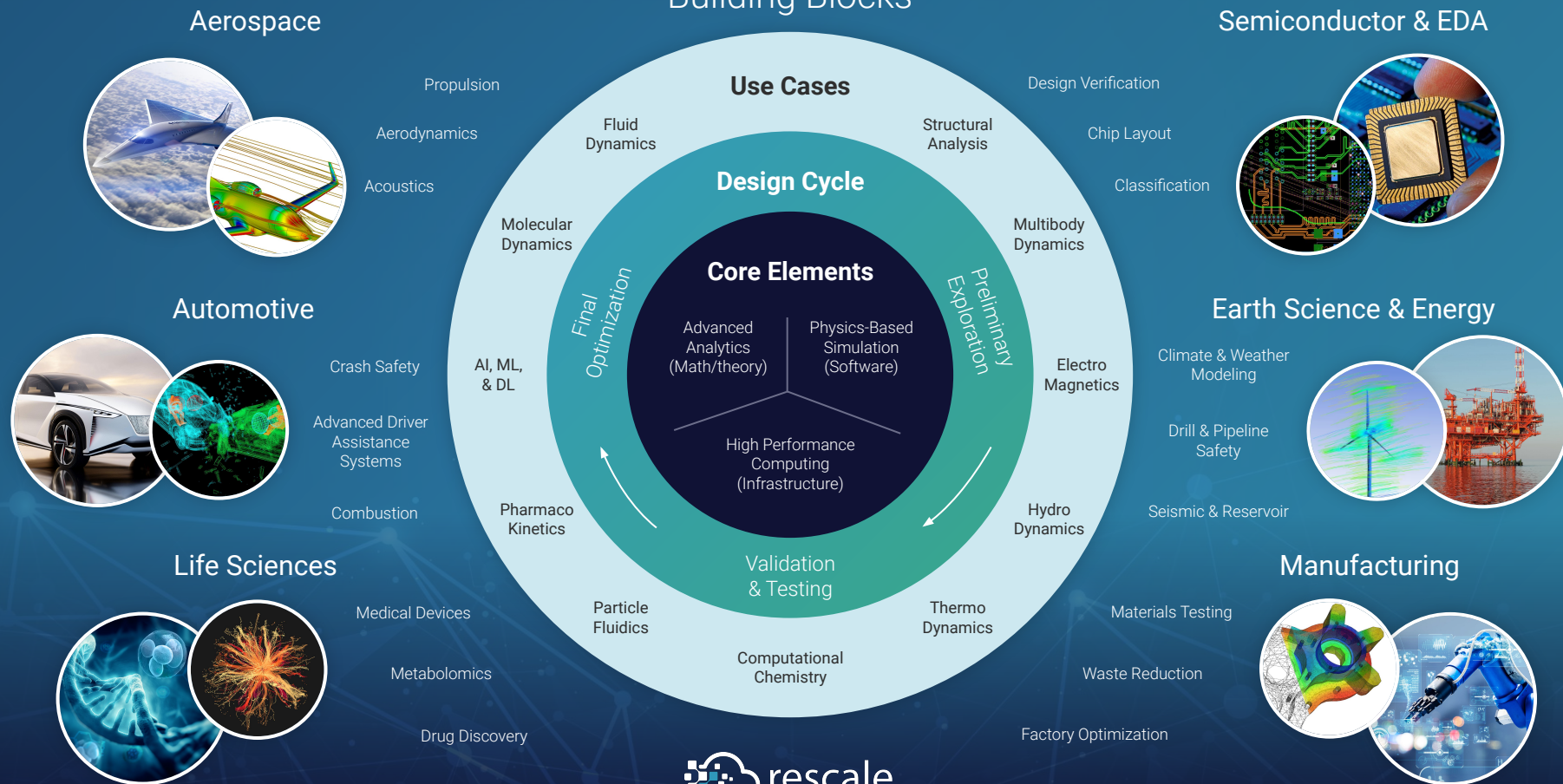
Energy Efficiency



Advanced Semiconductors

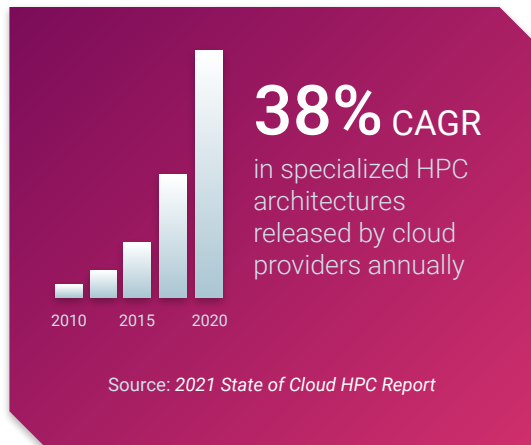
COMPUTATIONAL SCIENCE & ENGINEERING

Building Blocks

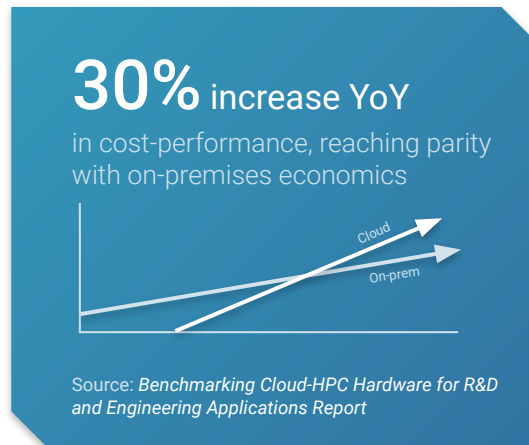


Engineering and IT orgs increasingly pursue cloud strategies to accelerate digital initiatives

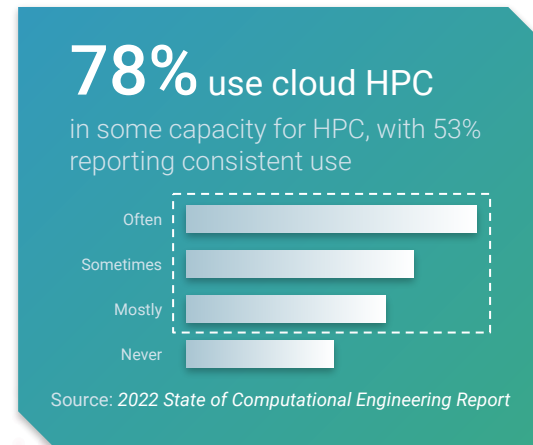
Cloud infrastructure choice and scale rapidly expanding



Cloud cost-performance continuing to increase



Majority of IT and Engineering have cloud HPC strategies



Company Overview

- Founded in 2011, HQ in San Francisco, locations in Amsterdam, London, Seoul, and Tokyo
- 300+ enterprise customers across all major Fortune 500 and Global 2000 enterprises
- #1 HPC solution for all major cloud providers
- Leading solution for R&D digital transformation

Enterprise HPC category leader

Venture backing
\$200M

Ranked
Deloitte Fast 500
Y-Combinator Top 50

HPCwire awards
Readers & Editors
Choice Winner

Customers Leading Digital Transformation

Enterprise customers
300+

