



Highlights

- Add high-performance computing (HPC) resources without the upfront costs of purchasing in-house infrastructure or the ongoing management costs
 - Accelerate time to market with access to ready-to-run, high-performance clusters on demand
 - Reduce costs and fuel growth with pay-as-you-go access to computing resources
 - Enhance user productivity with workload management software that delivers the same user experience for cloud resources as for local resources
 - Achieve unsurpassed end-to-end data availability, reliability and scalability with high-performance storage
 - Minimize administrative costs by leveraging a skilled cloud operations team with deep HPC and Hadoop expertise
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High-performance cloud offerings from IBM

Delivering speed and flexibility for demanding technical computing, analytics and Hadoop workloads

Advances in high-performance applications are enabling financial analysts, researchers, scientists and engineers to run more complex and detailed simulations and analyses in a bid to gather game-changing insights. These advances put a continual strain on IT infrastructure managers and system administrators who are required to meet unique business needs while addressing changing user requirements, ensuring service continuity and delivering resource efficiency.

IBM cloud computing solutions are helping to meet those demands, allowing organizations to move beyond inefficient, project-oriented, static environments to a dynamic shared infrastructure. With the ability to allocate the right resource at the right time—on bare-metal systems, clusters or virtual machines—these solutions allow you to achieve improved operational and resource cost-efficiencies while meeting changing workload demands. Based on proven cluster, grid and cloud technology, IBM cloud offerings are built on scalable, high-performance software and platforms. They have intuitive and versatile user interfaces, robust “resource-aware” job scheduling, workload-aware and user-driven provisioning, and powerful management capabilities to help ensure departmental, enterprise or community resources are optimally deployed, simple to use and easy to manage.



IBM Technical Computing Solution Brief

With IBM high-performance cloud solutions, you can be confident you are getting the best performance and processing efficiency out of your hardware and software resources. You can deploy an efficient, consolidated infrastructure that meets time-variant and evolving business demands—while also delivering the performance your users expect. At the same time, your organization gains greater access to computing and application resources, whether locally or in the cloud, and benefits from higher throughput for faster time to results as well as improved administrator and user productivity.

The power of cloud computing

Cloud computing enables convenient, on-demand access to a shared pool of configurable resources, such as servers, networking and applications. These shared resources can be rapidly deployed and redeployed with minimal human intervention to meet resource requirements. You can rapidly change the resource to match the immediate need of the workload in minutes instead of hours or days. For example, multiple computer-aided engineering workloads can process faster in an environment that is able to scale to meet demand, which makes cloud computing efficient and flexible, and enables greater collaboration.

For hybrid and public cloud deployments, versatile, application-ready IBM cloud services that are optimized for Hadoop, analytics and technical computing workloads enable organizations to easily meet additional resource demands without the cost of purchasing or managing in-house infrastructure. By applying

cloud technologies and standards to Hadoop, analytics and technical computing infrastructures, your organization benefits from:

- Improved time to results with on-demand access to ready-to-run clusters in the cloud
- Enhanced productivity and collaboration with an easy-to-use, web-based portal and visualization tools
- Better data access, resource availability and security while boosting performance
- Increased automation and decreased manual effort for improved administrator productivity
- High-performance data storage with unsurpassed end-to-end data availability, reliability and scalability
- Reduced operating costs and total cost of ownership with a consolidated infrastructure

Transforming your infrastructure

Whether you have been working with an HPC infrastructure for years or you need to deploy your first cluster, IBM can help you manage your technical computing, big data and analytics environments using cloud computing technology.

Specifically designed for hybrid cloud environments, these offerings include:

- **HPC cloud management software from IBM® Platform Computing™:** Powerful cloud infrastructure and workload management tools help you improve productivity and agility, and drive down costs.
- **IBM Platform Computing cloud services:** A ready-to-run cluster in the IBM SoftLayer® cloud—complete with workload management software, dedicated physical machines and the support of a cloud operations team—enables you to burst analytics and technical computing workloads to quickly address increases in infrastructure demand.

