IBM Platform Symphony V6.1 enables scalable, high-performance grid services for parallel compute- and data-intensive analytic applications

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At a glance

Platform Symphony® V6.1 helps exceed performance goals. With it you can realize:

- Faster throughput and performance
- Higher levels of resource utilization
- Reduced infrastructure and management costs
- Reduced application development and maintenance costs
- The agility to respond instantly to real-time demands

For ordering, contact your IBM® representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

Platform Symphony V6.1 is an enterprise-class grid manager for running distributed application services on a scalable, shared, heterogeneous grid.

Platform Symphony can help you:

- Obtain higher-quality business results faster
- Reduce infrastructure and management costs
- Accelerate many types of Hadoop MapReduce workloads
- Combine compute- and data-intensive applications on a single shared platform

Features include the following:

- Ultrafast, low-latency grid scheduler
- Redesigned web interface
- Multicluster support for scalability to 100,000 cores
- Unique resource-sharing model that enables multitenancy with resource lending and borrowing for maximum efficiency
- Optimized, low-latency MapReduce implementation compatible with IBM InfoSphere® BigInsights™ and other big data solutions

Platform Symphony V6.1 now supports IBM Platform Analytics through the use of new data collectors for Symphony .

Perform capacity planning and chargeback accounting by analyzing how applications perform and how infrastructure is used.

Platform Symphony is available in four different editions tailored to different business requirements.

- Platform Symphony Developer Edition: Build and test applications without the need for a full-scale grid.
- Platform Symphony Express® Edition: The ideal solution for departmental clusters.
- Platform Symphony Standard Edition: Enterprise-class performance and scalability.
- Platform Symphony Advanced Edition: Use for distributed compute- and data-intensive applications requiring Hadoop MapReduce.

Key prerequisites

- A physical grid computing environment that consists of any of the following:
  - IBM Power Systems™ , IBM PureSystems™ , or IBM System x® servers
  - Similar servers from third-party companies
- Cluster nodes preinstalled with supported operating environments
- Cluster nodes that are connected via a fast TCP/IP network infrastructure
- Management hosts on the cluster that ideally share a common network file system (enable recovery of grid sessions in case of failure)

Planned availability date

- December 14, 2012: Electronic delivery
- January 11, 2013: Physical media

Description

Platform Symphony V6.1 is a high-performance grid middleware and management solution that runs on your choice of hardware and operating environments. You can use Platform Symphony to run preintegrated applications available from a variety of ISVs, or easily adapt and accelerate your own compute- and data-intensive parallel workloads on a grid, making your organization agile and flexible.

Performance and scalability

Platform Symphony gives organizations a competitive advantage by solving a wide range of large-scale compute- and data-intensive business problems that can be run concurrently with exceptional performance.

- Scale to 10,000 cores per application and 40,000 cores per cluster
- Scale to 100,000 cores in multicluster configurations
- Deliver sub-millisecond latency for grid services
- Enable throughput exceeding 17,000 tasks per second
- Reallocate service instances at a rate of up to 1,000 instances per second

For workloads such as MapReduce where standard comparative benchmarks are available, Platform Symphony demonstrates clear business value. As an example, in the SWIM benchmark developed at the University of California, Berkeley (UCB) the

Platform Symphony scheduler was measured to deliver approximately four times the performance of Apache Hadoop Release 1.0.1 running on identical hardware.

Flexible resource sharing

A key advantage of Platform Symphony is its sophisticated hierarchical resource-sharing model. The ability of Platform Symphony to lend and borrow resources, based on policy, guarantees users access to owned resources when needed. Departments can also easily share resources not in use with others and borrow resources dynamically as needed. By avoiding the need for application-specific silos, users enjoy a better quality of service with reduced infrastructure and management costs. Whether you are deploying on Linux™ , IBM PowerLinux™ , Microsoft™ Windows™ , Windows HPC Server, UNIX™ , or all of the above, you can manage your environment as a single, shared resource pool with Platform Symphony .

Support for compute- and data-intensive analytic workloads

Platform Symphony is optimized for both compute- and data-intensive parallel workloads. This is important to large organizations that want to avoid having a discrete grid for each application. Platform Symphony delivers a rich set of client- and server-side APIs for a variety of parallel computing problems alongside an optimized Hadoop-compatible MapReduce implementation. It also delivers other data handling innovations to accelerate the processing of large distributed data sets. The low-latency middleware and resource orchestration capability of Platform Symphony delivers dramatic performance gains for both compute- and data-intensive applications. Tasks can be dispatched with an awareness of data locality resulting in better performance and efficiency as applications avoid the needless movement of data across congested networks.

