



IBM InfoSphere Streams V2.0 extends streaming analytics, simplifies development of streaming applications, and improves performance

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At a glance

IBM® InfoSphere™ Streams V2.0 delivers:

- Developer tools and clustered runtime software for high-performance, low-latency streaming applications using structured and unstructured data streams
- Enhancements to Streams Processing Language designed to improve productivity and agility
- New database support, including Netezza TwinFin, Microsoft® SQLServer, and MySQL
- High availability via runtime restart and recovery services
- Enhanced usability in InfoSphere Streams Studio to speed writing, testing, and debugging Streams Processing Language applications
- New editors to help develop and manage applications and toolkits
- Improved security with trusted and vetted zones in runtime and pluggable authentication
- New health monitoring capabilities, including support for scripting to programmatically access metrics
- New Standard Toolkit with many new operators, including DirectoryScan, Filter, DynamicFilter, Beacon, ThreadedSplit, and DeDuplicate
- New windowing library makes it easy to build custom operators by providing reusable components like tumbling and sliding windows
- New flexible deployment allows applications to be built on a development cluster and scaled up to production without recompiling
- New Internet Protocol version 6 (IPv6) support allows access to the latest version of the Internet
- Financial Services Toolkit with adapters, analytics, and sample programs to speed development of applications
- Mining toolkit that can reuse Predictive Model Markup Language (PMML) models to perform mining in real time against streaming data
- IBM DB2® is packaged with Streams V2.0 for optional use to maintenance of system state information for high availability

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL.

IBM InfoSphere Streams is a software platform that enables the development and execution of applications that process information in data streams. Streams enables continuous and fast analysis of massive volumes of moving data to help improve the speed of business insight and decision making. Streams consists of a programming language and an integrated development environment (IDE) for Streams applications, and a runtime system that can execute the applications on a single or distributed set of hosts. The Streams Studio IDE includes tools for authoring and creating visual representations of the Streams applications.

IBM InfoSphere Streams V2.0 delivers a range of new features and functions to speed development of applications that enhance performance, availability, and Streams administration. Streams Processing Language has been significantly enhanced for better readability and maintainability. The new standard toolkit delivers many more relational, adapter, and utility operators and functions, which help speed development of applications. Powerful new language features (such as composite operators that can encapsulate parameterized flows and native support for maps, sets, and nested data types) can make large scale development easier and more agile. Improved ODBC adapter now adds Netezza TwinFin, Microsoft SQLServer, and MySQL support to the existing DB2, Informix®, solidDB®, and Oracle database support. Communications improvements speed overall application performance and new composition constructs simplify creation of multithreaded flows. Improved Java™ support allows shared Java Virtual Machines (JVMs) for better resource utilization. Improved monitoring capabilities and deployment flexibility can enhance availability and simplify administration of Streams.

InfoSphere Streams has the following basic components:

- **InfoSphere Streams Studio:** An integrated development environment (IDE) based on Eclipse 3.6.2, which may be used by developers to develop Streams Processing Language (SPL) applications. Streams V2.0 adds auto-completion, code templates, code-folding, continuous build, in-line error reporting, refactoring, and outline view for development of applications. The project explorer now supports a logical view of SPL namespaces and artifacts. New editors are available for the toolkit, operator, and function models.
- **InfoSphere Streams Runtime:** Provides extreme scalability and can be deployed on a single server or a cluster of servers. New Tagging support and dynamic allocation for host pools improves deployment flexibility. Applications can now be created for deployment on any instance to simplify moving applications from development to production or migrating from one Streams instance to another. Dynamic Stream matching makes it easier for jobs to communicate with each other and change application topology based on data or new analytic results. Improved network support allows Streams to communicate with Internet Protocol version 6 (IPv6) networks.
- **Toolkits and adapters:** The new Standard Toolkit, along with existing Financial Toolkit and Mining Toolkit, speed application development with adapters, operators, and sample applications. Streams now offers 17 new operators in the toolkits, including DirectoryScan, Filter, DynamicFilter, Beacon, ThreadedSplit, and DeDuplicate.