- **HPC cloud services:** Professional services help you assess, build, optimize and manage an HPC cloud—additionally, Platform Computing can provide system administrator and user training to help ensure ongoing success.
- **IBM Spectrum Scale™:** Powerful software for managing data in the cloud. Based on IBM General Parallel File System (IBM GPFS™), Spectrum Scale software defined storage is capable of managing petabytes of data and billions of files for fast, reliable access to a common set of file-based data that can be accessed globally and managed centrally.

Software for building, managing and optimizing clouds

The HPC cloud management software suite from Platform Computing provides a comprehensive set of powerful workload, resource and cloud management capabilities. Featuring intuitive user and system administrator portals, robust application programming interfaces (APIs), command-line interface support and integration with leading independent software vendor (ISV) offerings and tools, Platform Computing software is powerful yet easy to use.

The software supports intelligent resource sharing across multiple clusters and grids, both locally and in the cloud, as well as policy-driven workload and process management for service-oriented and batch workloads. Because it provides automated provisioning capabilities based on workloads, you can help ensure your users will have access to the best resources available to meet their application performance requirements and committed service-level agreements (SLAs).

Platform Computing provides a comprehensive set of cloud management capabilities that are designed to work together to address your analytics and HPC cloud needs:

- **IBM Platform™ LSF®** is a powerful workload management platform for demanding, distributed HPC environments. It provides a comprehensive set of intelligent, policy-driven scheduling features that help you use all of your computing infrastructure resources and ensure optimal application performance.
 - **Platform Application Center** provides a flexible, application-centric, easy-to-use interface for cluster users and administrators. Available as an add-on module to Platform LSF, Platform Application Center enables users to interact with intuitive, self-documenting standardized interfaces to ISV applications, tools and hardware platforms.
 - **Platform Process Manager** enables Platform LSF users to design computational processes, capturing and protecting repeatable best practices. Workflow steps and dependencies are documented using an intuitive graphical interface, enabling users to automate lengthy, repetitive tasks that are prone to human error.
 - **Platform Dynamic Cluster** turns static Platform LSF clusters into a dynamic cloud infrastructure. By automatically changing the composition of clusters to meet ever-changing workload demands, service levels are improved and organizations can do more work with less infrastructure.

- **IBM Platform Symphony** software delivers powerful, enterprise-class management for running compute and data-intensive distributed applications on a scalable, shared service-oriented grid. It accelerates dozens of parallel applications for faster results and better utilization of all available resources.
- **IBM Platform Cluster Manager** delivers the infrastructure management needed to consolidate disparate HPC and analytics clusters into a shared pool of resources, and provides one centralized interface to simplify management. It enables the self-service creation and management of multiple flexible clusters from that pool of resources to deliver the performance required by the compute-intensive workloads in multi-tenant high-performance technical computing, analytics and big data environments.

IBM Platform Computing cloud services

IBM Platform Computing cloud services enable speedy deployment of technical computing, analytics or Hadoop workloads in the cloud. You can easily meet additional resource demands without the cost of purchasing or managing in-house infrastructure, minimizing your administrative burden and quickly addressing evolving business needs.

With Platform Computing cloud services, you have a single source for end-to-end cluster support, with access to technical computing experts to eliminate the skills barrier for using clustered resources. Dedicated bare-metal servers are available for applications that require the raw horsepower of a non-virtualized environment, and non-shared physical machines on dedicated networks are available for workloads requiring maximum security. You can also specify the locality where your workloads run to protect your information and meet data regulations, choosing one of the many SoftLayer data centers around the globe that best meets your needs.

Architected to meet your organization's needs

Platform Computing cloud services eliminate the complexity of architecting, integrating, provisioning and managing a high-performance cluster. You have a choice of four cloud service options:

- **Platform LSF (SaaS):** Ready-to-run HPC cluster in the cloud that can be integrated with an on-premises LSF cluster as a hybrid cloud, complete with cloud bursting, data-aware scheduling and remote 2-D/3-D visualization.
- **Platform Symphony (SaaS):** Complete, integrated service-optimized platform for the most demanding Hadoop and analytics public and hybrid cloud environments.
- **Spectrum Scale:** Data and file storage management solution for adding high-performance storage capacity and sharing data across the cloud.
- **High Performance Services for Hadoop:** Instantly accessible, fully supported and ready to run as a stand-alone Hadoop cluster in the cloud.