Rapid response for business-critical workloads

Platform Symphony can react instantly to changes in application demand. With the flexibility to adapt when priorities change, Platform Symphony can reallocate service instances at a rate of up to 1,000 per second to different workloads depending on configurable sharing policies and application priorities. This translates into better application performance, better utilization, and an ability to respond quickly to business-critical demands.

Ease of application and data integration

Regardless of your development environment, Platform Symphony can meet your needs. Well-documented APIs enable fast integrations for applications written in the following languages and software environments:

- C++
- C#, .NET
- Java™
- Excel COM
- Native binaries

Platform Symphony also supports other languages and environments commonly used in distributed computing including Python. It also supports layered Hadoop technologies including Apache PIG (a high-level language for writing data analysis programs) and HIVE (a data warehouse implementation for Hadoop) available as part of IBM BigInsights or with third-party Hadoop distributions.

Plug-ins provided for Microsoft Visual Studio Professional support compilation-free integration of .NET assemblies. Developers can use a step-by-step wizard to integrate and test applications end-to-end without needing to be expert in the Platform Symphony APIs. For Java developers, the Eclipse integrated development environment (IDE) is supported as well.

Associated with the MapReduce scheduling capabilities of Platform Symphony , plug-ins are included for distributed file systems such as IBM General Parallel File System

(GPFS™), Hadoop Distributed File System (HDFS) and Appistry. Platform Symphony also supports integrations with third-party in-memory data grid solutions.

The free downloadable Platform Symphony Developer Edition makes developers productive immediately, enabling them to develop and test CPU- or GPU-based applications on their operating system of choice without the need for a production grid. Platform Symphony Developer Edition also enables developers to integrate and test data MapReduce applications. The Platform Symphony Developer Edition is available from IBM DeveloperWorks at

http://www.ibm.com/developerworks/

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Product positioning

Platform Symphony is an enterprise-class grid manager for running distributed application services on a scalable, shared, heterogeneous, multitenant grid. It accelerates a variety of compute- and data-intensive applications, quickly computing results while making optimal use of available infrastructure. Unlike other solutions that perform poorly or lack dynamic resource sharing, the efficient low-latency middleware and scheduling architecture of Symphony deliver the performance and agility required to predictably meet and exceed throughput goals for the most demanding analytic workloads. Optimized for performance and reliability, and including advanced management features, Platform Symphony helps organizations realize improved application performance at a significantly reduced total cost of ownership.

Using optimized protocols and a fast and efficient push model, Platform Symphony can respond instantly to applications, resulting in higher throughput, better performance, and superior infrastructure utilization. Flexible sharing policies mean that resource allocations can flex in real-time, expanding the number of compute engines assigned to priority calculations while respecting SLAs so that applications finish more quickly and run more reliably. Because of its fast middleware and scheduling capabilities, Platform Symphony is particularly effective when running latency-sensitive big data MapReduce workloads.

The Platform Symphony resource-sharing model makes it practical to deploy multiple heterogeneous applications on the same shared grid while preserving ownership and delivering service-level guarantees. With this unique capability, Platform Symphony enables administrators to avoid the business and technical concerns that frequently impede resource sharing and result in application and grid silos. By sharing resources fluidly subject to policy and preserving ownership, managed resources are more fully utilized, resulting in better performance, simplified management, and reduced infrastructure costs.

Reference information

Refer to Preview Announcement 212-392, dated October 3, 2012 .

Program number

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Program                 Program
number       VRM        name

5725-G86     6.1.0      Platform Symphony
5725-G84     8.3.0      IBM Platform Analytics
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Education support

The following classes are available:

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Course    Course
code      title

Classroom

H050G     IBM Platform Symphony Administration for Linux
H051G     IBM Platform Symphony Administration for Windows
H060G     IBM Platform Symphony Application Programming for Linux
H061G     IBM Platform Symphony Application Programming for Windows
H070G     IBM Platform Symphony-MapReduce Administrator
H071G     IBM Platform Symphony-MapReduce Developer
H072G     IBM Platform Symphony-MapReduce Data Management


Instructor-led online (ILO)

