IBM Platform Computing: Accelerating Business Results for Compute and Data-intensive Applications

IBM Redbooks Solution Guide

IBM® Platform Computing is a set of systems software that helps with High Performance Computing (HPC), including computationally and data-intensive design, manufacturing, financial analytic, business, and research applications. IBM Platform Computing solutions optimize complex application implementation and workloads in many of the world's largest environments (with more than 100,000 cores). The core value of the product portfolio is to simplify and accelerate high-performance simulations and analysis to gain insights into business, products, and science.

Many organizations have the constant challenge of increasing compute capacity to support massive amounts of data that drive business value and competitive advantage. IBM Platform Computing solutions simplify the setup, integration, and management of your heterogeneous technical computing infrastructure and drive up server usage to increase application throughput and help greatly improve time to results. IBM Platform Computing software also helps you integrate servers, storage, parallel execution environments, and applications. Together, IBM Platform Computing solutions enable the delivery of complete solutions that simplify and accelerate implementation and management of high-performance clusters, grids, and HPC clouds. Business value is delivered in days versus weeks or months.

Figure 1 shows an overview of IBM Platform Computing solutions.

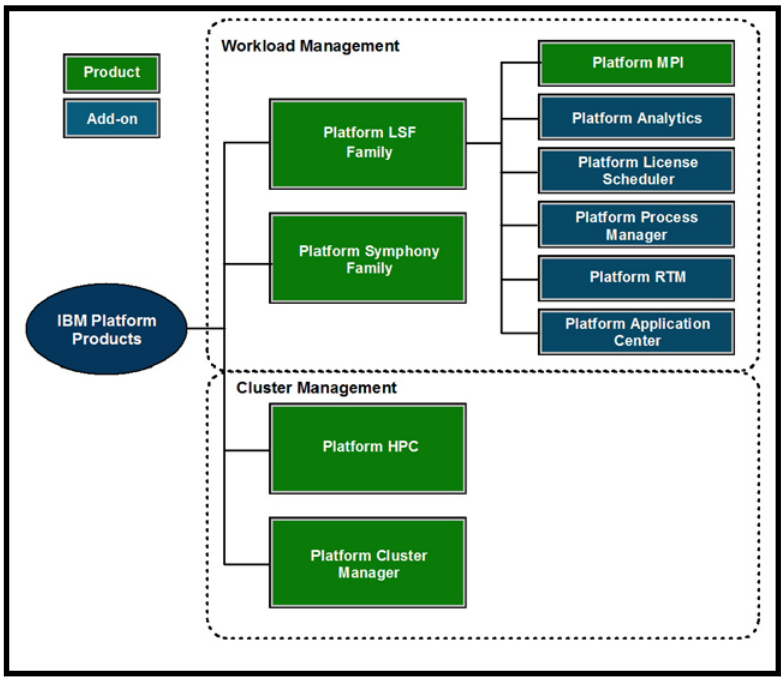

Figure 1. IBM Platform Computing solutions

Did you know?

Technological innovation and medical, financial, and research workloads have placed outstanding performance requirements on specialized and powerful processing (HPC) infrastructures. Traditionally, such workload requirements were not feasible for the available infrastructure deployments, even though those workloads could use virtualization technology. However, the performance gap between physical and exclusive deployments is now ending. Specialized users can now benefit from the versatility, cost effectiveness, and enhanced resources that High Performance Computing (HPC) provides.

Companies in nearly every industry have growing data volumes and developing application demands. These challenges drive the need for more compute capacity. Even in HPC environments, having several compute silos, irregular processing, design cycle issues, and late results are common. Today, you need ways to improve IT performance, reduce infrastructure costs, and bring your products to market quicker.

With the advent of more intelligent and connected devices and systems, the amount of information that you are collecting is increasing at an alarming rate. In some sectors, as much as 90% of that information is unstructured and increasing at rates as high as 50% per year. To keep your business competitive, to innovate, and to get products and solutions to market quickly, you must be able to evaluate that information and extract insight from it easily and economically. As compared to IBM Platform Computing solutions for big data analytics, current alternatives do not offer the response time for statistical tasks, thus reducing user efficiency and delaying decision making.

Business value

IBM Platform Computing offers the technology to help you gain the most from your IT investment. From pooling your technical computing resources to managing them efficiently and improving the performance of your applications, IBM Platform Computing solutions help IT organizations with the daily challenges of the data center.

Also, the overall IT resources are fairly static and clients want to be able to use cloud service providers. If clients have short-term needs, they can increase the resource roles, but they do not necessarily want to keep the resources on a long-term basis.

There are many demands on the business and user side. The resources are from the IT side. How do you make these two sides fit together better without increasing costs? IBM Platform Computing solutions deliver the power of sharing for technical computing and analytics in distributed computing environments.

One of the key concepts is shared, distributed computing. Distributed computing is the network of computers. Sharing is bringing multiple groups together to use one large connection of networks and computers without increasing cost. This concept is a key message for many CFOs or CEOs. It is all about being able to do more without increasing cost, effectively increasing the output for you to compute. We see this concept in two main areas. One area is scientific or engineering applications that are used for product design or breakthrough science. The other area is large complex commercial tasks that are increasingly seen in industries, such as financial services or risk management. These tasks are necessary for banks and insurers that need complex analytics on larger data sets.

Within financial services, IBM Platform Computing helps people make better decisions in real time with pre-trade analysis and risk management applications. In the semiconductor and electronics space within electronic design automation (EDA), IBM Platform Computing helps clients get to market faster by providing the simulation analysis that they need for their designs. Within the industrial manufacturing space, IBM Platform Computing helps people create better product designs by powering the environments behind computer-aided design (CAD), computer-aided engineering (CAE), and Model-Driven Architecture (MDA) applications.

In life sciences, it is all about faster drug development and faster results, even with genomic sequencing. The oil and gas shared applications are seismic and reservoir simulation applications that provide faster results, leading to the discovery of reserves and identifying how to exploit other producing reservoirs.

