IBM Platform LSF V9.1 delivers significant performance and scalability advances

Table of contents
1 Overview
2 Key prerequisites
2 Planned availability date
2 Description
3 Product positioning
4 Program number
4 Publications
5 Technical information
9 Ordering information
12 Terms and conditions
16 Prices
17 Announcement countries

At a glance

Realize excellent performance, scalability, and utilization with the IBM® Platform LSF® V9.1 family of products. Features and benefits include the following:

- Easily adapts to changing user requirements with unmatched scalability, flexible policies, and extensive reporting.
- Increases user productivity by using robust workload management capabilities.
- Reduces infrastructure cost with optimal resource utilization.
- Accelerates time to results with high-throughput scheduling.

Overview

The IBM Platform LSF product family delivers powerful workload management for demanding, distributed, and mission-critical technical computing environments. It includes a complete set of resource-aware, monitoring, workflow, analysis, and license management capabilities, all designed to work together to address high performance computing (HPC) needs.

This latest version, Platform LSF V9.1, is designed to deliver significantly enhanced performance, scalability, manageability, and usability, as well as new scheduling capabilities. A new addition, Platform LSF - Advanced Edition may provide greater than three times more scalability than prior versions of LSF, enabling you to consolidate your compute resources to achieve maximum flexibility and utilization.

If you are looking to improve service levels and utilization with a dynamic, shared HPC cloud environment, IBM Platform Dynamic Cluster V9.1 is now available as an add-on to Platform LSF. Platform Dynamic Cluster turns static Platform LSF clusters into dynamic, shared 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. With smart policies and numerous features, such as live job migration, Platform Dynamic Cluster enables you to realize improved utilization, better reliability, and increased productivity, while reducing administrator workload.

The new IBM Platform Session Scheduler V9.1 is designed to work with Platform LSF to enable high-throughput, low-latency scheduling for a wide range of workloads. It is particularly well suited to environments that run high volumes of short duration jobs, and where users require faster and more predictable job turnaround times. Unlike traditional batch schedulers that make resource allocation decisions for every job submission, Platform Session Scheduler enables you to specify resource allocation decisions only once for multiple jobs in a user session, providing you
with your own virtual private cluster. With this more efficient scheduling model, you can benefit from higher job throughput and faster response times, while cluster administrators realize an overall improvement in cluster utilization.

Key prerequisites

Refer to the Hardware requirements and Software requirements sections.

Planned availability date

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

Description

**The IBM Platform LSF product family**

The Platform LSF product family provides powerful workload management for demanding, distributed, and mission-critical technical and HPC environments. It includes a complete set of workload management capabilities, all designed to work together to address your HPC needs.

New in V9.1:

**Improved performance, scalability, usability, manageability, and scheduling**

Response time for queries is improved, scheduling cycles for start/restart time is decreased, and memory is optimized. Reporting of resource usage is more clear for improved usability. For better manageability, Platform LSF is updated to provide fast detection of stalled jobs, and leverages the kernel cgroup function to improve process tracking, and topology cpu and memory enforcement. Scheduling resource requirements is extended to consider memory in addition to cores, as well as other multicluster enhancements.

**IBM Platform Session Scheduler: High-throughput batch scheduling**

Platform Session Scheduler is designed to work with Platform LSF to provide high-throughput, low-latency scheduling for a wide range of workloads. Platform Session Scheduler is particularly well suited to environments that run high volumes of short-duration jobs, and where users require faster and more predictable job turnaround times. Unlike traditional batch schedulers that make resource allocation decisions for every job submission, users specify resource allocation decisions only once for multiple jobs in a user session, giving them their own virtual private cluster. With this more efficient scheduling model, users benefit from higher job throughput and faster response times while cluster administrators realize an overall improvement in cluster utilization.