H150G     IBM Platform Symphony Administration for Linux
H151G     IBM Platform Symphony Administration for Windows
H160G     IBM Platform Symphony Application Programming for Linux
H161G     IBM Platform Symphony Application Programming for Windows
H170G     IBM Platform Symphony-MapReduce Administrator
H171G     IBM Platform Symphony-MapReduce Developer
H172G     IBM Platform Symphony-MapReduce Data Management
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IBM training provides education to support many IBM offerings. Descriptions of courses for IT professionals and managers are on the IBM training website

http://www.ibm.com/services/learning/

Call IBM training at 800-IBM-TEACH (426-8322) for catalogs, schedules, and enrollments.

Offering Information

Product information is available via the Offering Information website

http://www.ibm.com/common/ssi

Also, visit the Passport Advantage® website

http://www.ibm.com/software/passportadvantage

Publications

The following publications are shipped with the Platform Symphony 6.1 as part of the Platform Symphony Knowledge Center. Documentation is included in both web-friendly and PDF formats.

- Cluster Verification
- Connector for Microsoft Excel User Guide
- Platform Symphony Foundations
- GPU Application Development Guide
- Installing the Platform Symphony Client on UNIX
- Installing the Platform Symphony Client on Windows
- Installing Platform Symphony : Cluster Overview
- Cluster and Application Management Guide
- MapReduce Application Integration Guide
- MapReduce User Guide
- MATLAB Integration Readme
- Platform Symphony Reference
- Troubleshooting RPM Installation Issues
- Upgrading your Platform Symphony Cluster
- Upgrading your Platform Symphony 3.x/4.x Cluster
- Virtual Server Harvesting User Guide
- Getting Started: Developer Overview
- Application Development Guide
- Installing and Using the Platform Symphony Solaris SDK
- Installing the Platform Symphony Developer Edition
- Platform Symphony Developer Tutorials
- Installing Platform Symphony MultiCluster
- MultiCluster User Guide
- FAQs
- Data Schema for Platform Symphony
- Platform Symphony C++ API Reference
- Platform Symphony Java API Reference
- Platform Symphony .NET API Reference
- Platform Symphony COM API Reference
- Platform Symphony Development Tutorials
- Platform Symphony Error Message Reference
- Platform Symphony WSDL API Reference

Documentation is also available at the IBM Publications Center.

http://www.ibm.com/shop/publications/order

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. Payment options for orders are via credit card (in the US) or customer number for 50 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries, free of charge.

Technical information

Specified operating environment

Hardware requirements

Platform Symphony V6.1 is supported on IBM System x iDataPlex® and other rack-based servers as well as non-IBM x86 and x64 servers. New in Platform Symphony

V6.1 is support for IBM Power Systems servers running PowerLinux™ operating environments.

IBM Power® System 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 supported on IBM POWER6® and PowerLinux systems
- IBM AIX V5 (restrictions apply)
- Oracle Solaris 8, 10
- Other Linux distributions 2.6, or later, with glibc 2.3

Note: Not all product capabilities are supported uniformly across all operating systems.

For Linux installations, precompiled binaries facilitate easy installation on different Linux kernels. The distribution to install depends on the version of Linux (specifically the Linux kernel version) and version of glibc.

In the case of Microsoft cluster deployments, compatibility is based on the version of the Windows operating environment.

IBM POWER6 and PowerLinux platforms supporting RHEL 6.x and SUSE Linux Enterprise Server 11 SP1 can run Platform Symphony .

Clusters can consist of nodes running multiple operating systems. For example, 32-bit and 64-bit Linux hosts can be mixed running different Linux distributions, and multiple Windows operating systems can be deployed as well. Platform Symphony has mechanisms to deal with the management of these different types of hosts in the same cluster to control what application services are able to run on each type of host. Also, clients and services may be heterogeneous. It is common to have Platform Symphony clients and services be implemented on different operating environments, languages, and frameworks. For example, a client-side spreadsheet can embed visual-basic code that opens a connection to Platform Symphony to a simulation service that is built on Java running on RHEL 6.2.

Platform Symphony clients can integrate their own applications so that they can be deployed and managed on a Platform Symphony cluster. Because of this, software development environments become an important consideration for clients deploying Platform Symphony .