InfoSphere Streams come in three editions:

- **InfoSphere Streams:** For production environments, licensed by **Resource Value Units (RVU)** based on activated processor cores
- **InfoSphere Streams for Non-Production Environment:** For development, licensed by **Resource Value Units (RVU)** based on activated processor cores
- **InfoSphere Streams Developer Edition:** For development, licensed by **Authorized User**

Key prerequisites

Refer to the [Hardware requirements](#) and [Software requirements](#) sections.

Planned availability date

April 15, 2011: Electronic availability

May 13, 2011: Media availability

Description

Data volumes are expected to double every two years over the next decade with over 80% of the growth resulting from unstructured data such as email, voice, and video. Also, the global economic slowdown is resulting in organizations seeking to become more nimble with their operations and more innovative with their decisions. In the face of exploding data volumes and data types, these organizations are struggling to make truly real-time, effective decisions to gain competitive advantage. Existing tools and technologies that aid decision making by the line of business first require data to be recorded on a storage device and queries run after-the-fact to detect actionable insights. Most of these technologies are further limited in their ability to handle nonrelational and nontraditional data types for better business insight. Savvy businesses are realizing quickly that the time lost and data sources ignored in this process can lead to missed opportunities that might be the difference between success and failure.

InfoSphere Streams addresses this gap effectively by providing a state-of-the-art platform on which to run powerful in-motion analytics on a wide variety of relational and nonrelational data types. It provides a state-of-the-art infrastructure to support highly complex heterogeneous data analysis with exceptional performance, and more efficiently interoperates with existing application infrastructures. Its runtime environment can scale from a single server to thousands of compute nodes seamlessly based on data volumes or analytics complexity.

InfoSphere Streams radically extends the state of the art in information processing by simultaneously addressing several technical challenges including:

- Sub millisecond response time to events and changing requirements
- Continuous analysis of data at rates significantly higher than existing systems
- Ability to seamlessly extend existing applications with new analytics
- Ability to deploy existing data mining models in InfoSphere Streams application for real-time insights

InfoSphere Streams has attained initial success with a number of commercial and scientific applications across a spectrum of industries, such as healthcare, financial services, law enforcement, environment and water quality monitoring, and manufacturing.

IBM InfoSphere Streams V2.0 delivers a range of new features and functions to speed development of applications to enhance performance, availability, and administration of Streams, by delivering a range of new features and functions described below.

Simplified development of streaming applications

IBM InfoSphere Streams Studio is an Eclipse-ready tool that enables you to create, edit, visualize, test, debug, and run Streams Processing Language (SPL) and SPL mixed-mode applications. The integrated development environment (IDE) of Streams Studio consists of the following major features:

- Streams Explorer view that helps you set up and manage your Streams development environment.
- SPL Project and SPL Application Set Project support for organizing and building SPL applications and toolkits.
- SPL editor with auto-completion, code templates, code-folding, continuous build, in-line error reporting, refactoring, and outline view.
- Split-view SPL mixed-mode editor.
- Toolkit model, operator model, and function model editors.
- Streams Explorer that can manage runtime instances.
- Visualizer with expand/collapse support for composite operators.
- Project Explorer view to visualize your SPL resources in a logical manner.
- Graph view that displays topology of application.
- Metrics view that allows you to view and analyze metrics from running applications.
- Log viewing support that allows you to gather and examine logs from a running instance.
- Launchers for running stand-alone and distributed applications.
- Debugger for testing and debugging Streams applications.
- Integrated Help system that provides information needed during the development of SPL applications and toolkits.

InfoSphere Streams V2.0 includes a wide array of enhancements to significantly increase business agility through improved developer productivity. The newly improved Streams Processing Language (SPL) delivers major improvements, including:

- Greater consistency in syntax, APIs, and configurations.
- A type system that allows hierarchical representation of the data items.
- Nested types that allow hierarchical representation of data.
- Easy-to-use extension mechanisms for writing primitive operators and native functions.
- Composite operators for addressing large-scale development.
- Support for updating behavior of operators on-the-fly.
- A common windowing library implementation which is available to operator developers.
- Common container types, such as lists, sets, and maps.
- Composition-level constructs for creating multithreaded flows.
- Modularity support, via namespaces and multiple files.
- Versioned toolkit support for operators and functions.
- A new standard toolkit, with new relational, adapter, and utility operators.
- Improved compile-time performance (compile-time folding and function evaluation minimize code generation and even improve performance).