**IBM Platform Dynamic Cluster: Workload-aware cloud computing**

Platform Dynamic Cluster turns static Platform LSF clusters into dynamic, shared 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. Unlike other less capable solutions, Platform Dynamic Cluster offers the flexibility to automatically provision mixed physical and virtual environments and leverages your existing investments in hypervisors, management tools, and virtual machine templates to create a dynamic private cloud environment. With smart policies and features such as live job migration, sites running Platform Dynamic Cluster realize improved utilization, better reliability, and increased productivity, while reducing administrator workload.

Additional Platform LSF capabilities include the following:
• Platform Application Center: Portal management and application support
• Platform Process Manager: HPC workflow designing and executing complex HPC workflows
• Platform RTM: Resource utilization reporting and monitoring
• Platform License Scheduler: License management and reporting
• Platform Analytics: Advanced analytics for HPC data jobs, resources, licenses, and more

**Accessibility by people with disabilities**

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


**Product positioning**

IBM Platform LSF V9.1 is part of the IBM Platform Computing portfolio of products, which includes:

• IBM Platform Symphony® V6.1
• IBM Platform MPI V9.1
• IBM Platform Cluster Manager 4.1

Platform Symphony typically runs different types of workloads than Platform LSF, and is therefore a complementary product. LSF is optimized for scheduling batch jobs where each job is discrete and the application is typically parallelized using MPI. However, workloads that require very fast scheduling, low latency, high throughput and scalability, and fast, agile resource sharing are likely to be best served by Platform Symphony. As a result, LSF is typically beneficial to HPC clients in manufacturing, oil and gas, life sciences, electronics, government, and media and entertainment, whereas Platform Symphony is more appropriate to clients in financial services.

Platform MPI is often purchased in conjunction with LSF. Platform MPI is a high-performance, production-ready quality implementation of the Message Passing Interface (MPI). It is widely used in the high performance computing (HPC) industry and is considered one of the standards for developing scalable, parallel applications.

Platform Cluster Manager Advanced Edition V4.1 complements the Platform LSF product family by providing the capability to assemble multiple high-performance technical computing environments on a shared compute infrastructure for use by multiple teams. In addition to support for Platform LSF, IBM Platform Cluster Manager Advanced Edition includes support for multitenant HPC cloud and multiple workload managers including Grid Engine and TIBCO DataSynapse GridServer (formerly DataSynapse GridServer). It creates an agile environment for running technical computing and analysis workloads to consolidate disparate cluster infrastructure, resulting in increased hardware utilization and the ability to meet or exceed service level agreements while lowering costs. For clients with a single HPC cluster and more static application requirements, Platform Cluster Manager Standard Edition V3.2 helps you quickly provision, run, manage, and monitor an HPC cluster with unprecedented ease.

Platform LSF has the following additions to the product family:

• An advanced scheduling model (Platform Session Scheduler) that enables users to specify resource allocation decisions only once for multiple jobs in a user session, providing them with their own virtual private cluster.
• Dynamic, shared HPC cloud management (Platform Dynamic Cluster) that supports mixed physical and virtual environments, provisioned dynamically based on smart policy controls, and workload demand.
Reference information

Refer to Preview Announcement ZP12-0498, dated October 3, 2012.

Program number

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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 product and available on the web:

IBM Platform LSF:

- Administering Platform LSF
- Platform LSF Security
- Platform LSF Foundations Guide
- Platform LSF Command Reference
- Platform LSF Configuration Reference
- Running Jobs with Platform LSF
- Using Platform LSF HPC Features
- Platform LSF Desktop Support User's Guide
- Platform LSF Quick Reference
- Using Platform MultiCluster
- Using Platform LSF on Windows™
- Platform LSF Programmer's Guide
- Using the Platform LSF Launch Framework
- Platform LSF API Reference (auto-generated)
- Installing Platform LSF on UNIX™ and Linux™
- Upgrading Platform LSF on UNIX and Linux
- Installing Platform LSF on Windows
- Completing Your Platform LSF Installation (lsf_getting_started.tmpl)
- Getting Started with Platform LSF (lsf_quick_admin.tmpl)
- IBM Platform LSF 9.1 Release Notes
- Using Platform Dynamic Cluster
- Dynamic Cluster 9.1 Release Notes
Technical information