Platform Symphony supports the following compilers and development environments:

- Compilers:
  - C++
  - C# on Microsoft .NET, COM, Java 1.4.2, 1.5, 1.6, Sun Java Virtual Machine
  - BEA JRockit
  - VisualAge® C++ (AIX)
  - Intel™ C++
  - Various GNU compilers
- Microsoft Visual Studio Professional 2008 and 2010; Eclipse 3.2.2 and 3.3.0.

Additional details are available in the Platform Symphony documentation.

If you choose to run Platform Symphony together with a big data solution such as IBM BigInsights , Cloudera, or Apache Hadoop, Platform Symphony supports the following Hadoop versions and the MapReduce API version:

- 1.0.0
- 1.0.1
- 0.21.0
- 0.20.2
- 0.20.203
- 0.20.204
- Cloudera CDH3, update 1 and update 2

Platform Symphony has been tested with and supports the following applications, also often deployed in big data environments:

- IBM GPFS 3.4
- BigInsights 1.3, 1.4, and 2.0
- Appistry CloudIQ storage
- Datameer Analytics solution
- Most layered open-source Hadoop applications, including Pig, Mahout, Nutch, HBase, Oozie, Zookeeper, Hive, Pipes, and JAQL

Following is a partial list of third-party packages known to work with Platform Symphony . In some cases, integration is explicitly supported by the vendor, but in other cases, integration is achieved through the scriptable symexec interfaces included in Platform Symphony . Symexec enables workloads to be called using the Platform Symphony service-oriented middleware without explicitly requiring that applications be linked to Platform Symphony client- and service-side libraries.

- Murex
- Microsoft Excel
- Sungard Front Arena, Adaptiv
- Algorithmics® Algo Risk®
- Oracle Coherence
- Milliman Hedge, Alfa
- Polysys
- Fermat
- Numeric
- Calypso
- Mathworks MATLAB
- Quantifico
- Tillinghast MoSes
- Sophis Risque
- Misys
- GGY Axis
- Openlink
- Kondor+

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a README file, or other information published by IBM , such as an announcement letter. Documentation and other program content may be supplied only in the English language.

Companion products

For clients running applications that benefit from fast, distributed shared file services, Platform Symphony can be deployed in conjunction with GPFS on the same cluster. Using GPFS will provide performance benefits over other file system alternatives, including NFS or AFS® file sharing.

At a file system level, clients running MapReduce workloads on Platform Symphony typically use either the Hadoop file system (HDFS) included with IBM InfoSphere BigInsights , Apache Hadoop (open source software not included in the Platform Symphony distribution), or GPFS to support MapReduce workloads.

You can choose to deploy IBM Platform LSF® and Platform Symphony on the same shared cluster infrastructure, but there are some limitations. If deploying mixed Platform Symphony and IBM Platform LSF clusters, contact a Platform Symphony product specialist for configuration advice and assistance.

New in Platform Symphony 6.1 is support for IBM Platform Analytics. This gives business planners and IT personnel the ability to analyze how applications are performing and how infrastructure is being used for purposes such as capacity planning and chargeback accounting. Additional information about how Platform Symphony is supported by IBM Platform Analytics is included in the IBM Platform Analytics sales kit resources and documentation.

Compatibility

Platform Symphony V6.1 is fully backward compatible with Platform Symphony V5.2, V5.1, and previous supported versions. To facilitate your migration, Platform Symphony allows different versions of the service-oriented architecture middleware (SOAM) to coexist on the same cluster at the same time. This means that clients running applications developed against earlier versions of the Platform Symphony APIs can deploy their application on the most up-to-date version of Platform Symphony .

For example, if you have qualified your applications using the client- and server-side components and libraries included in Platform Symphony V4.1, those applications can be run as they are, without recompilation on Platform Symphony V6.1. Application profiles specific to each grid service govern the version of the API being used, making it possible for applications using multiple API versions to coexist on the same grid at the same time.

Platform Symphony V6.1 is also fully compatible with previous Platform MapReduce versions. MapReduce applications developed for Platform MapReduce 1.5 will run without modification on Platform Symphony V6.1.