Top Aerospace Companies
7 of 10

Top Automakers
7 of 10

Broadest Application & Infrastructure Ecosystem

Software marketplace
1000+ Apps

Cloud infrastructure
4 of top 4

Software vendors
80+ ISVs

Investors



Sam Altman



Jeff Bezos



Richard Branson



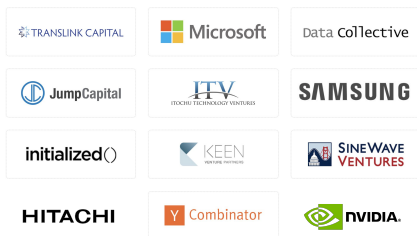
Paul Graham



Peter Thiel



Ben Verwaayen



Industries



Analyst Recognition



Rescale + Microsoft Partnership



Top Tier Global Partner
HPC & Simulation Cloud Platform



[Microsoft M12 Partner](#)

[Marketplace Listing](#)

Full stack integration with 1,000+ ISVs

Public Customer References on Azure

The DENSO logo, featuring the word "DENSO" in a bold, italicized, red sans-serif font.

The Hankook logo, featuring a stylized orange flame icon followed by the word "HANKOOK" in a bold, black sans-serif font.



The Liberty University logo, featuring the word "LIBERTY" in a blue serif font above the word "UNIVERSITY" in a smaller, blue sans-serif font.

The Affival logo, featuring the word "AFFIVAL" in a bold, black, sans-serif font.