Specified operating environment

**Hardware requirements**

Platform LSF V9.1, Platform Session Scheduler V9.1, and Dynamic Cluster V9.1 are supported on IBM System x® iDataPlex® and other non-IBM rack-based servers. Platform LSF V9.1 and Platform Session Scheduler V9.1 are also fully certified to run on clusters comprising Pure Systems or Power Systems™ servers running AIX® or Linux.

The hardware requirements for Platform LSF, Platform Session Scheduler, and Platform Dynamic Cluster are as follows:

- A minimum of 2 GB of physical memory (RAM), 16 GB or more recommended for large clusters
- Available swap space that is twice physical memory
- A minimum of one high-speed network interface
- A secondary master host recommended in large clusters

Platform Dynamic Cluster requires the following hardware:

- A minimum of 2 GB of physical memory (RAM); 16 GB or more recommended for large clusters
- Available swap space that is twice the physical memory
- A minimum of one high-speed (Gigabit Ethernet, 10 Gigabit Ethernet preferred) network interface

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

**Software requirements**

Platform LSF and Platform Session Scheduler are supported on any of the following operating environments:

- Red Hat Enterprise Linux (RHEL) 4, 5, 6 (on x86_64)
- SUSE Linux Enterprise Server (SLES) 9, 10, 11
- IBM AIX 6 and 7 on POWER®
- HP B11.31 IA64
- Oracle Solaris 10 and 11 on SPARC and x86-64
- Other Linux distributions 2.6, or later, on x86-64 and POWER
- Microsoft™:
  - Windows Server 2003
  - Windows Server 2003 R2 32- or 64-bit
  - Windows Server 2008
  - Windows Server 2008 R2 32- or 64-bit
Platform Dynamic Cluster supports the following software environments:

- At least one of the following operating systems: RHEL 4.7, or later, or Windows 2003/2008/XP/7 (32-bit and 64-bit)
- One of the following hypervisors: RHEL 5,6, or 6.2 KVM (CPU binding included) or VMware ESXi 5.0
- Either an NFS shared filesystem or local disks large enough to house virtual machine operating system images
- Platform LSF

**Note:** For Linux installations, precompiled binaries facilitate easy installation on different Linux kernels. The distribution to install will depend more on the version of Linux (specifically the Linux kernel version) rather than the actual distribution (RHEL, CentOS, or SLES). The version to install will also depend on the version of glibc.

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**

The following IBM products may be purchased with the IBM Platform LSF product family:

- IBM System x, IBM Power Systems, and IBM Pure Systems servers and clusters
- IBM General Parallel File System (GPFS™)
- Platform Symphony
- Platform MPI
- Platform Cluster Manager
- Platform Computing Services and Training

These products complement the Platform LSF family as follows:

- Platform Computing supports a diverse, multivendor set of operating systems and hardware, and is therefore an ideal Platform for consolidating a heterogeneous compute environment.
- Clusters comprising x86 servers are an ideal hardware platform for the Platform LSF product family. Platform LSF is certified to run on System x iDataPlex and other rack-based servers including the M4 generation of System x servers. Platform LSF is also fully certified to run on clusters consisting of Pure Systems and Power Systems servers running AIX or Linux.
  - For clients running applications that benefit from a distributed parallel file system, GPFS can be deployed together with Platform LSF, delivering improved file system performance for data-intensive applications.
  - For clients with diverse workload scheduling requirements, Platform LSF may be sold in conjunction with Platform Symphony and associated add-on products. Platform LSF and Platform Symphony share a common resource management layer and can share resources on the same physical cluster.
  - Platform MPI is a high-performance, production-ready quality implementation of the Message Passing Interface (MPI). It is widely used in the HPC industry and is considered one of the standards for developing scalable, parallel applications.
• Platform Cluster Manager - Advanced Edition V4.1 includes support for multitenant HPC cloud and multiple workload managers, including Grid Engine. It creates an agile environment for running technical computing and analysis workloads to consolidate disparate cluster infrastructure, resulting in increased hardware utilization, and the ability to meet or exceed service-level agreements while lowering costs. In addition to private cloud management, Platform Cluster Manager - Advanced Edition enables bursting to public cloud providers and self-service creation of HPC clusters in the public cloud.

