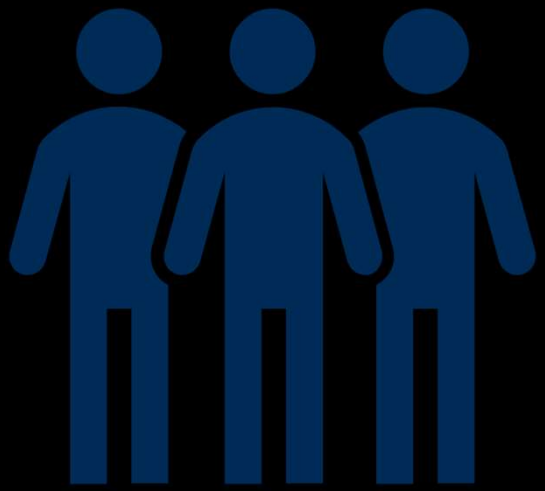
HPC in the cloud: Market snapshot



47%

of HPC customers are testing workloads in the cloud

Drivers

- Faster time-to-solution
- Integration of AI
- Broad awareness

Challenges

- Complex workflows
- Software licensing
- Long sales cycle
- Perceived costs

New workloads

- Predictive analytics
- Autonomous driving
- Deep learning

By 2022, global HPC market expected to grow to

~$45B

at a compound annual growth rate of 7%

Customer challenges in moving to the cloud

Lack scalability for unpredictable computation demand

"GPU accelerators are just not cost effective as is, on premises."

"I need the results as fast as my budget allows."

Limited workflow agility and infrastructure extensibility

"Will the cloud support the kind of scaling I need to do?"

"How can I rapidly expand our remote productivity services without reinventing the wheel?"

Require trusted platform with seamless experience

"I require equivalent security and control over my data in the cloud as I've built here."

"I cannot afford the time and effort to learn how to do all this in the cloud."

Need capability to gain deep insights

"How can I start using AI to generate insights from my simulations?"

"We wish we could make our HPC cluster more versatile."

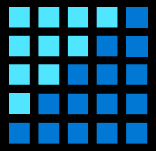
Rising to challenges with Azure HPC

Optimized performance with cost control

Gain market-leading capacity and scalability for any domain, industry, or use case

End-to-end workflow agility

Rapidly execute direct prototype-to-production scale for your HPC applications



Production-class platform

Stay on track with robust reliability and security for the same development tools and processes you've been using all along

Incorporating intelligence

Take advantage of AI to extract new perspectives and insights from your modeling and simulation workloads

Rising to challenges with Azure HPC

Lack scalability for unpredictable computing demand

Optimized performance with cost control

"GPU accelerators are just not cost effective as is, on premises."

Gain market-leading capacity and scalability for any domain, industry, or use case

"I need the results as fast as my budget allows."

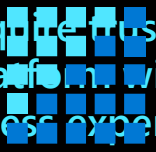
Limited workflow agility and infrastructure extensibility

End-to-end workflow agility

"Will the cloud support the kind of scaling I need to do?"

Rapidly execute direct prototype-to-production scale for your HPC applications

"How can I rapidly expand our remote productivity services without reinventing the wheel?"



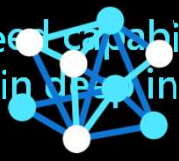
Require trusted platform with seamless experience

Production-class platform

"I require equivalent security and control over my data in the cloud as I've built here."

Stay on track with robust reliability and security for the same development tools and processes you've been using all along

"I cannot afford the time and effort to learn how to do all this in the cloud."



Need capability to gain deep insights

Incorporating intelligence

"How can I start using AI to generate insights from my simulations?"

Take advantage of AI to extract new perspectives and insights from your modeling and simulation workloads

"We wish we could make our HPC cluster more versatile."

Optimized performance with cost control

Optimized performance with cost control

Gain market-leading capacity and scalability for any domain, industry, or use case

Purpose-built infrastructure across full range of CPU, GPU, and FPGA designs with fast interconnect capabilities across compute, storage, and network

Expert onboarding for designing and delivering HPC capabilities from the ground up and offering them in the cloud

Cloud versatility that allows you to add HPC infrastructure on demand, paying only as you consume

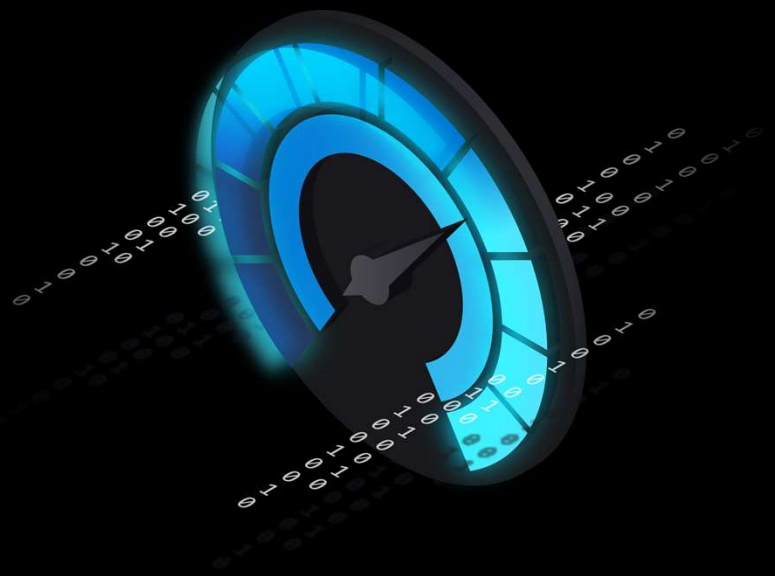
Azure HPC solves your complex workloads

Up to **80,000** cores in one tightly coupled job

Le Mans **one billion** cell model named after famed 24-hour race

45% more memory bandwidth means faster application performance

Up to **80%** cost reduction moving from a fixed-size, on-premises actuarial compute grid to an on-demand variable size cloud compute solution



Achieve more with Azure HPC

Purpose-built HPC	A full range of CPU and GPU capabilities that help applications scale to 80K+ cores
Fast, secure networking	Fast InfiniBand inter-connects as well as edge-to-cloud connectivity
High performing storage	A range of storage capabilities to support simple-to-complex storage needs
Workload orchestration	End-to-end workflow agility using known, familiar tools and processes
Intelligence services	AI, machine learning, and deep learning at supercomputer scale

Industry coverage with Azure HPC

Automotive

Simulate all aspects of vehicle engineering cost effectively and at scale with highly secure infrastructure

- **Crash testing simulations**
- **Autonomous driving**

Automotive

Financial services

Confidently meet regulatory requirements with an **elastic and intelligent infrastructure for risk modeling**

- **High-performance risk simulations**
- **FRTB impact assessments**

Financial services

Energy

Optimize all upstream oil and gas processes, including **highly complex seismic and reservoir simulations**

- **Reservoir simulations**
- **Seismic imaging and modeling**

Energy

Life sciences

Accelerate insights in genomics, precision medicine, and clinical trials with near-infinite, high-performance bioinformatics infrastructure

- **Genomics analysis**
- **Clinical trial simulation**

Life sciences

Silicon

Achieve fine-grained control over chip design flow by **optimizing your chip design process**

- **Circuit design**
- **Silicon manufacturing**

Silicon

Manufacturing

Rapidly iterate on product designs to improve quality with scalable and highly secure, on-demand infrastructure

- **Computational fluid dynamics**
- **Finite element analysis**

Manufacturing