Solution brief

High performance computing

Find the high-performance computing (HPC) solution on IBM Cloud® to solve your compute-intensive challenges

Highlights

Automated deployment of HPC clusters

Spectrum LSF and Symphony for workload management

Spectrum Scale for parallel high performance data access

Optimized cost for Cloud

Intelligent Data Management

Global and High Availability

Hybrid Cloud Connectivity

Highest level encryption and KYOK

Security-rich, High Performance Computing (HPC) in the IBM Cloud can accelerate results by scaling a vast number of tasks and reduce costs by optimizing the right technology to meet your specific goals. Whether the workload requires a hybrid environment or one that is fully contained in the cloud, IBM Cloud has the solution to meet your needs.

The HPC offering is for organizations that want to bring their workloads to the cloud, import associated data, define compute requirements, execute the job, and gather results, without getting into the complex details of deploying and configuring the compute environment themselves. Existing on-premise HPC customers who are running at capacity and need an on-demand option for bursting to the cloud can also greatly benefit. 55% of the United States GDP of around $10 trillion is touched by HPC for industrial design, weather prediction, genomic research, vehicle crash simulation and drug discovery. With scalable cloud computing relatively inexpensive, and, coupled with workload and storage management, optimizing resources and applications to over 95% utilization is a real possibility.

Solve compute-intensive problems quickly on the IBM Cloud

HPC on IBM Cloud enables you to apply a large number of compute assets to huge problems that are either too large for standard computers or take too long to run. IBM Cloud also gives you access to state of the art computing thereby avoiding lengthy waits for on-premise hardware refresh cycles.

- Quickly configure and deploy intensive HPC workloads without needing deep infrastructure expertise.
- Reduce time to results through scaling with on-demand capacity on the cloud
- Reduce costs by optimizing the right technology to meet the specific task at hand and paying only for the compute power you use.
- Work closely with IBM on algorithm development, architecture design, and your specific HPC workloads.

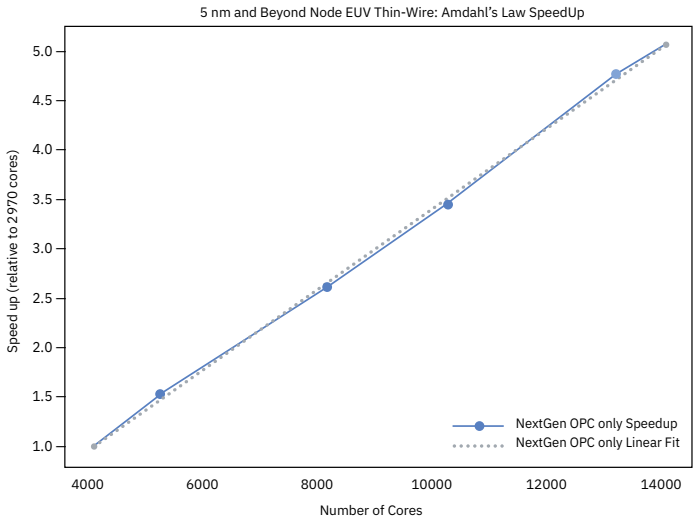
Business drivers and why IBM

Tight deadlines, fast moving markets, regulatory requirements and the unrelenting demand for new innovations have driven companies beyond their compute capacity. In addition, AI and deep learning initiatives are becoming top priorities now and for the future, generating workloads that require massive amounts of compute power. Continuing to build new on-premise data centers and keep existing compute servers up with the latest advancements is expensive and impractical. This is generating a huge opportunity for solutions that offer HPC workloads in the cloud.

At IBM, we have a long history and experience with High Performance Computing. We have thousands of customers using Spectrum LSF, Symphony and Scale.

Key capabilities

- Integrated User Experience across Compute, Workload and Storage Management
- Time to Value by deploying HPC Clusters in hours not days
- Cloud like licensing for HPC Resources
- Hybrid Cloud enabled to burst easily for peak workloads
- Ability to run both on premise steady state and dynamic cloud workloads simultaneously



Electronic Design Automation (EDA) application scaled up by IBM and an independent software vendor from 2,970 to 14,500 physical cores resulting in a 5X performance improvement.

HPC users need to get to market faster, realize cost savings, require ease of use to rapidly consume the capabilities on cloud, leverage a cloud optimized solution, and control cloud resources to meet application requirements.

What do we offer?

IBM HPC on Cloud offerings are well suited for running high throughput computing jobs such as semiconductor regression or genome realignment or highly parallel applications such as computational fluid dynamics or weather forecasting. Other workloads that lend themselves well to HPC are Serverless Computing, Hadoop, Big Data, Analytics or Machine Learning.

IBM offers an end-to-end offering delivering tremendous value in cloud infrastructure, workload management, and high-performance storage to help drive Return on Investment (ROI) by enhancing user productivity.

- **IBM Cloud HPC IaaS** for building HPC environments using IBM's Virtual Private Cloud (VPC). It enables you to create your own configuration for Compute Instances; High-Performance Storage and Networking like Public Gateways, Load Balancers and Routers. Multiple connectivity options are available upto 80Gbps and IBM Cloud offers the highest level of security and encryption with FIPS 140-2 Level 4. Also available is IBM Code Engine, a fully managed serverless platform to run containers, applications or batch jobs.

- **Spectrum Computing** provides intelligent dynamic hybrid cloud capabilities which enables organizations to use cloud resources according to defined policies. Spectrum LSF and Symphony allows you to burst workloads to the cloud, dynamically provision cloud resources and intelligently move data to manage egress costs. It also enables the ability for auto scaling to take full advantage of consumption-based pricing and pay for cloud resources only when they are needed.

- **Spectrum Scale** is an enterprise grade High Performance File System (HPFS) that delivers scalable capacity and performance to handle demanding data analytics, content repositories and HPC workloads. Spectrum Scale architecture allows it to handle tens of thousands of clients, billions of files and petabytes of data written and retrieved as files or objects with low latency. Optionally, IBM Aspera can be used for high speed data movement using the FASP protocol.

Use Cases

- **Financial Services:** Monte Carlo simulation, risk modeling, actuarial sciences
- **Health and Life Sciences:** Genome analysis, drug discovery, bio-sequencing, clinical treatments, molecular modeling
- **Automotive:** Vehicle drag coefficient analysis, crash simulation, engine combustion analysis, air flow modeling
- **Aerospace:** Structural, fluid dynamics, thermal, electromagnetic and turbine flow analysis
- **Electronic Design Automation (EDA):** Integrated Circuit (IC) and Printed Circuit Board (PCB) design and analysis
- **Oil and Gas:** Subsurface terrain modeling, reservoir simulation, seismic analysis
- **Transportation:** Routing logistics, supply chain optimization
- **Energy & Utility:** Severe storm prediction, climate, weather and wind modelling
- **Education/Research:** High energy physics, computational chemistry

Next steps

Schedule a consultation with our experts

For more information

To learn more about High Performance Computing, visit ibm.com/cloud/hpc

HPC Workload Management, visit ibm.com/products/hpc-workload-management

HPC High Performance Storage, visit ibm.com/products/spectrum-scale

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