• For clients with a single HPC cluster and more static application requirements, Platform Cluster Manager - Standard Edition V3.2 delivers the capability to quickly provision, run, manage, and monitor HPC clusters with unprecedented ease.
  – Depending on the nature of your requirements, Platform LSF deployments often involve software development and integration services. With its breadth of services capabilities, IBM is uniquely positioned to help you integrate applications and be up and running quickly to get maximum value from your grid computing investment.

**Compatibility**

IBM Platform LSF V9.1 is fully compatible with Platform LSF 7 and 8. However, the Scheduler must be running V9.1, or later.

**Limitations**

Users deploying IBM Platform LSF - Advanced Edition should be aware of the following limitation:

Platform LSF - Advanced Edition has been tested on configurations up to 18,000 nodes and 160,000 cores running high-throughput workloads of 160,000 concurrent short (below 5 minute) jobs with 2,000,000 pending jobs. These are not hard scalability or performance limits.

Users deploying IBM Platform LSF - Standard Edition should be aware of the following limitations:

• It is possible to run Platform LSF and IBM Platform Symphony on the same grid environment and share resources between the two environments. While documentation is included in the Platform Symphony distribution that explains how to do this, it is recommend that users running mixed Platform Symphony and LSF environments seek configuration assistance from IBM.

• Platform LSF - Standard Edition has been tested on clusters up to 6,000 nodes and 60,000 cores running high-throughput workloads of 60,000 concurrent short (below 5 minute) jobs with 250,000 pending jobs. These are not hard scalability or performance limits. Higher node or core counts can be achieved with a lower volume of jobs such as parallel HPC workloads where cluster sizes of 75,000 to 100,000 cores are supported. Higher core counts are achievable with additional tuning and configuration.

• For high-throughput workloads, the overall system performance is dependent upon the processing power, I/O capacity, and memory of the scheduling node. Sizing guidelines are included in the documentation. For very large clusters, it is recommended that users seek configuration assistance from IBM.

• Other specific limitations are discussed in the IBM Platform LSF Standard Edition release notes and documentation.

Users deploying IBM Platform LSF - Express® Edition should be aware of the following limitations:

• Platform LSF Express Edition is supported only on x86_64 Linux.

• This edition is optimized for clusters of 100 nodes or fewer with straightforward scheduling requirements.

• Other specific limitations are discussed in the IBM Platform LSF - Express Edition release notes and documentation.

Users deploying IBM Platform Session Scheduler should be aware that it is supported on Linux only.

Users deploying IBM Platform Dynamic Cluster should be aware of the following limitations:

• No mixed hypervisor clusters; clusters must use either VMware or KVM, but not both in a single cluster.
• Virtual machine IPs must all be on a single subnet.
• Jobs running under guaranteed SLA cannot be migrated or save/restored.
• A single NFS server is used for all VMs.
• Save/Restore and live migration are available only when VMs are stored on an NFS filesystem.
• Parallel jobs cannot span multiple VMs.
• Multicluster configurations using resource leasing are not supported.

Performance considerations
The performance of Platform LSF depends upon many factors, including the number of nodes in the cluster, the number of concurrently executing jobs, the number of pending jobs, the number of users querying the system, and the frequency of queries. As these increase, the scheduling cycle and user response time will increase.