Organizations that are looking to burst their workload from local infrastructure out to the cloud can add capacity on demand with Platform Symphony and Platform LSF clusters provisioned on the SoftLayer cloud and connected to an on-premises cluster. For companies experiencing new or emerging resource demands, a stand-alone cluster running on the SoftLayer cloud provides compute and storage resources as needed, accessible on a temporary basis with near-zero wait time.

IBM Technical Computing Solution Brief

In addition to offering fully integrated workload management spanning on-premises and on-cloud resources, Platform Computing cloud services provide a security-rich cloud environment for demanding technical computing, analytics and Hadoop applications. The SoftLayer infrastructure includes dedicated physical machines, InfiniBand interconnects, Aspera® for high-speed data transfer and the latest processor technology to help ensure optimal application performance and fast time to results. SoftLayer public, private and out-of-band management networks are fully integrated, spanning data centers and network points-of-presence in multiple locations around the world.

IBM High Performance Services for Hadoop enables fast and easy deployment of Hadoop workloads on ready-to-run, stand-alone clusters on the SoftLayer cloud, complete with bare-metal SoftLayer infrastructure, a private network and your choice of data center to help ensure optimal performance and security. A dedicated, experienced IBM cloud operations team configures, deploys and supports the cloud-based infrastructure and software, minimizing administrative burdens, as well as the need to develop the skills to architect and manage a Hadoop environment.

Services to help you plan, implement and optimize the cloud

Platform Computing Services has industry-proven experience to help organizations plan, deploy and manage optimized clusters, grids, big data, analytics and HPC clouds. These offerings encompass a broad range of services—from consulting and custom engineering to administration services and ongoing education.

Engineering the cloud for your industry

IBM big data analytics and HPC cloud offerings provide a foundation for a complete engineering solution in the cloud with which you can build a centralized, secure, shared product development environment. Through the use of workload and

resource-optimized web portals, management tools and accelerators, this engineering solution enables you to access a design environment and collaborate from almost any device, anywhere in the world.

This engineering solution is further strengthened by adding 2-D and 3-D accelerators and dynamic provisioning to create a secure, agile, cloud-based engineering environment that can visualize and manipulate 2-D and 3-D models, helping to drive up user productivity and improve application performance.

Fast data management across both local and cloud-based infrastructure

Traditional storage and data management solutions limit the data access, performance and reliability that data-intensive computing environments require. Application performance can be impacted by data access bottlenecks that delay schedules and waste expensive resources. Spectrum Scale software removes data-related bottlenecks by providing parallel access to data. The solution provides simplified data management and integrated information lifecycle tools capable of managing petabytes of data and billions of files. Spectrum Scale empowers geographically distributed organizations by making critical data quickly accessible to everyone who needs it, no matter where they are in the world, helping to accelerate schedules and improve productivity.

Spectrum Scale also simplifies data management at scale by providing a single namespace that can be scaled simply, quickly and infinitely by adding more scale-out resources. And Spectrum Scale provides for enhanced security by encrypting data at rest, enabling compliance with the US Health Insurance Portability and Accountability Act (HIPAA) and Sarbanes-Oxley Act (SOX), or European Union and various national data privacy laws.

Why IBM?

It may seem like a massive job to move from a traditional HPC or analytics environment to one that uses cloud technology, but IBM offers a wide range of professional and support services to simplify your step-by-step transition. Whether you are migrating existing systems and applications or deploying entirely new ones, cloud consulting, implementation and hosting services from IBM can help you develop and execute a holistic cloud strategy tailored to your needs. IBM can also help your team develop cloud expertise through hands-on system administrator and user training.

For more information

To learn more about enhancing your high-performance technical computing or analytics computing environment with cloud technology, contact your IBM representative or IBM Business Partner, or visit:

- ibm.com/platformcomputing
- ibm.com/systems/technicalcomputing/solutions/hpccloud.html



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