Limitations

Clients deploying Platform Symphony should be aware of the following limitations:

- AIX running on IBM Power Systems hardware is supported via Platform Symphony client-side integrations only. AIX support is limited, and AIX platforms can be clients only to a Platform Symphony managed grid.
- Platform Symphony clusters have been tested to support up to 40,000 service instances (usually each service instances is mapped to a core) on a single cluster. This does not mean that a single client application can use 40,000 services instances concurrently; rather it means that multiple applications running simultaneously can use up to 40,000 services instances. Platform Symphony supports scalability to 10,000 services instances (cores) per individual application.
- .NET applications written to use the Platform Symphony APIs using Platform Symphony V5.2, or earlier, will not automatically run in a Platform Symphony V6.1 environment. This is a limitation imposed by the .NET publisher's policy strictly enforced by the .NET framework. You can avoid this problem by either recompiling the applications with the latest version of the Platform Symphony

SDK or by modifying configuration files to override the publisher's policy and ignore differences in version numbers.

- For clients running MapReduce workloads with Platform Symphony and Apache Hadoop and HDFS, a Hadoop distribution is not actually included with Platform Symphony . The Platform Symphony documentation includes details on how to install and configure various different Hadoop implementations for Platform Symphony including IBM BigInsights , Cloudera CDH, and Apache Hadoop.
- There are some known issues related to the Microsoft Visual Studio 2010 multitargeting feature on Platform Symphony , which is intended to allow developers to write programs that target multiple versions of the .NET environment. These limitations are discussed in detail in the Platform Symphony release notes.
- If using Excel connector services, it is recommended that you deploy the most recent version of the connector service for the version of Symphony that you have deployed. This requirement is discussed in the Platform Symphony release notes.

Other limitations are discussed in the Platform Symphony release notes and documentation.

Performance considerations

Platform Symphony is specifically designed to help organizations meet their application performance goals by taking advantage of inherent opportunities for parallelism in a variety of application types. Because application parallelism is the key driver of performance in grid applications, efficiency emerges as the major consideration when determining how much faster an application can be expected to run when deployed on a Platform Symphony grid.

For example, if you need to run a workload consisting of 1,000 tasks that each takes 10 seconds on average to complete, you would expect this workload to take 10,000 seconds or a little under three hours on a single processing element. If a 100-node grid were assembled that was 100% efficient, you would expect this same workload under ideal circumstances to run 100 times faster, and complete all 1,000 10-second tasks in just 100 seconds. Platform Symphony has been tested in a 5,000 core environment to deliver application efficiency in excess of 95% for what are termed "embarrassingly parallel" applications.

A second consideration when talking about performance is latency. Latency refers to how quickly services can start in response to application demand, and what level of overhead is involved in servicing requests. Latency becomes particularly important for short-running tasks. For example, consider the need to compute 1,000 scenarios where the compute time is 50 milliseconds each. Ideally, with access to a 1,000-node cluster it should be possible to complete all 1,000 calculations in an elapsed time of 50 milliseconds. Where compute services are prestarted on the grid (as configured in the application profile), Platform Symphony comes close to achieving these theoretical maximums with measured overhead of close to 1 millisecond for end-to-end requests, and task-sending throughput measured up to 19,000 tasks per second.

Platform Symphony performance considerations are described in detail in a document called *Platform Symphony Performance White Paper* that characterizes Platform Symphony based on real benchmarks for a variety of types of application load.

Observed performance varies based on a large number of factors including:

- The nature of the application and the degree to which work can be parallelized.
- The nature of the application integration; for example, API-based integrations generally perform better than scripted integrations.
- The size and composition of the grid.
- The performance of individual management hosts and compute hosts.
- The capacity and nature of the network connecting grid nodes.

- The amount of data sent and retrieved along with each call to a service.
- The configuration of host computers running critical services such as the application session managers (referred to as SSM in the Platform Symphony architecture).
- Whether sessions are deemed "recoverable" or "unrecoverable" (unrecoverable sessions run slightly faster, but lose the ability to resume execution where they left off in the event of a failure of the node running the session manager.
- Considerations on the SSM host (sometimes referred to as broker host) such as virtual memory consumed and the speed of storage also impact performance as task counts become high. In cases where Platform Symphony is managing millions of tasks and exhausts memory in the SSM, the session manager itself needs to start recording transaction details to persistent storage in order to avoid oversubscribing virtual memory.

IBM has amassed a significant amount of experience characterizing the performance of different types of applications in grid computing environments and can help customers realistically assess the types of performance gains that they can expect.

IBM Electronic Support

The IBM Support Portal is your gateway to technical support. This includes IBM Electronic Support tools and resources, for software and hardware, to help save time and simplify support. The Electronic Support tools can help you find answers to questions, download fixes, troubleshoot, automate data collection, submit and track problems through the Service Request online tool, and build skills. All these tools are made available through your IBM support agreement, at no additional charge.