Improved performance enables handling higher volumes at increased velocity

InfoSphere Streams runtime ingests both structured and unstructured information at high rates, and analyzes the information to provide business insights. Portions of Streams programs are distributed across one or more nodes of the runtime computing cluster to achieve volumes in the millions of messages per second with velocities of well under a millisecond. Streams V2.0 continues to improve performance to help companies deal with increased volume of information and need to increase velocity through:

- New multi multithreading support makes better use of advanced multithreaded hardware.
- Improved Java-support allows for shared Java Virtual Machines to improve memory usage.

- Improved intranode and internode communications improve data speed through Streams Runtime (operator implementations, runtime fusion, transport integration).

Improved systems administration lowers administrative costs and helps improve runtime capacity

InfoSphere Streams offers both command line and graphical interfaces to administer the Streams runtime and maintain optimal performance and availability of applications. The web-based administrative console provides ability to create, start, and stop instances on a set of nodes in a cluster, and can cancel applications on these instances. Many new and improved capabilities can simplify administrator workloads as they strive to maintain optimal usage of the Streams runtime.

- New health metrics available programmatically to facilitate application performance and availability improvements.
- More granular health metrics and operator capabilities, down to the Streams operator level instead of at the Processing Element level.
- Submission time values to customize applications without recompilation.
- Instance agnostic and relocatable applications to help improve runtime capacity.
- Dynamic allocation of host pools to add agility to the runtime platform.
- New ex-location and isolation constraints via host tagging to simplify job deployment.
- Runtime APIs for programmatic manipulation of import subscriptions.
- Runtime and code-generation APIs for generic windowing manipulations.
- Streams Administrative console with new operator-level information.

High availability features

InfoSphere Streams has several features that enhance high availability and redundancy. Administrators can add or remove processor nodes to or from the cluster. The ability to seamlessly add or remove nodes to or from the cluster lets administrators perform necessary maintenance on the operating system or on data streams without shutting down the InfoSphere Streams application. This can help improve overall availability of the environment. Also, when the management nodes (that control the system) fail, the application nodes will continue to execute the InfoSphere Streams applications and the management nodes can be restarted by the administrators at a later time. The new programmatic manipulation of streaming data makes it easier to create highly available applications using redundant application components. New dynamic allocation of host pools, and additional location and isolation constraints of nodes in the runtime cluster can be used to isolate redundant application components to separate nodes in the runtime. Features such as these are aimed at enhancing high availability aspects related to InfoSphere Streams.

Security capabilities to ensure protection of vital information and analysis

Streams provides security capabilities such as:

- Support for Security-Enhanced Linux® (SE Linux) that helps provide a mechanism for supporting access control security policies, including US Department of Defense-style mandatory access controls, through the use of Linux Security Modules (LSM) in the Linux kernel.
- Pluggable Security Services that provide the ability to plug in other authentication services (for example, smart cards) when authenticating users to the system.
- Secure Streams Web Services (SWS) that include command and control functions. (SWS is a browser-based environment from where users can start, stop, monitor, and perform Streams-related operational functions.)

Enhanced support for financial services domain

In order to make InfoSphere Streams more relevant in the financial services industry, the Financial Toolkit is intended to provide benefits such as faster time to value, better performance, and greater simplicity. The Financial Toolkit includes:

- A set of industry-specific adapters, each implemented as an InfoSphere Streams Processing Language operator, that allow InfoSphere Streams applications to interoperate with many generic financial services infrastructure and external protocols.
 - Bidirectional connectivity between InfoSphere Streams applications and Financial Information eXchange (FIX) version 4 gateways for order execution, confirmation, and other tasks performed through the FIX protocol.
 - Bidirectional connectivity between InfoSphere Streams applications and the WebSphere® Front Office platform, including support for its Reliable Multicast Messaging (RMM) option for consumption of market data feeds, use of order books, and access to other functions provided by WebSphere Front Office.
 - Capability to send messages via WebSphere MQ Low-Latency Messaging (LLM) for access to a low-latency message-oriented middleware platform. This supports InfiniBand communications hardware, with significantly higher data rates than existing Ethernet-based communications hardware.
- A set of built-in functions and analytics that are routinely used for typical trading applications in the financial services domain. They are:
 - InfoSphere Streams Processing Language operators who help integrate InfoSphere Streams applications with QuantLib - a popular open-source financial analytics package. The InfoSphere Streams operators provide access to two QuantLib "engines" that compute valuations for European-style and American-style Equity Options from within an InfoSphere Streams application.
 - A set of library functions accessible from InfoSphere Streams Processing Language that help calculate a set of equity option derivative values known as "The Greeks", such as delta, theta, rho, vega, gamma, vanna, zomma, and charm.
 - A set of library functions that help calculate theoretical put-and-call option values based on Black-Scholes options valuation model. These functions further demonstrate how customer-proprietary analytic functions, outside of InfoSphere Streams environment, can be accessed from a InfoSphere Streams application.
- The Financial Services Toolkit that also includes two "starter" applications to illustrate how InfoSphere Streams can be used to develop powerful proprietary applications for two popular High-Frequency Trading (HFT) scenarios namely Equities Trading and Options Trading. Each application is designed to be a starting point, providing a more easily extensible model or template for further customization based on proprietary analytics.

Better relevance within a data warehouse environment

InfoSphere Streams supports scoring of data models that adhere to the Predictive Model Markup Language (PMML). PMML analytic models are vendor agnostic and are currently supported by over 30 vendors. By providing the ability to score models in real time, you can reuse existing tried-and-tested analytic models within the InfoSphere Streams processing domain and can get alerted to anomalous patterns much earlier than before.

The Mining Toolkit enables mining of data streams to extract relevant information or intelligence; is critical for a majority of stream processing applications, ranging from fraud detection, to customer segmentation, to churn or intrusion prevention. In most cases, stream mining requires applying models (learned from history) to streaming data in order to detect patterns of interest. The models that need to be applied may involve complex data mining algorithms that may not be easily supported by Streams built-in operators.

The IBM InfoSphere Streams Mining Toolkit supports scoring these complex data mining algorithms. This toolkit integrates algorithms from the IBM InfoSphere

Warehouse using the Predictive Model Markup Language (PMML) standard. PMML is a standard XML representation that allows specifications of different mining models, their ensembles, and associated preprocessing. PMML is supported by several state-of-the-art statistics and data mining software tools: InfoSphere Warehouse, R / Rattle, SAS Enterprise Miner, SPSS, and Weka. The supported mining algorithms in the toolkit are shown in the following table. The supported algorithms include both "Supervised" approaches, where data labels and ground truth is available during model training, and "Unsupervised" approaches, where no ground truth is available during model training.

Algorithm Type	Algorithm Name
Classification	Decision Trees Naïve Bayes Logistic Regression
Clustering	Demographic Clustering Kohonen Clustering
Regression	Linear Regression

Advanced analytics capabilities to create improved business insight

Streams applications have been built to perform many different kinds of analysis on many kinds of data. For example:

- Holt-Winters algorithms for machine learning and prediction of seasonal data
- Acoustic analysis for speaker recognition
- Video analysis to transform color to black and white and perform contour detection in real time
- Bloom filters for deduplication of Call Detail Records
- Text analysis for keyword recognition in unstructured text
- Unstructured Information Management Architecture (UIMA) adapters for text analysis to determine nouns, verbs, and so on
- EKG analysis to determine variability of heart rate
- High-frequency radio wave analysis to predict space weather

The range of analytic algorithms that can be implemented is tremendous. A key capability is that multiple models can be easily run in parallel on system-duplicated data streams. Running multiple models and combining the results allow for high confidence levels with predicting behavior or future events.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested via the IBM website

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

Accessibility features supported by InfoSphere Streams V2.0:

- Supports interfaces commonly used by screen readers
- Can be operated using only the keyboard
- Supports customization of display attributes such as color, contrast, and font size
- Communicates all information independently of color
- Provides documentation in an accessible format
- Allows the user to access the interfaces without inducing seizures due to photosensitivity

Section 508 of the US Rehabilitation Act

IBM InfoSphere Streams is capable as of May 13, 2011, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of

Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT), containing details on the products accessibility compliance, can be requested on the following website

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

Product positioning

IBM InfoSphere Streams V2.0 is a high-performance platform in the Real Time Analytic Processing (RTAP) market segment that also highlights a significant evolution for the Business Intelligence market. RTAP is characterized by huge volumes of information that require complex analytics and must be processed very quickly, that is, under a millisecond.

InfoSphere Streams can extend existing Business Intelligence offerings, such as Cognos® and OLAP, by offering lower-latency processing with its advanced runtime.

A key difference between other Business Intelligence offerings and InfoSphere Streams is that other offerings typically first store data in relational databases and only then analyze the data. InfoSphere Streams analyzes the data as it is streaming by, prior to persisting data, to help provide lower-latency analytics. This also supports persisting only pertinent information, which is important when processing unstructured data such as audio or video. Unstructured data can be summarized or modeled to structured data for further analysis.

The RTAP market overlaps the complex event processing market place, where IBM leads with WebSphere Business Events offerings. InfoSphere Streams extends the WebSphere Business Events offering by being able to process more events per second by an order of magnitude, and also by being able to process unstructured data such as video and audio.

Availability of national languages

Product description	Language	GA date
Developer Edition v2.0.0	English	May 13, 2011
IS Streams Non-Prod Environ v2.0.0	English	May 13, 2011
InfoSphere Streams v2.0.0	English	May 13, 2011

Program number

Program number	VRM	Program name
5724-Y95	2.0.0	IBM InfoSphere Streams

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

No hardcopy publications are shipped with this product.

Soft copy publications shipped with this product include:

- Release Notes
- What's New (**Note:** This will not be included in the install image, but only available only on the information center)
- Installation and Administration Guide
- IBM Streams Processing Language (SPL) documentation:
 - SPL Introductory Tutorial
 - SPL Compiler Usage Reference
 - SPL Config Reference
 - SPL Specification
 - SPL Operator Model Reference
 - SPL Standard Toolkit Reference
 - SPL Toolkit Development Reference
 - SPL Streams Debugger Reference
 - SPADE to SPL Migration
 - SPL User-Defined Operators Javadoc-based documentation
 - Java Operator API for InfoSphere Streams
 - Deprecated Java Operator API
 - Samples for the Java Operator API
 - SPL Code Generation and Runtime API documentation (Doxygen-based).
 - SPL Operator Code Generation API Documentation
 - SPL Runtime C++ API Documentation
 - SPL Standard Toolkit Types and Functions
- Studio Installation and User's Guide
- Getting Started with the IBM InfoSphere Streams Trial
- Financial Services Toolkit
- Mining Toolkit
- Database Toolkit
- Internet Toolkit
- Learning About Streams Using the Commodity Purchasing Sample Application

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 20 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries.

Specified operating environment

Hardware requirements

- X86 32-bit or 64-bit systems with a minimum of 500 MB memory
- 2 GB memory to run simple applications, such as the Commodity Purchasing Sample Application that is included with InfoSphere Streams

Software requirements

- Red Hat Enterprise Linux V5.3 or above V5.x

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.

Compatibility

InfoSphere Streams V2.0 includes a migration tool for migration of applications used with prior releases of InfoSphere Streams.