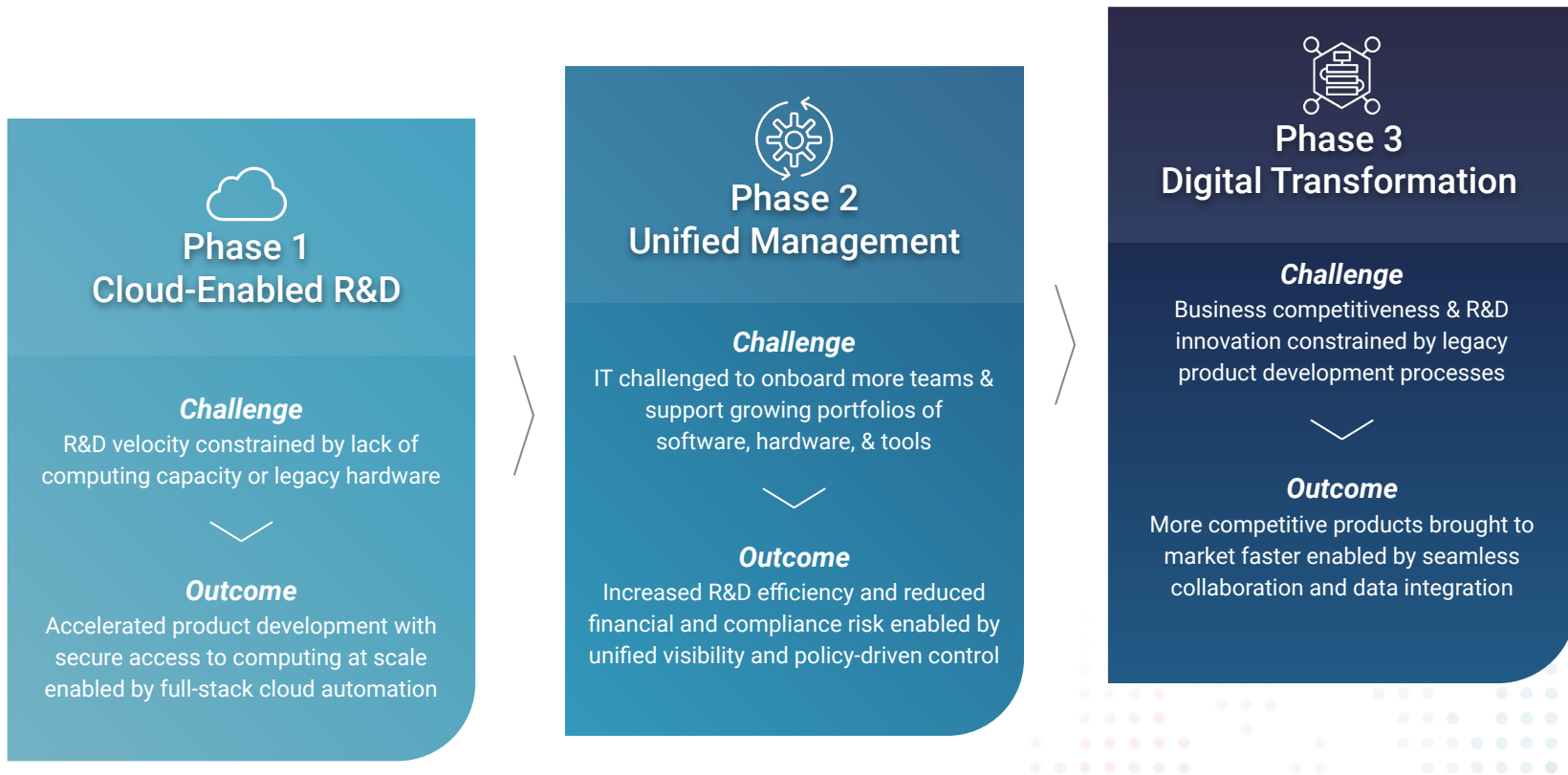
The Exponent logo, featuring the word "Exponent" in a green serif font, with a registered trademark symbol.

The kineticvision logo, featuring the word "kineticvision" in a blue sans-serif font.

The bionano GENOMICS logo, featuring the word "bionano" in a blue sans-serif font above the word "GENOMICS" in a smaller, black sans-serif font.

Digital Transformation Eliminates Obstacles to Innovation

Path to Digital Transformation of R&D and New Product Development



Engineering innovation has been underserved by cloud

A photograph of two people, a man and a woman, looking at a smartphone. In the background, a large monitor displays a web application interface with various charts and data. The entire image is overlaid with a semi-transparent blue filter.

Application Developers

Business Process Innovation
E.g. Ecommerce, CRM, Social, Mobile

A photograph of a man and a woman looking at a computer monitor. The monitor displays a 3D CAD model of a mechanical part. The image is overlaid with a semi-transparent teal filter.

Engineers

Science & Engineering Innovation
E.g. Simulation, Modeling, Design Exploration

Cloud transformation accelerates software development

- Application developer-friendly tools
- Easy-access platform services (e.g., databases, message queues)
- Simple access to low-cost commodity hyperscale infrastructure

Traditional HPC strategies in the cloud continue to constrain engineering innovation

- Difficult user experience to run HPC
- Complex technology stacks and workflows
- Lack of easy access to new, specialized hardware

Challenges HPC IT and engineering face

Engineering / R&D challenges



Digital maturity



IT & HPC challenges

High performance computing “built for the cloud” empowers engineers while delivering IT security & control

Traditional HPC (On-premises or cloud)

- 1 Hardware-centric - Focused on HW utilization
- 2 Inflexible - Predefined HW, SW and fixed capacity
- 3 Siloed - Isolated islands of analysis
- 4 Static - One-time tuning with stagnant configs
- 5 Manual - Script-based, complex operations



Constrained engineering innovation,
inefficient use of talent & resources

HPC built for the cloud

- 1 User-centric - Intuitive with SaaS-like simplicity
- 2 Unlimited - Any scale, any architecture, any application
- 3 Connected - Seamless, secure, global collaboration
- 4 Intelligent - Continuous performance optimization
- 5 Automated - Policy-driven control & end-to-end workflows