The IBM Platform Computing products can simplify the setup, integration, and management of the heterogeneous technical computing infrastructure while it drives up server usage, increases application throughput, and helps improve greatly the time to results. The products also help you integrate servers, storage, parallel execution environments, and applications. This integration enables the delivery of complete solutions that greatly simplify and accelerate deployment and management of high-performance clusters, grids, and High Performance Computing (HPC) clouds. IBM Platform Computing products are divided into two main categories: workload management and cluster management.

Solution overview

IBM Platform Computing solutions have the following benefits:

- They achieve high-quality results quickly.
- They reduce the costs of management and infrastructure.
- They adapt easily to changing requirements that are requested by users.

Table 1 shows a list of IBM Platform Computing solutions for HPC Cloud, workload management, big data analytics, and cluster management and the available products.

Table 1 IBM Platform Computing Solutions

IBM Platform	HPC Cloud	Workload management	Big data analytics	Cluster management
Load Sharing Facility	X	X		
HPC	X	X		X
IBM Symphony®	X	X	X	
Cluster Management - Advance Edition	X			X
Application Center	X			
Cluster Manager	X			

IBM Platform Computing solutions complement the IBM systems and technology portfolio, providing simplified management software to eliminate the complexity of optimizing cluster, grid, and HPC cloud environments. The following products are used with IBM Platform Computing solutions:

- IBM Platform LSF®

  The IBM Platform LSF (Load Sharing Facility) product family is a workload management platform for demanding, distributed, and mission-critical HPC environments. It provides a set of intelligent, policy-driven scheduling features that you can use to take advantage of all of your compute infrastructure resources and ensure optimal application performance. By using the highly scalable and available architecture, you can schedule complex workloads and manage petaflop-scale resources.

IBM Platform LSF has the following editions:

- IBM Platform LSF Express Edition
- IBM Platform LSF Standard Edition
- IBM Platform LSF Advanced Edition

For information about these editions, see the "IBM Platform LSF V9.1 family of products delivers excellent performance, scalability, and utilization" announcement letter at http://www-01.ibm.com/common/ssi/rep_ca/8/897/ENUS213-018/ENUS213-018.PDF.

For more information about the IBM Platform LSF product, see the product page at http://www.ibm.com/systems/technicalcomputing/platformcomputing/products/lsf/index.html.

- IBM Platform HPC

  IBM Platform HPC is an easy-to-use, comprehensive management software for high performance technical computing clusters and clouds. Its robust cluster and workload management capabilities are accessible by using the latest design in web-based portals. It simplifies the application integration process so that you can focus on developing your applications instead of managing your cluster.

  For information about IBM Platform HPC - Express Edition V3.2, see the "IBM Platform HPC - Express Edition V3.2 speeds time to cluster readiness, delivers improved productivity, and shortens time to solution" announcement letter at http://www-01.ibm.com/common/ssi/rep_ca/7/649/ENUSA13-0167/ENUSA13-0167.PDF.

  For more information about IBM Platform HPC and it advantages, see the IBM Platform HPC Software brochure at http://public.dhe.ibm.com/common/ssi/ecm/en/dcb03013usen/DCB03013USEN.PDF.

- IBM Platform Symphony

  IBM Platform Symphony delivers powerful enterprise-class management to run distributed applications and big data analytics on a scalable, shared grid. It accelerates dozens of parallel applications, for faster results and better utilization of all available resources.

  IBM Platform Symphony has the following editions:

  - IBM Platform Symphony Developer Edition
  - IBM Platform Symphony Express Edition
  - IBM Platform Symphony Standard Edition
  - IBM Platform Symphony Advanced Edition

  For information about IBM Platform Symphony V6.1, see the "IBM Platform Symphony V6.1 enables scalable, high-performance grid services for parallel compute- and data-intensive analytic applications" announcement letter at http://www-01.ibm.com/common/ssi/rep_ca/6/897/ENUS212-426/ENUS212-426.PDF.

  For information about IBM Platform Symphony, its advantages, and its editions, see the following documents:

  - The IBM Platform Symphony Software Family brochure at http://public.dhe.ibm.com/common/ssi/ecm/en/dcb03002usen/DCB03002USEN.PDF.
  - The IBM Platform Symphony data sheet at http://public.dhe.ibm.com/common/ssi/ecm/en/dcd12359usen/DCD12359USEN.PDF.

- IBM Platform Cluster Manager

  IBM Platform Cluster Manager quickly provisions, runs, manages, and monitors HPC clusters with unprecedented ease. It also helps automate the assembly of multiple high-performance technical computing environments on a shared compute infrastructure for use by multiple teams.

  For information about IBM Platform Cluster Manager - Standard Edition V4.1, see the "IBM Platform Cluster Manager - Standard Edition V4.1 allows you to manage a complex cluster as a single system" announcement letter at http://www-01.ibm.com/common/ssi/rep_ca/5/897/ENUS213-015/ENUS213-015.PDF.

  For information about IBM Platform Cluster Manager - Standard Edition V4.1, see the "IBM Platform Cluster Manager V4.1 Advanced Edition can consolidate your cluster and grid environments" announcement letter at http://www-01.ibm.com/common/ssi/rep_ca/2/649/ENUSA12-0922/ENUSA12-0922.PDF.

  IBM Platform Cluster Manager is available in the Standard Edition and the Advanced Edition. The "Solution architecture" section shows a description of these products. For more information about each of the editions, see the following resources:

  - The IBM Platform Cluster Manager - Standard Edition data sheet at http://public.dhe.ibm.com/common/ssi/ecm/en/dcd12362usen/DCD12362USEN.PDF.
  - The IBM Platform Cluster Manager – Advanced Edition data sheet at http://public.dhe.ibm.com/common/ssi/ecm/en/dcd12349usen/DCD12349USEN.PDF.

For more information about IBM Platform Computing portfolio, current versions, and the software roadmap of products, see Chapter 1, “Products and portfolio for IBM Platform Computing solutions”, in *IBM Platform Computing Solutions*, SG24-8073.

Solution architecture

IBM Platform Computing is widely viewed as the systems software of choice for technical and high performance computing (HPC), including computationally and data-intensive design, manufacturing, financial analytics, business, and research applications. Platform Computing products are used to optimize deployment of complex applications and workloads in many of the world's largest environments (100,000+ cores). The core value of the product portfolio is simplifying and accelerating high-performance simulations and analysis to help you uncover insights into your business, products, and science.