Read about the Electronic Support portfolio of tools: http://ibm.com/electronicsupport

Access the IBM Support Portal: http://ibm.com/support

Access the online Service Request tool: http://ibm.com/support/servicerequest

Planning information

Clients who want to run both Platform Symphony and IBM Platform LSF on the same grid environment, and share resources between the two environments should seek configuration assistance from IBM . While documentation is included in the Platform Symphony distribution that explains how to do this, IBM can offer useful guidance.

Similarly, IBM can offer assistance to clients who want to augment an IBM InfoSphere BigInsights installation with Platform Symphony . Platform Symphony replaces several of the grid management and service monitoring facilities inside BigInsights .

Customer responsibilities

While the installation and upgrade procedures for Platform Symphony V6.1 have been tested carefully, as with any installation or upgrade, it is prudent to ensure that backups exist and prepare for the installation or upgrade in advance.

To facilitate this process, the Platform Knowledge Center, provided with Platform Symphony , includes web-based and PDF documentation *Upgrading Your Platform Symphony Cluster* that outlines the specific steps that should be taken in planning and executing a cluster upgrade

For clients planning a new installation, the document *Installing Your Platform Symphony Cluster* should be reviewed carefully. This document provides a thorough explanation of the steps involved in installing Platform Symphony in Windows or Linux and UNIX environments.

Installability

When installing or upgrading your Platform Symphony cluster, the functionality of prior versions of Platform Symphony is preserved. For example, cluster

configuration, application definitions, resource sharing profiles, and all historical data are retained.

After updating to Platform Symphony V6.1, existing applications that ran previously on Platform Symphony V4.1, V5.0, V5.1, and V5.2 will continue to run until you decide to update and test those individual applications using later versions of the Platform Symphony APIs. Even after upgrading your applications to Platform Symphony V6.1, you can continue to leave prior versions of your applications installed on the Platform Symphony cluster.

Packaging

Platform Symphony V6.1 is distributed on multiple DVD media and is available for electronic download with multiple eAssemblies. Included are:

- IBM International Program License Agreement (L-VASN-8X2PQQ) in multiple languages
- Release notes
- Installation or User's Guide
- Required files

This program, when downloaded from a website, contains the applicable IBM license agreement and License Information, if appropriate, and will be presented for acceptance at the time of installation of the program. For future reference, the license and License Information will be stored in a directory such as LICENSE.TXT. This program, when downloaded from a website, contains the applicable IBM license agreement and License Information, if appropriate, and will be presented for acceptance at the time of installation of the program. For future reference, the license and License Information will be stored in a directory such as LICENSE.TXT.

Security, auditability, and control

Platform Symphony uses the security and auditability features of the system in which it is installed. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Software Services

IBM Software Services has the breadth, depth, and reach to manage your services needs. You can leverage the deep technical skills of our lab-based, software services team and the business consulting, project management, and infrastructure expertise of our IBM Global Services team. Also, we extend our IBM Software Services reach through IBM Business Partners to provide an extensive portfolio of capabilities. Together, we provide the global reach, intellectual capital, industry insight, and technology leadership to support a wide range of critical business needs.

To learn more about IBM Software Services or to contact a Software Services sales specialist, visit

http://www.ibm.com/software/sw-services/

Ordering information

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Product group: IBM Platform Computing
  Product Identifier Description (PID)
  IBM Platform Symphony    5725G86
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Product category: Other Software

Charge metric

Program name	Part number or PID number	Charge metric
IBM Platform Symphony	5725-G86	
Express Edition		Managed core RVU(1)
Standard Edition		Managed core RVU
Advanced Edition		Managed core RVU
Desktop Harvesting		Client device
GPU Harvesting		GPGPU(2)
Server and VM Harvesting		Virtual server
IBM Platform Analytics	5725-G84	
Data Collectors for Symphony		Managed core RVU

1 Resource Value Unit

RVU is a unit of measure by which the program can be licensed. RVU Proofs of Entitlement are based on the number of units of a specific resource used or managed by the program. Licensee must obtain sufficient entitlements for the number of RVUs required for licensee's environment for the specific resources as specified in the program specific table. RVU entitlements are specific to the program and the type of resource and may not be exchanged, interchanged, or aggregated with RVU entitlements of another program or resource. Refer to the program specific RVU table.