Accelerated R&D initiatives,
new possibilities



Turnkey HPC-as-a-Service for Any Size Organization

STAR-CCM+
 SIEMENS
 Ansys
 LS-DYNA
 GROMACS
 COMSOL

ESI
 HEXAGON
 MSC Software
 DASSAULT SYSTEMES
 SIMULIA ABAQUS
 CONVERGENT SCIENCE
 MATLAB

Over a Thousand Applications & Versions

Full-Stack Environment

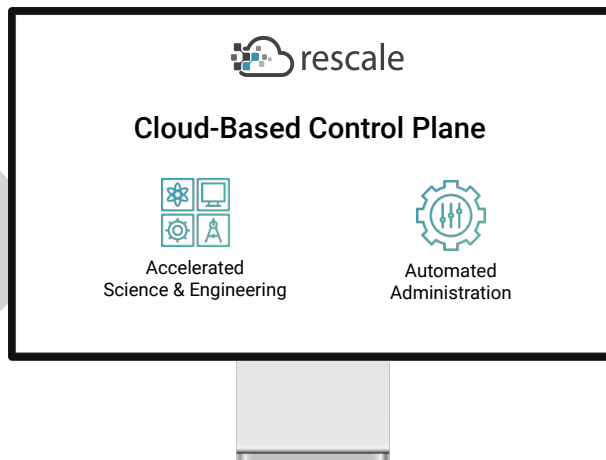
Workload Performance Intelligence

Software Licensing

Operating System & File System

Compilers and Libraries

R&D Workflows



End-to-End Management

Leading Security & Compliance

Financial Controls

Technical Support

Resource Optimization

Multi-Team & Access Controls

Full Choice of the Latest Specialized HPC Architectures

AMD

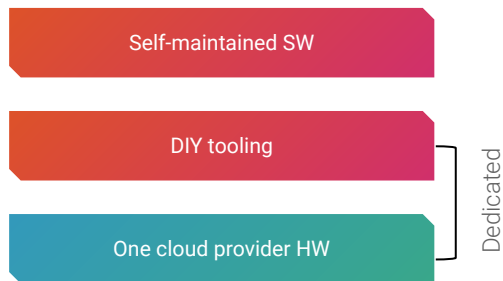
intel

NVIDIA

Managing Complexity is Key to Success

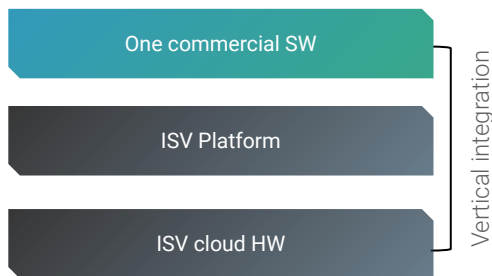
Implications of each approach to Cloud-based HPC

Do-it-yourself “lift and shift”



- Significant ongoing engineering resources required (e.g., capacity, compatibility, security, maintenance)
- Unable to leverage lowest-cost resources, tied single cloud provider
- Legacy R&D user experience

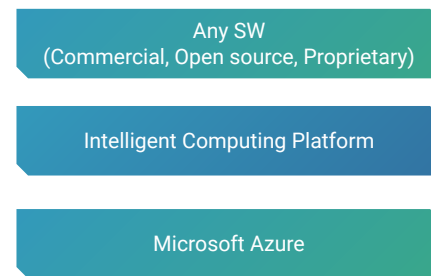
Simulation ISV cloud



- Tied to single ISV Software and Hardware portfolio
- Likely infeasible in key industries where a mix of commercial and OSS software is used



Built for the Cloud



- Empowers R&D with IT/HPC control
- Any architecture, at any scale, any software, anywhere in the world on Azure
- Security and compliance

HPC Agility Optimized For R&D Engineers

R&D Teams have unique requirements:



Ansys Mechanical
High clock speed



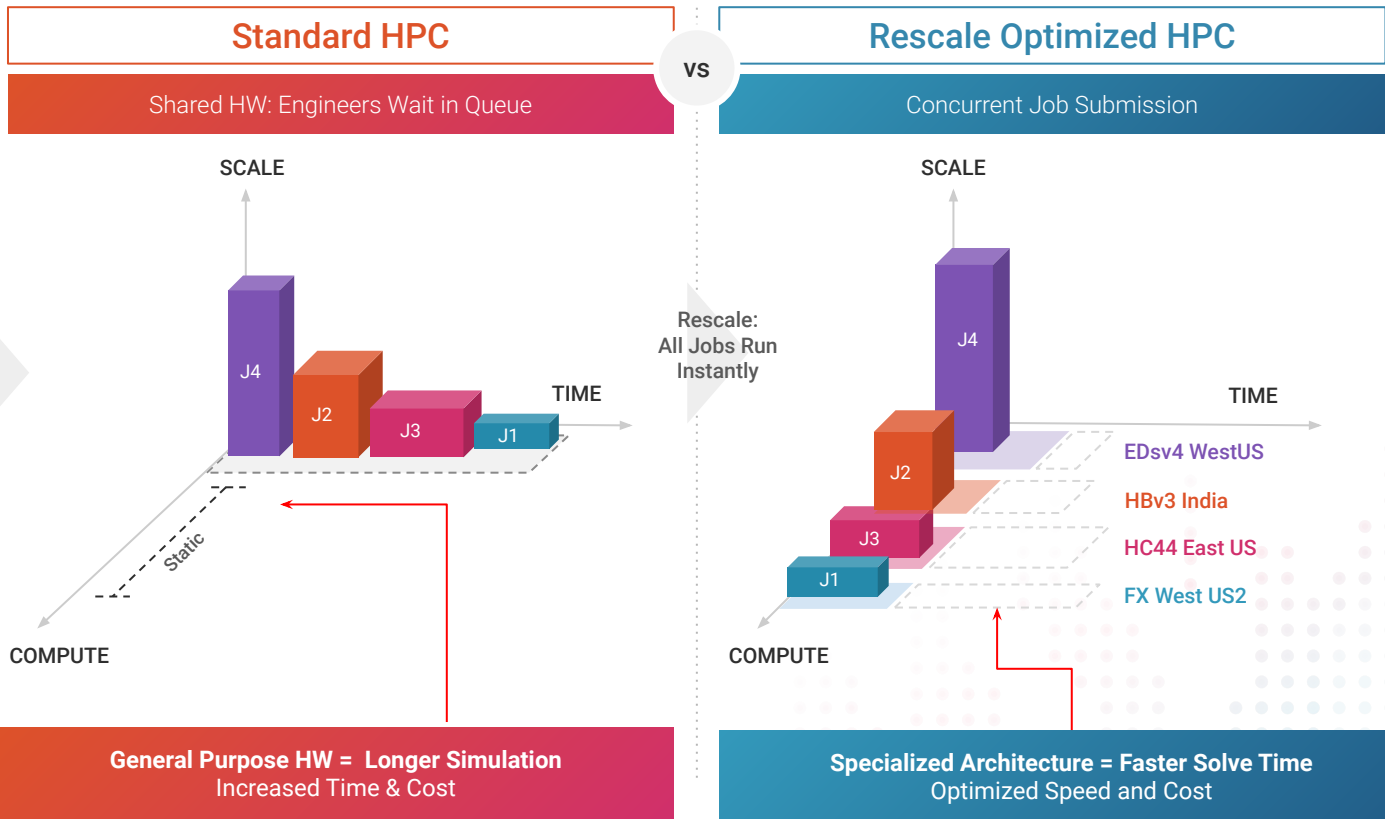
Mentor Graphics
High-Speed Interconnect



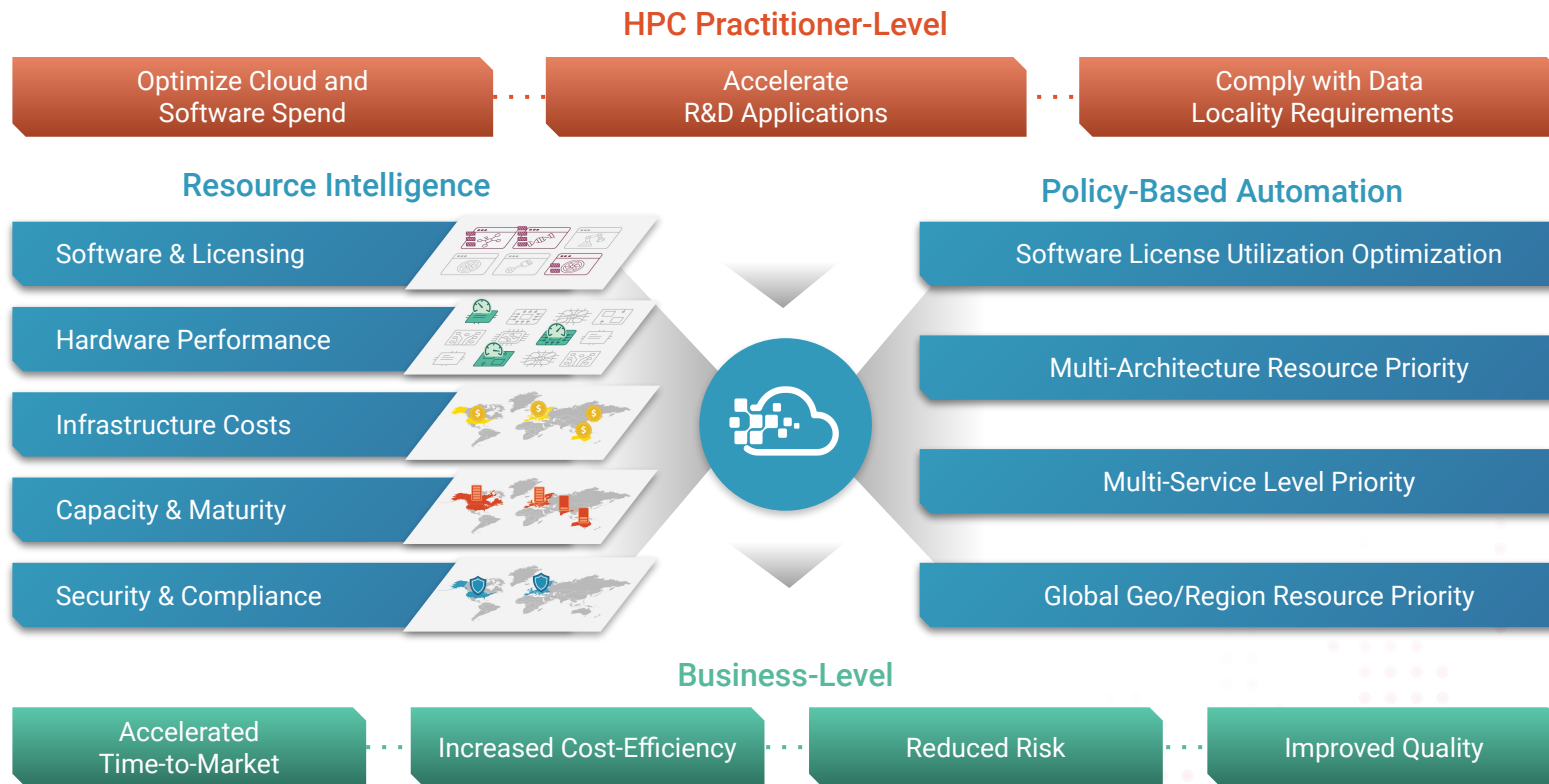
Cadence
Large RAM + High clock Speed



Synopsis
Highly Parallelized



Rescale Makes Intelligent Resource Automation Achievable



Rescale enables complete control of your HPC environment

Financial Controls

Robust controls and reporting, flexible billing, budget management and alerting for total financial management.