Figure 2 shows the IBM Platform Computing solution architecture concept.

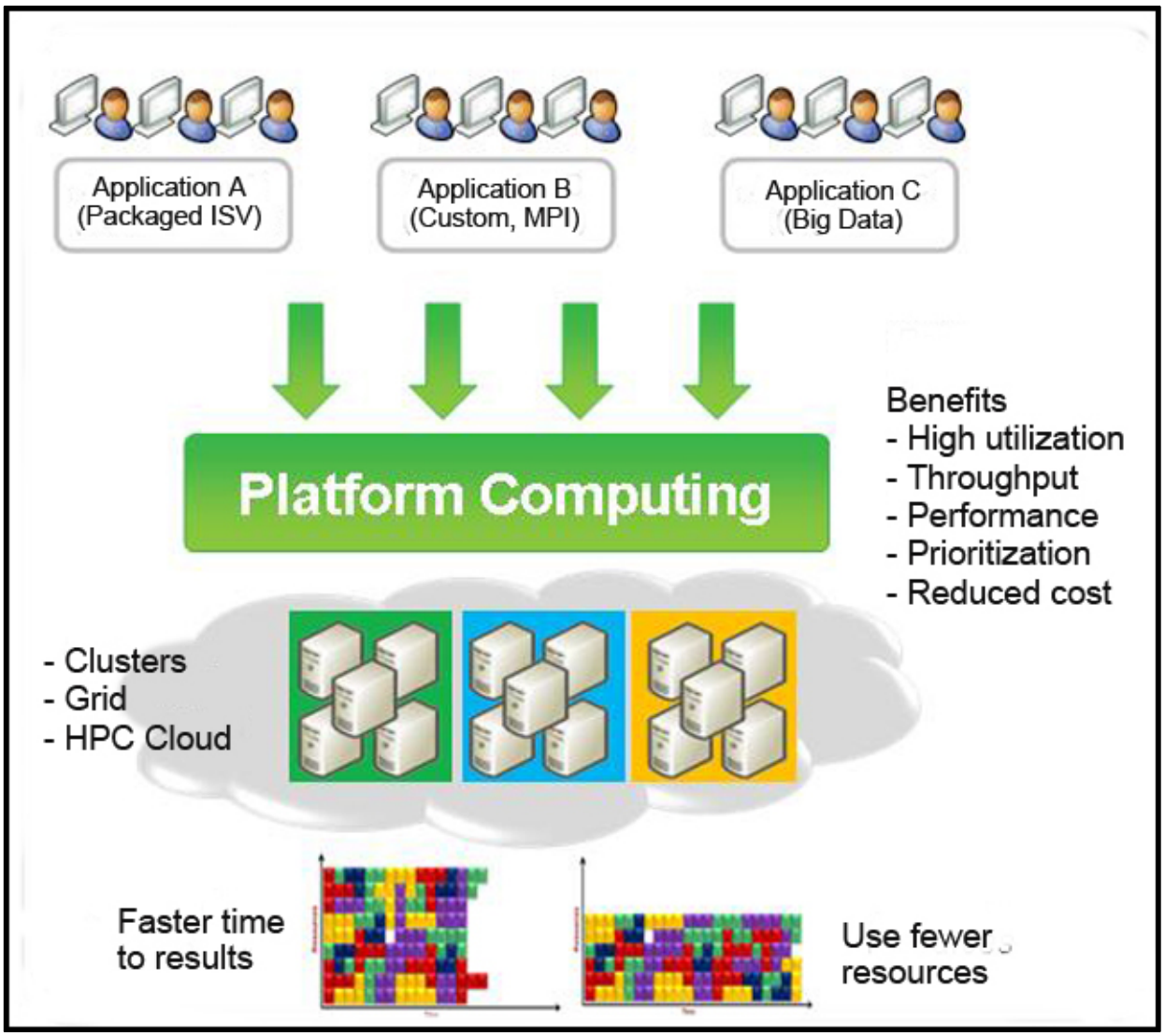

Figure 2. IBM Platform Computing architectural concept

Platform Computing offerings can help you accomplish the following tasks:

- Obtain higher quality results faster.
- Reduce infrastructure and management costs.
- Easily adapt to changing user requirements.

IBM Platform Computing complements the IBM systems and technology portfolio by providing simplified management software to help eliminate the complexity of optimizing cluster, grid, and HPC cloud environments. The following products comprise the IBM Platform Computing portfolio:

- IBM Platform LSF product family: Powerful, comprehensive technical computing workload management
- IBM Platform HPC: Fully integrated, easy to use management software, including cluster management, workload management, reporting, and MPI

- IBM Platform Symphony product family: High-throughput, low-latency grid management software for compute and data-intensive applications
- IBM Platform Cluster Manager: Automated self-service creation, flexing, and management of heterogeneous HPC clusters for use by multiple tenants
- IBM Platform MPI: High-performance, production-quality MPI implementation for application parallelization
- IBM Platform Analytics: Advanced technical computing analytics for visualizing, correlating, and analyzing massive amounts of workload data for data-driven decision making

Usage scenarios

IBM Platform Computing solutions can help you improve the performance of financial and insurance programs to support faster, more precise, and more reliable decision-making in markets. By using private HPC clusters, grids, and clouds, multiple applications and lines of business can effectively use a single heterogeneous, shared infrastructure to support the following areas:

- Costs of market and credit risk
- Compliance reporting
- Pretrade analysis
- Back testing
- New product development

IBM Platform Symphony is a powerful, enterprise-class grid management solution for companies that are running compute-intensive and data-intensive applications. IBM Platform Symphony accelerates many parallel applications that quickly compute results and create optimal use of the available infrastructure. This product provides the speed that is required to predictably meet and surpass throughput goals for the most demanding risk management applications.

The application software solutions from IBM Platform Computing help manage and accelerate workload processing and realize workloads across a distributed, shared IT environment, while fully using all HPC resources, regardless of the operating system or architecture. The result is improved application performance for a reduced total cost of ownership (TCO).

Figure 3 shows the IBM Platform Symphony concept.