- Some programs may require licenses for the resources available to and the resources being managed by the program. In that case, the following applies. In addition to the entitlements required for the resources used by the program directly, licensee must obtain entitlements for this program sufficient to cover the resources managed by the program.
- Some programs may be licensed on a managed basis only. In that case, the following applies. Instead of the entitlements required for the resources used by the program directly, licensee must obtain entitlements for this program sufficient to cover the resources managed by the program.

2 General Purpose Graphics Processing Unit

Each license includes 12 months subscription and support.

General Purpose Graphics Processing Unit

General Purpose Graphics Processing Unit (GPGPU) is a unit of measure by which the Program can be licensed. A GPGPU is a separately installable or identifiable component that is designed for and limited to workload-specific computation and is used as an application-specific accelerator in support of the computer's central processing units. Licensee must obtain an entitlement for each GPGPU that is managed or used by the Program.

Server

Server is a unit of measure by which the program can be licensed. A server is a physical computer that is comprised of processing units, memory, and input/output capabilities and that executes requested procedures, commands, or applications for one or more users or Client Devices. Where racks, blade enclosures, or other similar equipment is being employed, each separable physical device (for example, a blade

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or a rack-mounted device) that has the required components is considered itself a separate server. For the purpose of server-based licensing, licensee must obtain entitlements for each server that is made available to the program, regardless of the number of processor cores and partitions in the server or the number of copies of the program on the server.

Note:

- Some programs may require licenses for the program and what is being managed. In that case, the following applies. In addition to the entitlements required for the program directly, licensee must obtain entitlements for this program sufficient to cover the servers managed by the program.
- Some programs may be licensed on a managed basis only. In that case, the following applies. Instead of the entitlements required for the program directly, licensee must obtain entitlements for this program sufficient to cover the servers managed by program.

Client Device

Client Device is a unit of measure by which the program can be licensed. A Client Device is a single-user computing device or special-purpose sensor or telemetry device that requests the execution of or receives for execution a set of commands, procedures, or applications from or provides data to another computer system that is typically referred to as a server or is otherwise managed by the server. Multiple Client Devices may share access to a common server. A Client Device may have some processing capability or be programmable to allow a user to do work. Examples include, but are not limited to, actuators, appliances, automated teller machines, automatic meter readers, cash registers, disk drives, desktop computers, kiosks, notebook computers, personal digital assistants, point-of-sale terminals, sensors, smart meters, tape drives, and technical workstations. Licensee must obtain entitlements for every Client Device that runs, provides data to, uses services provided by, or otherwise accesses the program and for every other computer or server on which the program is installed.

Resource Value Unit (RVU)

RVU is a unit of measure by which the program can be licensed. RVU Proofs of Entitlement are based on the number of units of a specific resource used or managed by the program. Licensee must obtain sufficient entitlements for the number of RVUs required for licensee's environment for the specific resources as specified in the program specific table. RVU entitlements are specific to the program and the type of resource and may not be exchanged, interchanged, or aggregated with RVU entitlements of another program or resource. Refer to the program specific RVU table.

Note:

- Some programs may require licenses for the resources available to and the resources being managed by the program. In that case, the following applies. In addition to the entitlements required for the resources used by the program directly, licensee must obtain entitlements for this program sufficient to cover the resources managed by the program.
- Some programs may be licensed on a managed basis only. In that case, the following applies. Instead of the entitlements required for the resources used by the program directly, licensee must obtain entitlements for this program sufficient to cover the resources managed by the program.

The following components of the Platform Symphony program are licensed based on Value Unit-Based pricing:

```
Program                              Value Unit
number      Program name             exhibit

5725-G86    IBM Platform Symphony    VUE139
               - Express Edition
               - Standard Edition
               - Advanced Edition
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```
5725-G84   IBM Platform Analytics
              - Data Collectors for
                Symphony
```