Security & Access Controls

Management tools to control users, access, security policy, software versions and workflows to ensure compliance and security

Software & License Controls

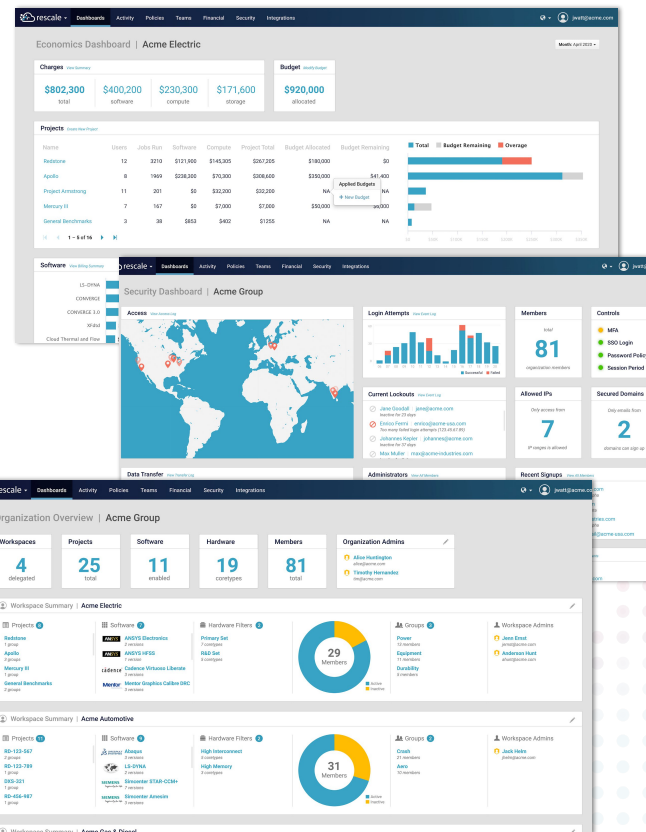
BYOL and on demand options to manage licence portfolio for cost, productivity, and utilization

Infrastructure Architecture Controls

Create constraints for users to align specific hardware giving you total control over cost/performance optimization

