IBM Power HPC Stack

A complete HPC solution optimized to accelerate time to results

Highlights

- Help simplify complex, heterogeneous environments with a comprehensive management solution
- Maximize utilization of resources and control costs
- Reduce complexity for users
- Create an agile environment for high-performance computing (HPC) through to next-generation cognitive workloads
- Optimize application performance to speed results

From scientific and engineering to finance and energy exploration, organizations across a range of fields implement HPC systems to gain the compute power needed to answer complicated questions. However, the difficulty of managing and using HPC systems prevents some organizations from capitalizing on the full value of those powerful resources.

Organizations need ways to simplify management tasks, maximize system utilization and optimize application performance to speed results. At the same time, they must make it easier for users to work with HPC resources. And as organizations increasingly explore big data analytics and deep learning, they need agile solutions that can accommodate new workloads as well as traditional HPC applications.

The IBM® Power® HPC Stack can help your organization address these requirements by simplifying complex environments. Preinstalled and validated for the IBM Power Systems™ HPC Cluster, the Power HPC Stack is a comprehensive solution that can accelerate time to production, streamline workload management, help optimize application performance and give you the flexibility to take advantage of new types of workloads for faster time to results.

Speed time to insight with the Power Systems HPC Cluster

The Power HPC Stack is a key component of the Power Systems HPC Cluster—an integrated solution that helps speed time to results (see figure). The Power Systems HPC Cluster is:

- Complete: Implement a turnkey solution with integrated compute, storage, networking, management and system software.
- Modular and extensible: Select the right combination of components and configurations to meet your particular requirements.
- Integrated: Eliminate testing and configuration time with a solution that has been racked and tested by IBM manufacturing.

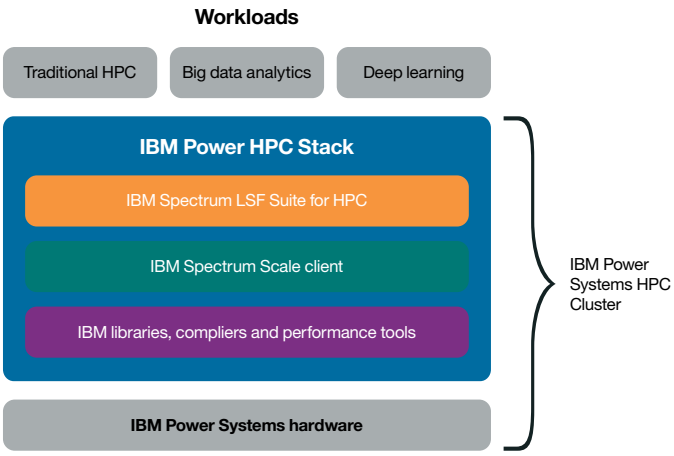

Figure 1. An agile infrastructure for high-performance computing and next-generation cognitive workloads.

Simplify the complex with a comprehensive solution

The Power HPC Stack brings together multiple IBM software components to facilitate efficient infrastructure and workload management, application optimization and more. Key components include:

IBM Spectrum LSF Suite for HPC

IBM Spectrum™ LSF® Suite for HPC provides a complete HPC workload management solution. It features:

- **Intelligent, policy-driven scheduling** capabilities that enable you to enhance the utilization of your computing resources
- **Web-enabled job and workflow management tools** that provide a consistent interface to users, helping to maximize productivity
- **An optimized and supported MPI library** based on the popular open source Open MPI implementation that helps deliver production-quality support and ease-of-use features

IBM Spectrum Scale client

The IBM Spectrum Scale™ client provides the ability to access data in Spectrum Scale environments.

IBM libraries, compilers and performance tools

To help you optimize performance of your HPC applications on IBM POWER® processor-based systems, Power HPC Stack includes several key libraries, compilers and performance tools. The Engineering and Scientific Subroutine Library (ESSL) and Parallel ESSL provide high-performing mathematical subroutines to enhance performance of engineering and scientific applications on Power Systems clusters. IBM XL C/C++ and XL Fortran compilers are fine-tuned to deliver outstanding performance for POWER processors. And the IBM Parallel Performance Toolkit offers performance analysis tools to help tune serial and parallel applications while enhancing developer productivity.

Flexible infrastructure

The Power HPC Stack allows you to leverage the latest technologies to accelerate workloads. The GUI-driven cluster designer simplifies software management while automation helps speed the creation of multiple scale-out environments on a shared infrastructure. This enables organizations to deliver new resources to users quickly.

Efficient lifecycle management

With the Power HPC Stack, you gain clear visibility into all of the moving parts of your HPC cluster. A complete infrastructure lifecycle management framework helps maximize uptime and increase administrative productivity. And a web-based interface lets you manage even complex clusters as a single system, from anywhere.

Automatic resource allocation

The Power HPC Stack includes advanced workload management capabilities to enhance resource utilization. Comprehensive and intelligent scheduling policies ensure resources are automatically allocated with utmost efficiency. Advanced workload management policies allow you to match the right resources to the right users at the right time to better support your organization's priorities.

Enhanced user experience

The Power HPC Stack helps simplify the user experience, enabling scientists, engineers and other users to start finding answers to questions quickly. A flexible, application-centric portal hides complexity and lets users transparently interact with compute resources. Intuitive, self-documenting job submission templates facilitate standardized access to applications, helping users become productive fast.

The ability to customize and automate job submission across a distributed, heterogeneous environment allows users to reach results sooner while maintaining the reliability of complex, mission-critical processes.

Optimized application performance

With an array of libraries, compilers and performance analysis tools, the Power HPC Stack has what you need to optimize application performance on your Power Systems-based cluster. Better performance means users can generate results faster and explore more iterations of ideas.

Amplified agility

The Power HPC Stack also gives you the agility to accommodate requests for new big data analytics and cognitive workloads. Deploying a new cluster to support every new workload is too expensive for many organizations. At the same time, switching back and forth between multiple workload types on the same cluster can require a time-consuming process of reconfiguring the cluster between workloads.

With the Power HPC Stack, you can avoid the costs and complexity of those approaches. The Power HPC Stack creates an agile environment for running multiple workloads, allocating the appropriate resources to the right workloads while consolidating disparate cluster infrastructure. As a result, you can run big data analytics, cognitive workloads and traditional workloads, all on the same infrastructure. Your organization can start creating new insights quickly, without large-scale expenditures.

Why IBM?

Managing and using powerful HPC resources should not be complex undertakings. The Power HPC Stack helps simplify management and reduce the learning curve for users. Your technical teams can quickly provision new applications, efficiently manage diverse workloads, optimize application performance and maximize utilization while your users can stay focused on producing breakthrough research and generating new insights.

For more information

To explore the IBM HPC strategy and the full range of IBM HPC solutions, please contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/systems/hpc

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition. For more information, visit: **ibm.com**/financing

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