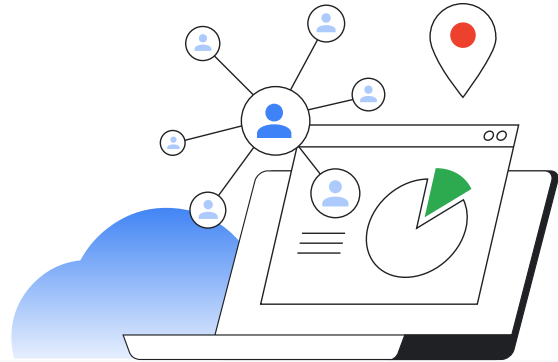


High Performance Compute (HPC) for Value-at-Risk



Key trends driving the need for new approaches to market risk simulations

1

Changing regulatory expectations

2

Need for intraday visibility

3

New products & risk drivers

4

Industry shift to cloud infrastructure

However, significant challenges remain

Cost

- Large capital expenditure
- Static resources
- Can't seamlessly scale up and down

Slow

- Queues & long wait times
- Legacy technology
- Disparate systems
- Difficult to procure hardware

Complex

- Custom setup
- Many levers for optimal performance

Google Cloud's solution helps users easily create repeatable, turnkey HPC clusters based on proved best practices

Key components:

- **Blueprints** define an HPC environment. They reference individual modules which they use to compose the desired system.
- **Modules** are code to deploy specific components of an HPC system, such as a cluster's partition, a storage system, or the network. Either imported from public sources (Github), or hosted privately.
- **Infrastructure** hosts the HPC system that is built, and the Cloud HPC Toolkit supports the core Google Cloud services and features that are required for HPC.

Cloud HPC Toolkit

Blue prints

Workload Specific

General Purpose

Partner Focused

Modules



Slurm



HTCondor



Filestore



DDN EXAScaler



Dell Omnia



Spack



Batch



PBS Pro



Intel DAOS



Cloud Monitoring



Packer

Infrastructure

Compute



Compute Engine

Storage



Filestore



Cloud Storage



Persistent Disk

Networking



VPC Networks

Google Cloud's HPC toolkit can help streamline the [value at risk calculation](#)



Customers are seeing results using HPC for risk calculations

Cost-effective

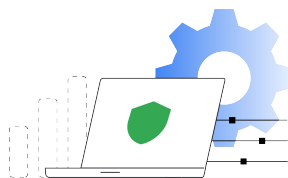
HSBC migrated its equities risk processing workload using TIBCO GridServer onto Google Cloud. Their ongoing running costs are now around 60% of their equivalent for on-premise infrastructure with greater flexibility and direct ownership of their grids by the application owners.



Faster

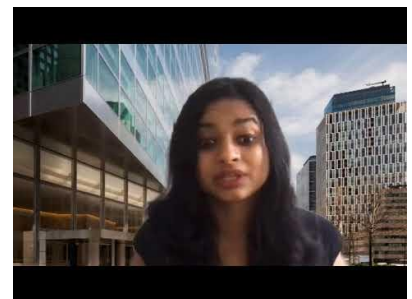
"By simply migrating from on-premises to BigQuery, we've already noticed a 60% improvement in compute time for overnight batch processing of risk simulations and calculations."

Chris Conway
Head of Risk and Finance
Technology, NatWest Markets



More Reliable

Watch Google Cloud [Webinar](#):
Goldman Sachs Customer
Spotlight: Delivering Scale,
Agility, and Trust



For a full list of example HPC blueprints, see the [Cloud HPC Toolkit GitHub repository](#). You can read more about using the HPC Toolkit in the [HPC Toolkit documentation](#), including our [quickstart guides](#).