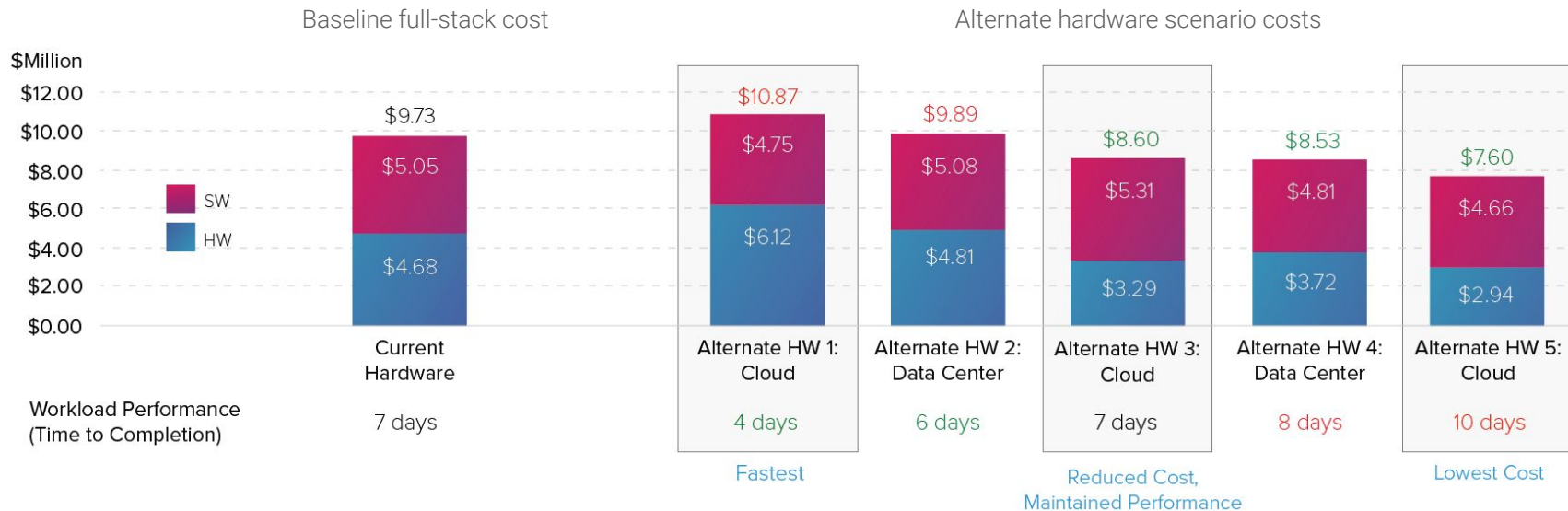
Multi-Team Controls

Define workspaces, user groups and projects. Delegate admins, and create unique environments for each level, allowing efficient and secure operations



Full stack economics analysis & optimization

Allows all Rescale users to be able to successfully run their jobs within their time to result and cost constraints.



Full-Stack management can reduce spend while maintaining performance, but can also accelerate time-to-answer at the same or lower costs.



Counterintuitively, more expensive hardware can sometimes lead to lower software spend and overall lower costs.



Optimization can be periodic (e.g., annual), or automated continuously as pricing and new architectures become available.

Delivering strategic business outcomes



Performance & efficiency

- Improved competitiveness
- Faster time to market of new product innovations
- Enhanced agility dynamic business environments

"25% reduction in time-to-market, decreased Capex, and scalable global processes for future agility."

-Semiconductor customer



IT control at scale

- Enterprise-wide visibility & transparency
- Architectural & financial controls
- Secure and compliant infrastructure, data, and intellectual property

"233% increase in design iterations and 100% utilization of software licenses with zero increase in spend."

-Aerospace customer



Empowered R&D

- Innovation leadership with global R&D collaboration
- Disciplined R&D with knowledge & data management
- Highest quality, more competitive products

"67% faster deployment time and 55% reduced cost of maintenance."

-Automotive customer

Accelerating innovation across industries and use cases



Aerospace

Aerodynamics •
Light-weighting • Propulsion
• MDO • Thermodynamics •
Digital Twins



Automotive

Crash testing • ADAS •
Combustion • Acoustics •
Finite Element Analysis •
Aerodynamics



Energy

Oil & Gas & Renewables •
Seismic Modeling •
Reservoir Location • Turbine
CFD • Grid optimization



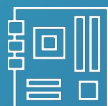
Life Sciences

Genomics • Molecular
dynamics • Computational
Chemistry • Drug Discovery



Manufacturing (Consumer & Industrial)

CAE • Digital twins • Finite
Element Analysis • MDO



Semiconductor

Electromagnetics • Analog &
Digital Silicon Design,
Verification, & Advanced
Node Sign-off



Government

National Labs • Research
Institutes • Military &
Defense • Weather
Prediction & Risk Modeling



Other


Applied AI/ML/DL • Higher
Education • Construction •
Marine • Visual Effects •
Financial risk modeling

Intuitive, time-saving user interface

Rescale automate cloud HPC complexity, making job submission as easy as a few clicks

● Infrastructure Tasks ● Engineering Tasks

HPC on Azure with Rescale

 Runs jobs **in minutes**, accessible to **anyone** with a browser

Requirements

A computer with an internet browser (e.g. Chrome) allows ease of access for scientists, researchers and engineers.