Dynamic Cluster performance and scalability mirror that of LSF, but they are also dependent upon the network speed between hypervisor hosts for operations such as live migration. They are also highly dependent upon the speed and caching ability of the NFS server to read and write quickly when instantiating new VMs.

For a high-throughput workload, such as the workloads found in the semiconductor design market, clusters of 5,000 nodes with 40,000 cores or concurrently executing jobs are not uncommon. In traditional HPC environments, where the concurrent job volume is significantly lower, LSF has been used on substantially larger clusters (for example, 75,000 to 100,000 cores).

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

Customer responsibilities
You must provide at least the minimum hardware and software environments in which the Platform LSF product family will operate. It is recommended to assign a systems administrator who has responsibility for planning, installing, maintaining, and administering the Platform LSF product family.

While the installation and upgrade procedures for Platform LSF V9.1 have been tested carefully, as with any installation or upgrade, it is prudent to ensure that backups exist and you prepare for the installation or upgrade in advance.
**Installability**

IBM Platform LSF V9.1 is functionally the same as prior versions. However, it will now be available in three product editions:

- **Express Edition** - ideal for single-cluster environments and optimized for low-throughput parallel jobs and simple user grouping structures
- **Standard Edition** - ideal for multicluster or grid environments and optimized for high-throughput serial jobs and complex user grouping structures
- **Advanced Edition** - architected to support extreme scalability and throughput

Clients using Platform LSF V8.1, and earlier, will map to the Standard Edition. However, IBM Platform LSF - Standard Edition is a new product; it is more than just LSF. It includes additional capabilities previously provided by Platform MultiCluster, Platform Make, and Platform LSF Client.

The Platform LSF licensing model changed between Platform LSF V7 and V8. Therefore, clients who are currently using LSF V7 update 6, or earlier, will require new licenses. In addition, IBM Platform LSF V8.3 and V9.1 no longer use FLEXlm for licensing. For assistance on configurations or licensing, contact your local Platform Computing Seller.

**Packaging**

Platform LSF V9.1, Platform Session Scheduler V9.1, and Platform Dynamic Cluster V9.1 are distributed on optional DVD media or available for electronic download in multiple eAssemblies. Included are:

- IBM International Program License Agreement (L-YCHW-8YGNRT) 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.

**Security, auditability, and control**

Platform LSF use the security and auditability features of the system in which they are installed.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

**Global Technology Services**

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings for the efficient installation, implementation, or integration of this product.

**Ordering information**

This product is only available via Passport Advantage. It is not available as shrinkwrap.
Product group: IBM Platform Computing
Product Identifier Description (PID)
IBM Platform LSF 5725G82

Product category: Other Software

For ordering information, consult your IBM representative or authorized IBM Business Partner, or visit


**Charge metric**

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<td>5725-G82</td>
<td>Managed core RVU(1)</td>
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<td>Advanced Edition</td>
<td>Managed core RVU</td>
<td></td>
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<td>Dynamic Cluster</td>
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<td></td>
</tr>
<tr>
<td>Session Scheduler</td>
<td>Managed core RVU</td>
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</table>

(1) Resource Value Unit

Each license includes 12 months' subscription and support.

**Concurrent User**

Concurrent User is a unit of measure by which the program can be licensed. A Concurrent User is a person who is accessing the program at any particular point in time. Regardless of whether the person is simultaneously accessing the program multiple times, the person counts only as a single Concurrent User. The program may be installed on any number of computers or servers, but licensee must obtain entitlements for the maximum number of Concurrent Users simultaneously accessing the program. Licensee must obtain an entitlement for each simultaneous Concurrent User accessing the program in any manner directly or indirectly (for example, via a multiplexing program, device, or application server) through any means.

**Note:** Some programs may be licensed where devices are considered users. In that case, the following applies. Any computing device that requests the execution of or receives for execution a set of commands, procedures, or applications from the program or that is otherwise managed by the program is considered a separate user of the program and requires an entitlement as if that device were a person.