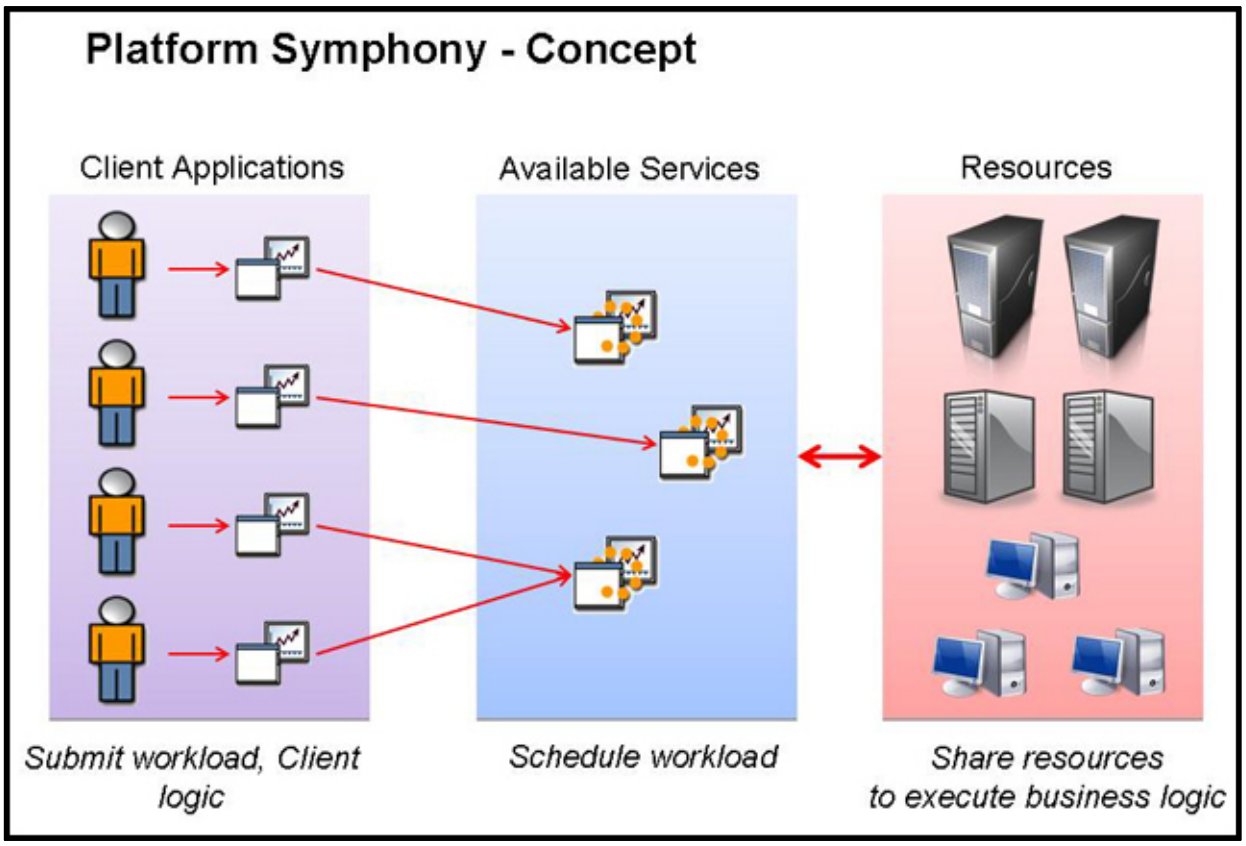

Figure 3. IBM Platform Symphony concept

IBM Platform Computing solutions, as shown in Figure 4, provide cluster, grid, and HPC cloud management software to support HPC components, and specialized computing applications to leverage the broad IBM portfolio. These offerings speed up the time to results for compute-intensive and data-intensive applications that run on distributed technical and statistics computing environments. They help manage dissimilar workloads, such as genome sequencing, drug design, simulations, product design analysis, and risk management.