For these components, the resource for the purpose of the RVU calculation are Activated Processor Cores managed by the program. An Activated Processor Core is a processor core that is available for use in a physical or virtual server, regardless of whether the capacity of the processor core can be or is limited through virtualization technologies, operating system commands, BIOS settings, or similar restrictions. Licensee can deploy the Program using either Full Capacity licensing or Virtualization Capacity (Sub-Capacity) licensing according to the Passport Advantage Sub-Capacity Licensing Terms (refer to the following website). If using Full Capacity licensing, each Activated Processor Core in the physical hardware environment managed by the Program must be counted, except for those servers from which the Program permanently no longer manages. If using Virtualization Capacity licensing, the Virtualization Capacity License Counting Rules defines how many Activated Processor Cores must be counted. Visit

  http://www.ibm.com/software/lotus/passportadvantage/
  Counting_Software_licenses_using_specific_virtualization_technologies.html

Resource Value Unit conversion table

- From 1 to 2,500 Resources, 1.0 (RVU/UVU) per Resource
- From 2,501 to 10,000 Resources, 2,500 RVUs plus 0.8 RVUs per Resource above 2,500
- From 10,001 to 50,000 Resources, 8,500 RVUs plus 0.6 RVUs per Resource above 10,000
- From 50,001 to 150,000 Resources, 32,500 RVUs plus 0.4 RVUs per Resource above 50,000
- For more than 150,000 Resources, 72,500 RVUs plus 0.2 RVUs per Resource above 150,000

Passport Advantage

```
                                                       Part
Program name/Description                               number
English media pack

IBM Platform Symphony Express Edition V6.1 Multiplatform   AJ00LEN
IBM Platform Symphony Standard Edition V6.1 Multiplatform  AJ00MEN
IBM Platform Symphony Advanced Edition V6.1 Multiplatform  AJ00NEN
IBM Platform Symphony Desktop Harvesting V6.1 MP           AJ00PEN
IBM Platform Symphony Server and VM Harvesting V6.1 MP     AJ00QEN
IBM Platform Symphony GPU Harvesting V6.1 Multiplatform    AJ00REN
IBM Platform Analytics Data Col v8.3.1 MP EN Media Pack    AJ00ZEN

IBM Platform Analytics Data Col Sym RVU LIC+SW S&S 12MO    D0VGZLL
IBM Platform Analytics Data Col Sym RVU SW S&S REINS 12MO  D0VH0LL
IBM Platform Analytics Data Col Sym RVU ANN SW S&S RNWL    E0F8YLL

IBM Platform Anlty Data Col Sym RVU FTL Int FT Lic+S&S 12Mo   D0VH1LL
IBM Platform Anlty Data Col Sym RVU FTL SubSq FT Lic+S&S 12Mo E0F8ZLL
```

Passport Advantage customer: Media pack entitlement details

Customers with active maintenance or subscription for the products listed are entitled to receive the corresponding media pack.

```
Entitled maintenance offerings                         Part
description                                            number

IBM PLATFORM SYMPHONY-EXPRESS EDITION RVU LIC+SW S&S 12MO  D0Q0ZLL
IBM PLATFORM SYMPHONY STANDARD EDITION RVU LIC+SW S&S 12MO D0Q0TLL
IBM PLATFORM SYMPHONY ADVANCED EDITION RVU LIC+SW S&S 12MO D0Q0PLL
```

```
PLTFM SYM STD ED FR PLTFM SYM EX ED TRDUP LIC+SW S&S 12MO  D0Q1NLL
PLTFM SYM ADV ED FR PLTFM SYM EX ED TRDUP LIC+SW S&S 12MO  D0Q1LLL
PLTFM SYM ADV ED FR PLTFM SYM ST ED TRDUP LIC+SW S&S 12MO  D0Q1SLL


IBM PLAT SYMPHONY DSKTP HARVESTING CLI DEV LIC+SW S&S 12MO D0Q0ILL
IBM PLATFORM SYMPHONY GPU HARVESTING GPGPU LIC+SW S&S 12MO D0Q0XLL
IBM PLAT SYMPH SERVER VM HARV VIRTUAL SRVR LIC+SW S&S 12MO D0Q0VLL



Media packs                                           Part
description                                            number

IBM Platform Symphony Express Edition V5.2 Multiplatform   AJ008EN
IBM Platform Symphony Standard Edition V5.2 Multiplatform  AJ009EN
IBM Platform Symphony Advanced Edition V5.2 Multiplatform  AJ00AEN
IBM Platform Symphony Desktop Harvesting V5.2 MP          AJ00BEN
IBM Platform Symphony Server and VM Harvesting V5.2 MP    AJ00CEN
IBM Platform Symphony GPU Harvesting V5.2 Multiplatform   AJ00DEN
```

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