Limitations

For additional information, refer to **Usage restrictions** in the [Terms and conditions](#) section of this announcement, or to the license information document that is available on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Performance considerations

Performance of InfoSphere Streams applications is dependent on many things, including, but not limited to:

- Application design
- Analytic complexity
- Server hardware, including number of cores, CPU speed, and memory size
- Server cluster communications bandwidth
- Number of InfoSphere Streams jobs running simultaneously

InfoSphere Streams V2.0 using quadcore x86 3.0 GHz machines in a cluster, an application with simple analytics, and WebSphere MQ Low Latency Messaging using IB, with 256-byte tuples, achieved a throughput of over one million tuples with just two machines instead of using six machines as in Release 1.0.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems, and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Planning information

Customer responsibilities

Successful application operation and management of InfoSphere Streams is the responsibility of the user. Examples of those responsibilities include:

- Confirming the validity of the proposed equipment and programs
- Developing appropriate system procedures
- Incorporating protective measures to safeguard the privacy of data from unauthorized modification, destruction, or disclosure
- Incorporating sufficient checkpoints, balances, and controls into the application design to satisfy accuracy, restart, and audit requirements
- Establishing adequate backup contingency plans
- Preparing adequate documentation
- Providing qualified personnel to obtain the desired results

Installability

This release has simplified installation with improvements in cluster, environment, and dependency checking. Installation can be performed once on a shared file system, and then all computers in the cluster loaded from this single installation.

Software Subscription and Support (also referred to as Software Maintenance) is included with licenses purchased through Passport Advantage and Passport Advantage Express®. Product upgrades and technical support are provided by the Software Subscription and Support (also referred to as Software Maintenance) offering as described in the Agreements. Product upgrades provide the latest versions and releases to entitled software, and technical support provides voice and electronic access to IBM support organizations, worldwide.

IBM includes one year of Software Subscription and Support (also referred to as Software Maintenance) with each program license acquired. The initial period of Software Subscription and Support (also referred to as Software Maintenance) can be extended by the purchase of a renewal option, if available.

Packaging

Note: InfoSphere Streams includes development tools (InfoSphere Streams Studio), runtime (InfoSphere Streams Runtime), and toolkits (mathematics, text, mining, and financial markets toolkits).

IBM InfoSphere Streams V2.0:

- IBM InfoSphere Streams - DVD
- IBM DB2 - DVD

Security, auditability, and control

IBM InfoSphere Streams uses the security and auditability features of the Linux operating system and, optionally, may use Security Environment Linux (SE Linux).

Security and auditability features of IBM InfoSphere Streams are:

- Pluggable authentication
- Optional labeling of data exiting InfoSphere Streams

Some of the security functions of IBM InfoSphere Streams depend on Security Enhanced Linux.

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

Ordering information

This product is only available via Passport Advantage. It is not available as shrinkwrap.

Product information

Licensed function title	Product group	Product category
IBM InfoSphere Streams	IBM InfoSphere Streams	IBM InfoSphere Streams
IBM InfoSphere Streams Developer Edition	IBM InfoSphere Streams	IBM InfoSphere Streams
IBM InfoSphere Streams for Non-Production Environment	IBM InfoSphere Streams	IBM InfoSphere Streams

Program name	PID number	Charge unit description
IBM InfoSphere Streams	5724-Y95	Per Resource Value Unit
IBM InfoSphere Streams Developer Edition	5724-Y95	PA Per Authorized User
IBM InfoSphere Streams for Non-Production Environment	5724-Y95	Per Resource Value Unit

Charge metrics definitions

Authorized User

Authorized User is the unit of measure by which this program is licensed. An Authorized User is an individual (named or unnamed) within or outside of your enterprise. The program may be installed on one or more computers or servers and accessed by the number of users authorized by the Proof of Entitlement (PoE). You must have an entitlement for each Authorized User accessing the program or any program component in any manner directly or indirectly (for example, via a multiplexing program, device, or application server) through any means.

Resource Value Unit (RVU)

RVU is the unit of measure by which this program is licensed. RVU entitlements are based on the quantity of a specific designated measurement for the given program. A Proof of Entitlement (PoE) must be obtained for the appropriate number of RVUs required for your environment as defined by the specific program terms. The RVU entitlements are specific to the program and may include, but are not limited to the following: Client Devices, data source records, messages, and servers, and may not be exchanged, interchanged, or aggregated with RVU entitlements of another program. To understand these benefits of RVU licensing, and to determine how many RVUs to obtain for the program, contact your IBM representative.