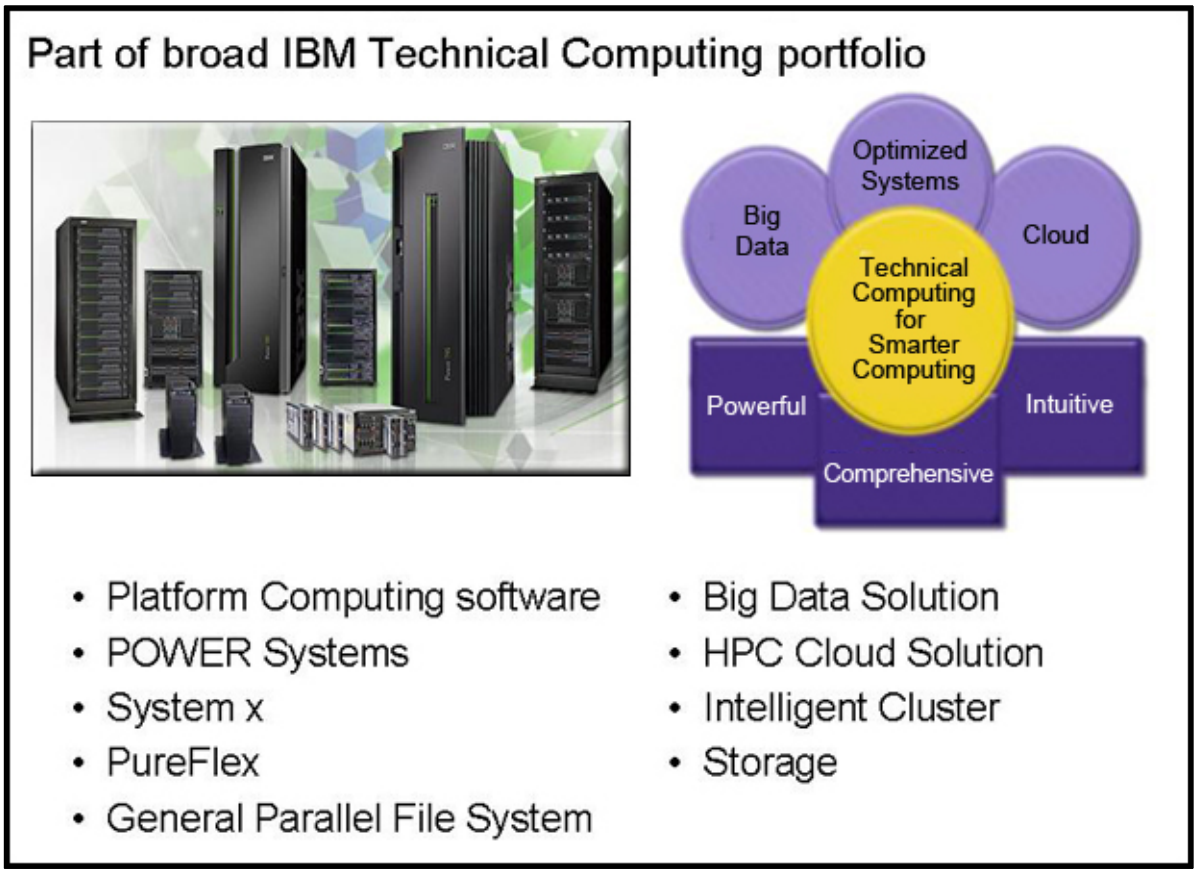

Figure 4. IBM Platform Computing part of IBM Technical Computing portfolio of solutions

The IBM Platform Computing product family helps you improve the confidence of IT professionals in life sciences, ensuring them that all available resources are used, from application software licenses to available network bandwidth. Application software solutions help manage and accelerate workload processing and ensure their achievement across a distributed, shared IT environment, while completely using all HPC resources, regardless of the operating system or architecture.

Scheduling capabilities, as shown in Figure 5, help you spend resources on users, groups, and jobs in a way that is consistent with service-level agreements (SLAs). With extended SLA-based scheduling policies, these application solutions simplify administration and ensure optimal alignment of business SLAs with the available infrastructure resources.

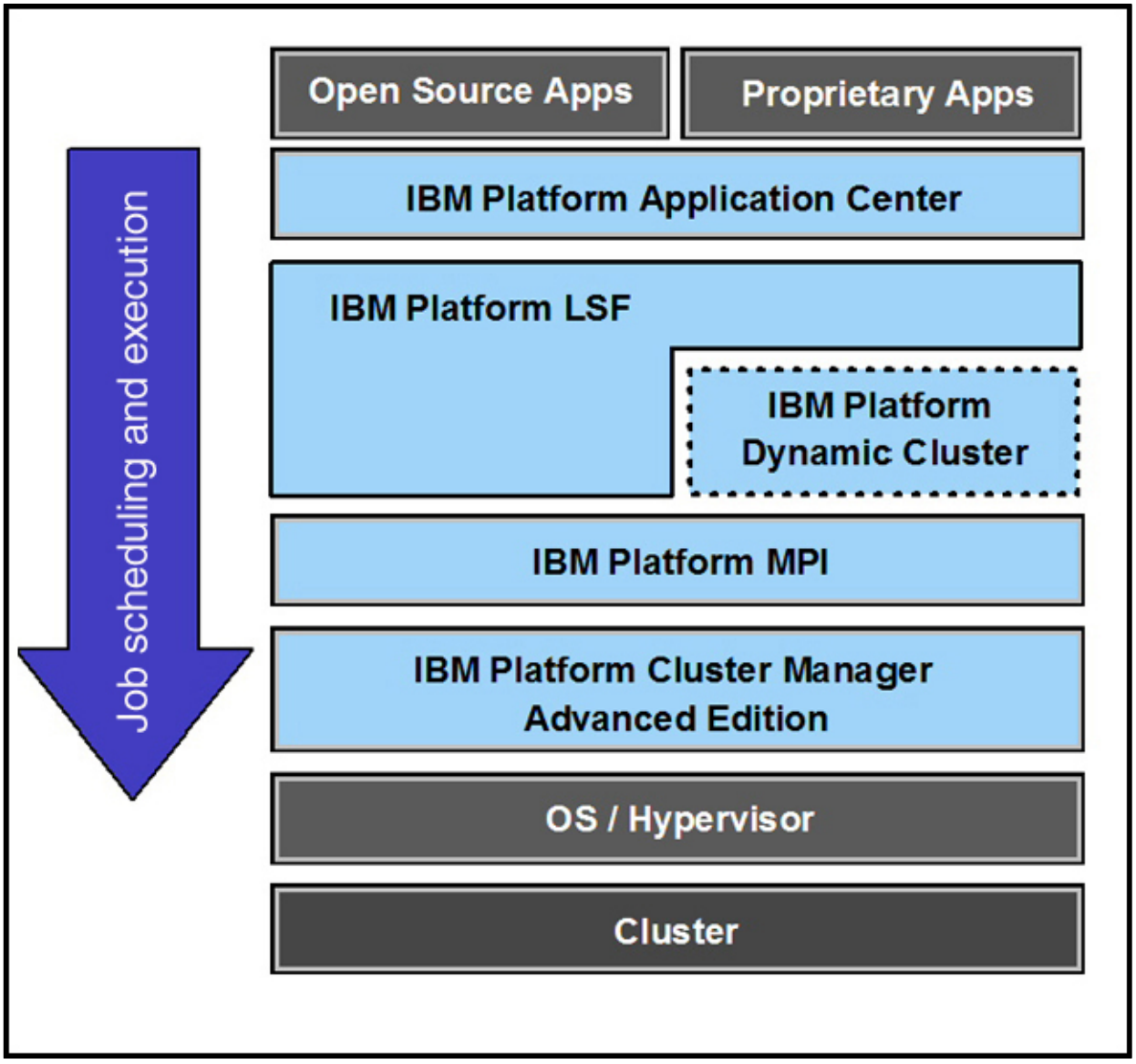

Figure 5. Job scheduling and execution

Integration

IBM Platform Symphony integrates with IBM InfoSphere® BigInsights™ to produce performance improvements for MapReduce workloads. Customers who deploy InfoSphere BigInsights or other big data application environments can realize significant advantages by using IBM Platform Symphony as a grid manager.