Steps

- 1 Sign into Rescale from any browser
- 2 Upload software input files
- 3 Choose ANSYS Fluent and use auto-recommended hardware or customize
- 4 Submit job and download results

VS

Do-it-yourself Cloud HPC

 Requires **HPC IT expertise** and **days of technical work** to run a job

Requirements

- A computer with an internet browser (e.g. Chrome)
- A cloud provider account with IAM user with Admin privileges
- Familiarity with cloud provider infrastructure services
- Familiarity with Linux terminal commands
- Access to install files and familiarity with using ANSYS Fluent

Steps

- 1 Create a VPC and Subnet on your CSP account
- 2 Create a storage bucket on your CSP account
- 3 Create an IAM role for accessing your storage bucket
- 4 Request increase your service quota
- 5 Setup a budget in CSP Budget
- 6 Select optimal VM/Instance types
- 7 Create machine images and templates for workload
- 8 Configure cluster networking
- 9 Configure license servers
- 10 Create / configure a parallel file system for working directories
- 11 Launch the cluster
- 12 Connect to the cluster via command line or interactive session
- 13 Upload software input files
- 14 Move files from storage to the parallel file system
- 15 Create a scheduler job submission script
- 16 Submit job to the scheduler
- 17 Wait to see if job completes successfully
- 18 Copy results to storage bucket once the simulation is complete
- 19 Shutdown the cluster and cleanup resources
- 20 Download results from storage bucket

More Time

to focus on science and engineering discovery



World's most secure & compliant HPC platform

- Full administrative management and IT dashboard provide comprehensive controls and visibility
- Software-defined security policy implementation tools to enforce proper IP handling
- Encryption in transfer with high-grade TLS and multi-layered encryption at rest with 256-bit AES



SOC 2 Type 2 Attested



CSA Registered



ITAR Compliant



HIPAA Certified



FedRAMP Authorized

“Our Investments in digital R&D partners like Rescale ultimately helped us produce an aircraft that is **100x safer, 100x quieter, and at a fifth of the cost** from what was previously possible.”

— CIO, Vertical Aerospace



Optimal infrastructure

Best cost-performance across multiple compute sources



400% HPC acceleration

Of application performance for CFD and other workloads



75% cost reduction

In Vertical's typical cost per HPC job

Spotlight on innovation



VERTICAL

Customer: Vertical Aerospace

Industry: Aerospace, eVTOL

“By choosing Rescale as our strategic cloud partner for digital R&D, Vertical Aerospace has dramatically increased engineering efficiency and accelerated new product commercialization without compromising quality or safety. These improvements help us drive innovative design and deliver personal, on-demand, and carbon-free air travel.”

— Madhu Bhabuta CIO, Vertical Aerospace

“The improvements delivered by Rescale were truly impressive: We were able to run Ansys Fluent and CFX fluid dynamics simulations 4x more quickly, enabling engineers to gain access to vital data more quickly to accelerate R&D. We saw similar improvements, up to 3.3x faster, with CHARM rotor dynamics simulations on Rescale. Work that previously extended over a five-day design period can now be completed in just one day, reducing the typical cost per job by 75%.”

“The complexity and accuracy that vertical Aerospace requires for our simulation is second to none; Rescale allows us to ride the very cutting-edge of what is possible and beyond.”

— Kurt Clement, Lead Aerospace Engineer

"Deploying cloud HPC across multiple software and cloud providers would have taken us 9 months, but with Rescale we were up and running in a matter of days. We also have assurance that Rescale optimizes our engineering efficiency and helps remove IT obstacles to get back to solving big problems."

— *Matthew Robinson, Engineering Systems Administrator*



100% license utilization

In HPC softwares and optimized licensing costs



95% deployment time reduction

In cloud HPC applications



80%+ cost reduction

In NOV's upfront HPC costs and reduced overall operational costs

Spotlight on innovation



Customer: NOV

Industry: Energy, Oil & Gas, Renewables

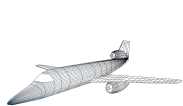
Leading the Future of Energy by Reimagining Computing

NOV uses advanced computer-aided engineering (CAE) simulation to design and test new technologies pumps, regulators, and drill heads. NOV relies on high performance computing (HPC) resources to get accurate predictions on safety, durability, and economic viability of new products before they reach production operations. This led Engineering and IT teams to pursue a global cloud HPC strategy managed on Rescale that alleviated resource constraints and unlocked new capabilities in oil and gas and renewables R&D to bring new products to market faster.

"Being cloud-native gives NOV the advantage of improved agility and efficiency across our many areas of R&D from offshore to renewables. Rescale streamlined our cloud transformation and continues to help us find new ways to improve our engineers' productivity and develop new products faster."

— *Matthew Robinson, Engineering Systems Administrator, NOV*

Powering R&D innovation across industries



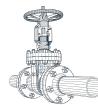
Aerospace



Automotive



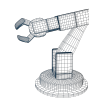
Energy



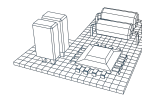
Industrials



Life Science



Manufacturing



Semiconductor



NISSAN



AMGEN



SAMSUNG



ARRIVAL

bionano
GENOMICS

C H I P S



DENSO



AGC





High Performance Computing Built for the Cloud



Digital
Engineering



Workload
Optimization



Intelligent
Automation



Security &
Compliance