RVU table

Minimum Cores	Maximum Cores	RVUs per Core
1	10	600
11	100	300
101	250	150
251	500	100
501	1,000	75
1,001	max	25

Passport Advantage program licenses

IBM InfoSphere Streams

Part description	Part number
IBM InfoSphere Streams	
IBM InfoSphere Streams Per Resource Value Unit Annual SW S&S Rnw1	E0AXCLL
IBM InfoSphere Streams Per Resource Value Unit Lic + SW S&S 12 Mo	D0H3YLL
IBM InfoSphere Streams Per Resource Value Unit SW S&S Reinststate 12 Mo	D0H3ZLL

IBM InfoSphere Streams

Part description	Part number
IBM InfoSphere Streams for Non-Production Environment	
IBM InfoSphere Streams Per Resource Value Unit Annual SW S&S Rnw1	E0AY5LL
IBM InfoSphere Streams Per Resource Value Unit Lic + SW S&S 12 Mo	D0H59LL
IBM InfoSphere Streams Per Resource Value Unit SW S&S Reinststate 12 Mo	D0H5ALL

IBM InfoSphere Streams

Part description	Part number
IBM InfoSphere Streams Developer Edition	
IBM InfoSphere Streams PA Per Authorized User Annual SW S&S Rnw1	E0AY6LL
IBM InfoSphere Streams PA Per Authorized User Lic + SW S&S 12 Mo	D0H5BLL
IBM InfoSphere Streams PA Per Authorized User SW S&S Reinststate 12 Mo	D0H5CLL

Passport Advantage supply

Program name/description	Part number
Developer Edition V2.0.0	
IBM InfoSphere Streams Developer Edition V2.0 for Linux English Media Pack	BB16LEN
IS Streams Non-Prod Environ V2.0.0	
IBM InfoSphere Streams Non-Production Environment V2.0 for Linux English MP	BB16KEN
InfoSphere Streams V2.0.0	
IBM InfoSphere Streams V2.0 for Linux English Media Pack	BB16JEN

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.

InfoSphere Streams V2.0.0

Entitled maintenance offerings description	Media packs description	Part number
IBM InfoSphere Streams per core Resource Value Unit	IBM InfoSphere Streams V2.0 for Linux English Media Pack	BB16JEN

IS Streams Non-Prod Environ V2.0.0

Entitled maintenance offerings description	Media packs description	Part number
IBM InfoSphere Streams for Non-Production Environment per Resource Value Unit	IBM InfoSphere Streams Non-Production Environment V2.0 for Linux English MP	BB16KEN

Developer Edition V2.0.0

Entitled maintenance offerings description	Media packs description	Part number
IBM InfoSphere Streams Developer Edition per Authorized User	IBM InfoSphere Streams Developer Edition V2.0 for Linux English Media Pack	BB16LEN

Terms and conditions

The information provided in this announcement letter is for reference and convenience purposes only. The terms and conditions that govern any transaction with IBM are contained in the applicable contract documents such as the IBM International Program License Agreement, IBM International Passport Advantage Agreement, and the IBM Agreement for Acquisition of Software Maintenance.

Licensing

IBM International Program License Agreement including the License Information document and Proof of Entitlement (PoE) govern your use of the program. PoEs are required for all authorized use.

Part number products only, offered outside of Passport Advantage, where applicable, are license only and do not include Software Maintenance.

This software license includes Software Subscription and Support (also referred to as Software Maintenance).

License Information form numbers

Program name	Program number	Form number
IBM InfoSphere Streams	5724-Y95	L-JPRE-8DDSN5
IBM InfoSphere Streams Developer Edition	5724-Y95	L-JPRE-8DGM96
IBM InfoSphere Streams for Non-Production Environment	5724-Y95	L-JPRE-8DGM53

The program's License Information will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

Limited warranty applies

Yes

Limited warranty

IBM warrants that when the program is used in the specified operating environment, it will conform to its specifications. The warranty applies only to the unmodified portion of the program. IBM does not warrant uninterrupted or error-free operation of the program or that IBM will correct all program defects. You are responsible for the results obtained from the use of the program.

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