IBM Platform Symphony is a low-latency scheduling solution that supports true multitenancy and sophisticated workload management capabilities. IBM InfoSphere BigInsights is built on top of open source Hadoop and extends it with advanced analytic tools and other capabilities. InfoSphere BigInsights helps organizations of all sizes to more efficiently manage the vast amounts of data that consumers and businesses create every day. At its core, Hadoop is a Distributed Computing Environment that manages the execution of distributed jobs and tasks on a cluster. As with any Distributed Computing Environment, the Hadoop software needs to provide facilities for resource management, scheduling, remote execution, and exception handling. Although Hadoop provides basic capabilities in these areas, IBM Platform Computing has been working on these problems and perfecting them for twenty years.

When IBM Platform Symphony is deployed with InfoSphere BigInsights, IBM Platform Symphony replaces the open source MapReduce layer in the Hadoop framework. (IBM Platform Symphony is not a Hadoop distribution.) IBM Platform Symphony relies on a Hadoop MapReduce implementation that is present with various open source components, such as Pig, Hive, HBase, and HDFS file systems.

As shown in Figure 6, IBM Platform Symphony replaces the MapReduce scheduling layer in the InfoSphere BigInsights software environment. As a result, IBM Platform Symphony provides better performance and multitenancy in a way that is transparent to InfoSphere BigInsights and its users.

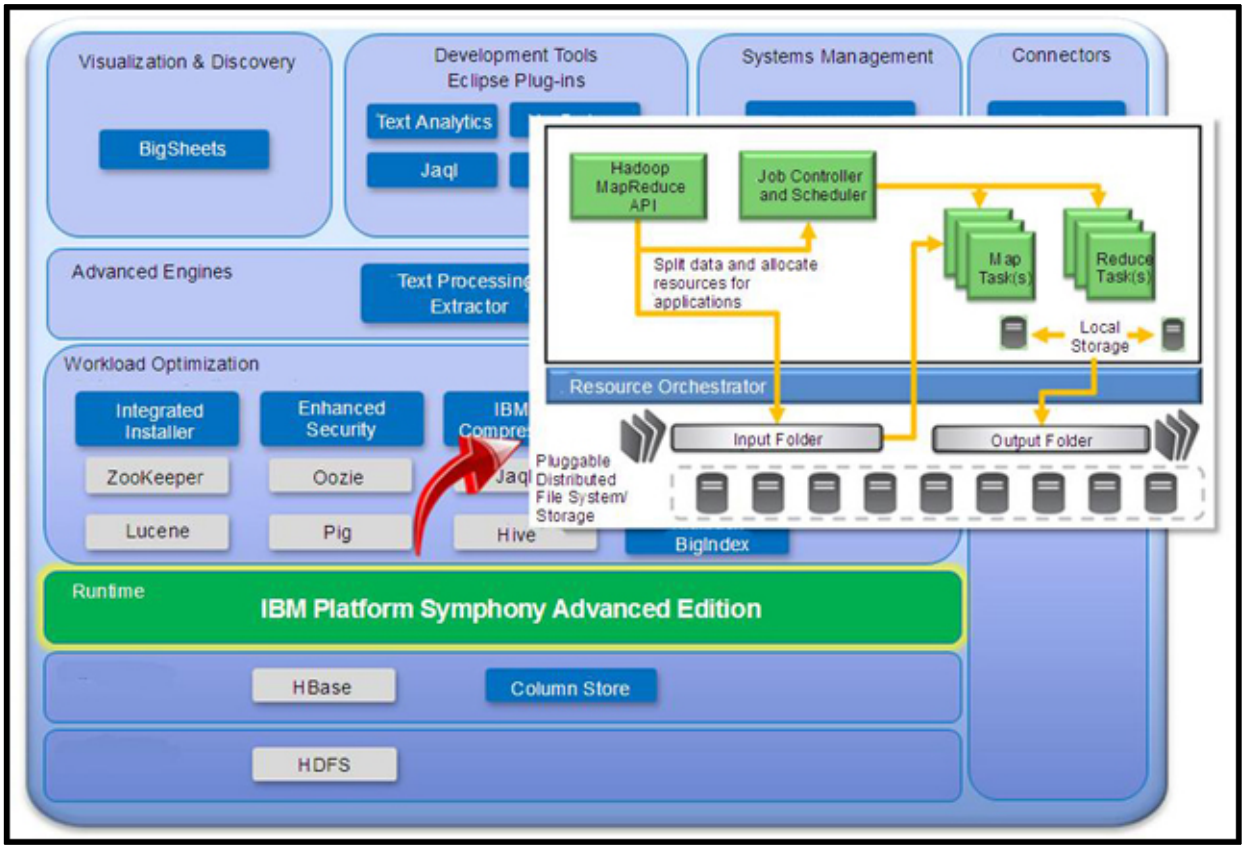

Figure 6. IBM Platform Symphony (Advanced Edition) runtime integration with InfoSphere BigInsights

Big data workloads can be submitted from the InfoSphere BigInsights graphical interface, from a command line, or from client applications that interact with the Hadoop MapReduce APIs. After you configure InfoSphere BigInsights to use the IBM Platform Symphony scheduler in place of the Hadoop scheduler, InfoSphere BigInsights workloads run seamlessly and are manageable from within the InfoSphere BigInsights environment.

Administrators must be aware that when they run InfoSphere BigInsights on a shared IBM Platform Symphony grid, some cluster and service management that are accessible from within InfoSphere BigInsights become redundant. For example, it is no longer assumed that InfoSphere BigInsights has exclusive use of the grid. Therefore, IBM Platform Symphony provides capabilities for cluster node management, service management, and high availability features, for example, for such components as the NameNode, JobTrackers, and TaskTrackers.

IBM Platform Symphony is especially beneficial to InfoSphere BigInsights customers who are running heterogeneous workloads that benefit from low latency scheduling. For Hadoop grid administrators who are looking for opportunities to improve performance, reduce cluster sprawl, and improve service levels at a lower cost, IBM Platform Symphony provides a powerful complement to InfoSphere BigInsights.

Supported platforms

In this section, we describe the platforms that support IBM Platform Computing solutions

Operating environment for Platform LSF V 9.1

This section describes the operating environment for Platform LSF V9.1.