**Install**

Install is a unit of measure by which the program can be licensed. An install is an installed copy of the program on a physical or virtual disk made available to be executed on a computer. Licensee must obtain an entitlement for each install of the program.

**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.

**Note:** The following component of the Platform LSF program is licensed based on Value Unit-Based pricing:

<table>
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<th>Program number</th>
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<th>Value Unit</th>
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<td>Platform LSF - Advanced Edition Dynamic Cluster Session Scheduler</td>
<td>VUE139</td>
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For this component, 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 define how many Activated Processor Cores must be counted. The rules can be found at

http://www-01.ibm.com/software/lotus/passportadvantage/
Counting_Software_licenses_using_specific_virtualization_technologies.html

**Resource Value Unit conversion table**

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<tr>
<td>1 to 2,500</td>
<td>1.0 (RVU/UVU) per Resource</td>
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<tr>
<td>2,501 to 10,000</td>
<td>2,500 RVUs plus 0.8 RVUs per Resource above 2,500</td>
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<tr>
<td>10,001 to 50,000</td>
<td>8,500 RVUs plus 0.6 RVUs per Resource above 10,000</td>
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<tr>
<td>50,001 to 150,000</td>
<td>32,500 RVUs plus 0.4 RVUs per Resource above 50,000</td>
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<tr>
<td>More than 150,000</td>
<td>72,500 RVUs plus 0.2 RVUs per Resource above 150,000</td>
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**Passport Advantage**

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<td>D0VC2LL</td>
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Program name/Description | Part number
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English Media Pack |  
IBM Platform LSF Advanced Edition v9.1 Multiplatform | AJ00WEN
IBM Platform LSF Express Edition v9.1 Multiplatform | AJ00UEN
IBM Platform LSF Standard Edition v9.1 Multiplatform | AJ00VEN
IBM Platform LSF Session Scheduler v9.1 Multiplatform | AJ00XEN
IBM Platform LSF Dynamic Cluster v9.1 Multiplatform | AJ00YEN

**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.

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<tr>
<td>IBM Platform LSF Standard Edition V8.3 Multiplatform</td>
<td>AJ001EN</td>
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<tr>
<td>IBM Platform Process Manager V8.3 Multiplatform</td>
<td>AJ002EN</td>
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<tr>
<td>IBM Platform License Scheduler V8.3 Multiplatform</td>
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<td>IBM Platform RTM V8.3 Multiplatform</td>
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<td>IBM Platform RTM Data Collectors V8.3 Multiplatform</td>
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**Variable charges apply**

No

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collected by the Electronic Service Agent tool also can be viewed on the secure
Electronic Support web portal, and used to improve problem determination and
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addition, ESA now includes a powerful Web user interface, giving the administrator
easy access to status, tool settings, problem information, and filters. For more
information and documentation on how to configure and use Electronic Service
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Benefits

**Increased uptime:** The Electronic Service Agent tool is designed to enhance the
Warranty or Maintenance Agreement by providing faster hardware error reporting
and uploading system information to IBM Support. This can translate to less wasted
time monitoring the "symptoms," diagnosing the error, and manually calling IBM
Support to open a problem record. Its 24 x 7 monitoring and reporting mean no
more dependence on human intervention or off-hours customer personnel when
errors are encountered in the middle of the night.

**Security:** The Electronic Service Agent tool is designed to be secure in monitoring,
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to communicate securely through gateways to provide customers a single point of
exit from their site. Communication is one way. Activating Electronic Service Agent
does not enable IBM to call into a customer's system. System inventory information
is stored in a secure database, which is protected behind IBM firewalls. It is viewable
only by the customer and IBM. The customer's business applications or business
data is never transmitted to IBM.

**More accurate reporting:** Since system information and error logs are
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is run through a data knowledge management system and knowledge articles are
 appended to the problem record.
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