Hardware requirements

Platform LSF V9.1 and Platform Application Center V9.1 are supported on IBM System x® iDataPlex® and other rack-based servers. They are also fully certified to run on clusters that are composed of IBM Power Systems™ servers running IBM AIX® or Linux.

LSF installations are typically large and involve a significant amount of hardware. Because of this, rack-based solutions tend to be the most practical.

The hardware requirements for the IBM Platform LSF scheduler are as follows:

- A minimum of 2 GB of physical memory (RAM); 16 GB or more is recommended for large clusters.
- Available SWAP space that is twice the size of the physical memory.
- A minimum of one high-speed network interface.

A secondary master host is recommended in large clusters.

Note: The hardware requirements for the product options vary based on the HPC environment. Refer to the product publications for more details.

Software requirements

IBM Platform LSF is supported on any of the following operating environments:

- Red Hat Enterprise Linux (RHEL) 5, 6 (on x86_64)
- SUSE Linux Enterprise Server (SLES) 9, 10, 11
- AIX V6 and AIX V7 on IBM POWER®
- HP B11.31 on PA-RISC and IA64
- Oracle Solaris 10 and 11 on SPARC and x86-64
- Other Linux distributions 2.6 or later on x86-64 and IBM Power Systems
- Windows 2003, Windows 2008, Windows 2012, Windows XP, Windows 7, and Windows 8 32-bit and 64-bit

- Mac OS 10.x
- Cray XT

Operating environment for Platform Symphony V 6.1

This section describes the operating environment for Platform Symphony V6.1.

Hardware requirements

Platform Symphony V6.1 is supported on IBM System x iDataPlex and other rack-based servers and on non-IBM x86 and x64 servers. New in Platform Symphony V6.1 is support for IBM Power Systems servers that are running Linux operating environments.

IBM Power Systems servers running AIX can integrate with Platform Symphony, but from a client perspective only. AIX support is presently limited and restrictions apply.

Software requirements

Platform Symphony is supported on the following operating environments:

- Microsoft Windows 2003, 2003 R2 64 bit, 2008, 2008 R2 64-bit, and Vista
- Windows 7 and Windows HPC Server 2008
- Red Hat Enterprise Linux (RHEL) 4, 5, and 6
- SUSE Linux Enterprise Server 9, 10, and 11
- RHEL and SUSE distributions that are supported on IBM POWER6® and Linux systems
- IBM AIX V5 (restrictions apply)
- Oracle Solaris 8 and 10
- Other Linux distributions 2.6, or later, with glibc 2.3

Operating environment for Platform HPC V 3.2

This section describes the operating environment for Platform HPC V3.2.

Hardware requirements

Platform HPC - Express Edition requires the following hardware:

Minimum requirements for installer node/head node:

- 2 GB of physical memory (RAM) for installer node/head node
- 80 GB of free disk space
- Two Ethernet interfaces: One that connects to corporate/public network and one (provision) that connects to all compute nodes
- DVD drive

Minimum requirements for compute node for package-based installation:

- 1 GB of physical memory (RAM) for compute node
- 40 GB of free disk space
- One Ethernet interface

Minimum requirements for image-based installation:

- 3 GB of physical memory (RAM)
- 40 GB of free disk space
- One Ethernet interface

Minimum requirements for diskless installation:

- 4 GB of physical memory (RAM)
- One Ethernet interface

Minimum requirements for compute node without using Platform HPC provisioning:

- 512 MB of physical memory (RAM)
- 10 GB of free disk space
- One Ethernet interface

Software requirements

Platform HPC V3.2 is supported on the following operating environments:

- Red Hat Enterprise Linux 6.2 x86 64-bit
- Red Hat Enterprise 5.7 x86 64 bit (non-head node)
- CentOS 6.2 x86 64-bit (non-head node)
- SUSE Linux Enterprise Server 11 SP1 x86 64-bit

Operating environment for Platform Cluster Manager V 4.1

This section describes the operating environment for Platform Cluster Manager V4.1.

Hardware requirements

Platform Cluster Manager V4.1 Advanced Edition is supported on IBM System x iDataPlex, Intelligent Cluster™, and other rack-based servers, and is also supported on non-IBM x86_64 servers. The installations are typically large and involve a significant amount of hardware. Because of this, rack-based solutions tend to be the most practical. The choice of hardware is typically dictated by the type of workload that you expect to run in this environment. Platform Cluster Manager Advanced Edition installations involve a predefined management node and many compute hosts.

Software requirements

Platform Cluster Manager V4.1 Advanced Edition supports the following operating environments:

Master node installation:

- Red Hat Enterprise Linux™ (RHEL) 6.3 (x86 64-bit)

Physical machine provisioning:

- xCAT 2.7.6
- IBM Support for xCAT V2 - recommended

xCAT provisioning node installation:

- RHEL 6.3 (x86 64-bit)
- CentOS 5.8 (x86 64-bit)

Provisions the following operating environments:

- RHEL 6.3 (x86 64-bit)
- KVM on RHEL 6.3 (x86 64-bit)
- CentOS 5.8 (x86 64-bit)

Supports the following virtualization environments:

- KVM on RHEL 6.3 (x86 64-bit)
- IBM SmartCloud® Provisioning 2.1
- vSphere 5.0 with ESXi 5.0

Provisions the following guest operating environments:

- RHEL 6.3 (x86 64-bit)
- Microsoft™ Windows™ 2008 (64-bit)

Provisions the following storage clients:

- IBM GPFS™ client node V3.5

Manages the following network infrastructure:

- IBM RackSwitch™ G8000, G8052, G8124, and G8264
- Mellanox InfiniBand Switch System IS5030, SX6036, and SX6512
- Cisco Catalyst 2960 and 3750 switches

The Master node requires:

- MySQL, stand-alone 5.1.64
- Oracle 11g Release 2 or Oracle 11g XE

The web console requires Adobe™ Flash Player 10, or later, and is supported on:

- Internet Explorer 8 and 9 on Windows
- Firefox 10 on Windows
- Firefox 3.6 on Linux

Platform Cluster Manager Advanced Edition supports most workload managers, and supports the following:

- Platform LSF V8.3, or later
- Platform Application Center V8.3
- Platform Symphony V5.2, or later
- IBM InfoSphere BigInsights™ V1.4

Operating environment for Platform Cluster Manager Standard Edition 4.1

Platform Cluster Manager Standard Edition 4.1 requires the following operating systems:

- Red Hat Enterprise Linux 6.3 x86 64-bit
- Red Hat Enterprise Linux 6.3 Power
- Red Hat Enterprise Linux 5.8 x86 64-bit (non-management node)
- CentOS 6.3 x86 64 bit (non-management node)

Operating environment for Platform Cluster Manager Advanced Edition 4.1

Platform Cluster Manager Advanced Edition 4.1 requires the following operating system to install the master node:

- Red Hat Enterprise Linux (RHEL) 6.3 (x86 64-bit)

Provisions the following operating environments:

- RHEL 6.3 (x86 64-bit)
- KVM on RHEL 6.3 (x86 64-bit)
- CentOS 5.8 (x86 64-bit)

Supports the following virtualization environments:

- KVM on RHEL 6.3 (x86 64-bit)
- IBM SmartCloud Provisioning 2.1
- vSphere 5.0 with ESXi 5.0

Provisions the following storage clients:

- GPFS Client V3.5

Supports dynamic VLAN management on:

- IBM RackSwitch G8000
- IBM RackSwitch G8052
- IBM RackSwitch G8124
- IBM RackSwitch G8264
- Mellanox InfiniBand Switch System IS5030
- Mellanox InfiniBand Switch System SX6036
- Mellanox InfiniBand Switch System SX6512
- Cisco Catalyst 2960 Switch
- Cisco Catalyst 3750 Switch

Hardware requirements

The IBM Platform Cluster Manager - Standard Edition requires the following hardware:

Minimum requirements for the management node:

- 2.5 GB of physical memory (RAM) for management node
- 80 GB of free disk space
- At least one Ethernet interface
- DVD drive

Minimum requirements for the compute node for stateful package-based installation:

- 1 GB of physical memory (RAM) for compute node
- 40 GB of free disk space
- One Ethernet interface

Minimum requirements for stateless installation:

- 4 GB of physical memory (RAM)
- One Ethernet interface

Software requirements

One of the following operating systems is required:

- Red Hat Enterprise Linux 6.3 x86 64-bit
- Red Hat Enterprise Linux 6.3 POWER
- Red Hat Enterprise 5.8 x86 64-bit (non-head node)
- CentOS 6.3 x86 64-bit (non-head node)

For more information about the supported operating systems, platforms, or other key prerequisites, visit ibm.com/platformcomputing.

Ordering information

Table 2 shows a list of IBM Platform Computing solutions for HPC Cloud, workload management, big data analytics, and cluster management and the available products.

Table 2 IBM Platform Computing Solutions

Product family	Offering name - chargeable component
IBM Platform LSF V9.1	IBM Platform LSF - Express Edition IBM Platform LSF - Standard Edition (includes Power support) IBM Platform LSF - Express to Standard Edition Upgrade IBM Platform Process Manager IBM Platform License Scheduler IBM Platform RTM IBM Platform Application Center IBM Platform MPI IBM Platform Dynamic Cluster IBM Platform Sessions Scheduler
	IBM Platform Analytics - Express Edition IBM Platform Analytics - Express to Standard Upgrade IBM Platform Analytics - Standard Edition IBM Platform Analytics - Standard to Advanced Upgrade IBM Platform Analytics - Advanced Edition IBM Platform Analytics Data Collectors
	IBM Platform LSF - Advanced Edition
IBM Platform Symphony V6.1	IBM Platform Symphony - Express Edition IBM Platform Symphony - Standard Edition IBM Platform Symphony - Advanced Edition IBM Platform Symphony - Developer Edition IBM Platform Symphony - Desktop Harvesting IBM Platform Symphony - GPU Harvesting IBM Platform Symphony - Server and VM Harvesting IBM Platform Analytics IBM Platform Symphony - Express to Standard Upgrade IBM Platform Symphony - Standard to Advanced Upgrade
IBM Platform HPC V3.2	IBM Platform HPC V3.2 - Express Edition for System x
	IBM Platform HPC - x86 Nodes (other equipment manufacturers (OEM) only)
IBM Platform Cluster Manager V4.1	IBM Platform Cluster Manager - Standard Edition IBM Platform Cluster Manager - Advanced Edition

Ordering information, including the program number, version, and program name, are shown in Table 3.

Table 3. Ordering program number, version, and program name

Program number	VRM	Program name
5725-G82	9.1.1	IBM Platform LSF
5725-G82	9.1.0	IBM Platform Process Manager
5725-G82	9.1.0	IBM Platform RTM
5725-G82	9.1.0	IBM Platform License Scheduler
5725-G82	9.1.0	IBM Platform Application Center
5725-G88	4.1.0	IBM Platform Cluster Manager
5641-CM6	4.1.0	IBM Platform Cluster Manager, V4.1 with one-year S&S
5641-CM7	4.1.0	IBM Platform Cluster Manager, V4.1 with three-year S&S
5641-CM8	4.1.0	IBM Platform Cluster Manager, V4.1 with five-year S&S
5641-CMG	4.1.0	IBM Platform Cluster Manager, V4.1 Term License with one-year S&S
5725-G86	6.1.0	IBM Platform Symphony
5725-G84	8.3.0	IBM Platform Analytics
5725-K71	3.2.0	IBM Platform HPC - Express Edition

Related information

For more information, see the following documents:

- IBM Offering Information page (to search on announcement letters, sales manuals, or both):

  http://www.ibm.com/common/ssi/index.wss?request_locale=en

  On this page, enter `IBM Platform Computing`, select the information type, and then click Search. On the next page, narrow your search results by geography and language.

- *IBM Platform Computing Solutions*, SG24-8073:
  http://www.redbooks.ibm.com/abstracts/sg248073.html
- *IBM Platform Computing Integration Solutions*, SG24-8081:
  http://www.redbooks.ibm.com/abstracts/sg248081.html
- IBM Platform Computing:
  http://ibm.com/systems/technicalcomputing/platformcomputing/industries/index.html

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