



IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8 delivers new platform support

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At a glance

31-bit SDK for z/OS^(R), JavaTM Technology Edition, Version 8:

- Delivers a comprehensive Java SDK at the SE level 8 for the IBM^(R) z/OS platform
- Includes the enhancements to z/OS Java unique security and JZOS functionality
- Exploits new capabilities available with z/OS V2.1 and V2.2, as announced in Software Announcement [AP15-0006](#), dated January 14, 2015, and IBM z SystemsTM z13TM, as announced in Hardware Announcement [AG15-0001](#), dated January 14, 2015, IBM zEnterprise EC12 (zEC12), and IBM zEnterprise BC12 (zBC12)
- Provides improved performance using the Data Access Accelerator API for processing native data records and types directly from Java code
- Provides enhanced monitoring and diagnostics
- Contains the JZOS and z/OS unique security enhancements of previous z/OS Java SDK products

Overview

Java is a popular, general-purpose, highly portable object-oriented language that is widely used for application software and web-based applications. It is designed to have as few hardware and platform dependencies as possible, and is an ideal programming language useful in developing new and extending traditional web-based applications, and porting other applications to your IBM z Systems platform. The 31-bit SDK for z/OS, Java Technology Edition is also useful in helping developers who want to take advantage of the Java application programming interfaces (APIs) for z/OS, write or run Java applications across multiple platforms, or use Java to access z Systems data.

The 31-bit SDK for z/OS, Java Technology Edition, Version 8 is the latest version of this software development kit (SDK). It is designed to be compliant with the Java Standard Edition 8 (Java SE 8) APIs. With 31-bit SDK for z/OS, Java Technology Edition, Version 8, you can:

- Test and deploy Java applications in a 31-bit environment.
- Use the Java SE 8 APIs. Continue the "write once, run anywhere" Java paradigm.
- Leverage z Systems Integrated Information Processors (zIIPs) to run eligible Java work. You can also use "zAAP on zIIP" to run zAAP-eligible workloads on IIP specialty engines.

- Leverage traditional z Systems benefits: scalability, reliability, availability, and serviceability.
- Use valuable z/OS functions: security functions such as IBMPKCS11 and JCECCA ECC support, and JZOS functions such as z/OS JES Symbol Support and Preliminary Support for User Job Correlators.
- Exploit JMS-based performance logging to SMF for the JZOS launcher.
- Benefit from the improved security of new Java keystores now protected by AES encryption.
- Realize general performance improvements in JRE and hardware that improve application code.
- Improve support for processing native data records and types directly from Java code.
- Use enhanced monitoring and diagnostics.
- Benefit from additional reliability, availability, and serviceability (RAS) enhancements.
- Enable your Java applications to exploit the IBM z13 and zEC12 instruction sets.
 - Exploitation of the new vector extension facility (SIMD) instructions in z13 to accelerate text processing and business analytics workloads.
 - Exploitation of Simultaneous-Multi-Threading (SMT) facility for zIIP processors is expected to provide significantly more throughput for Java applications. You can use SMT capabilities to address the growing volume of zIIP-eligible work, such as Java-based, IBM full profile WebSphere[®] Application Server for z/OS and XML parsing.
 - Java 8 workloads that use encryption, such as those leveraging the IBM Encryption Facility for z/OS V1.2 (5655-P97), are expected to benefit from both the zEnterprise[®] Data Compression (zEDC) and the Faster CP Assist for Cryptographic Function (CPACF) processor.
 - Java 8 performance improvements for default IBMJCE security provider in Block ciphering, Secure Hashing and Public Key Cryptography will significantly improve throughput of WebSphere applications in secure mode.
 - Java 8 exploitation of Runtime Instrumentation facility in z13 and zEC12 to replace software-based sampling in JVM will reduce CPU time consumption and is expected to improve ramp-up of WebSphere Application Server for z/OS.
 - Java 8 exploitation of new z13 general instructions such as Load-and-zero-rightmost-byte, conditional load/store will benefit 31-bit compressed references JVMs.

IBM plans for maintenance roll-ups of IBM 31-bit and 64-bit SDK to support z13; these maintenance releases are planned for 1Q2015.

- SDK7 for z/OS Java Technology Edition, Version 7 Release 1 and Version 7 (5655-W43 and 5655-W44)
- SDK6 for z/OS Java Technology Edition Version 6.0.1 and Version 6 (5633-R31 and 5655-R32)

Key prerequisites

Hardware

This product currently runs on the following IBM z Systems servers:

- IBM z13
- IBM zEnterprise EC12 (zEC12)
- IBM zEnterprise EC12-GA2
- IBM zEnterprise BC12 (zBC12)
- IBM zEnterprise 196 (z196)¹
- IBM zEnterprise 114 (z114)¹
- IBM System z10^(R) (z10TM EC, z10 BC)¹

- IBM System z9^(R) (z9^(R) EC, z9 BC)¹
- IBM System z900 and z800¹

¹These products are withdrawn from marketing.

Software: Specific functions may require specific hardware or software levels or features.

This product requires z/OS V2.1 (5650-ZOS), or later. Specific functions may require specific software levels or features not included in the z/OS base.

Planned availability date

March 6, 2015, via the IBM z Systems Java website

<http://www.ibm.com/systems/z/os/zos/tools/java/>

March 6, 2015, via Shopz

<http://www.ibm.com/software/ShopzSeries>

Description

31-bit SDK for z/OS, Java Technology Edition, Version 8 is a Java SDK that contains the IBM J9 virtual machine, Version 2.8. The program is a key building block for developing on-demand applications. 31-bit SDK for z/OS, Java Technology Edition, Version 8 is designed to be compliant with the Java SE 8 APIs and is designed to provide the stability, service, scalability, and integration you expect from a z Systems program.

31-bit SDK for z/OS, Java Technology Edition, Version 8 is designed to provide you with the ability to:

- Test and deploy Java applications in a 31-bit environment
- Use the Java SE 8 APIs.
- Continue the "write once, run anywhere" Java paradigm
- Leverage z Systems Integrated Information Processors (zIIPs) with the zAAP on zIIP capability to run eligible Java work
- Leverage traditional z Systems benefits: scalability, reliability, availability, and serviceability
- Use the SDK V8 that contains the JZOS and z/OS unique security enhancements of previous z/OS Java SDK products
- Use valuable z/OS functions: security functions such as IBMPKCS11 and JCECCA ECC support, and JZOS functions, such as z/OS JES Symbol Support and Preliminary Support for User Job Correlators
- Exploit JMS-based performance logging to SMF for the JZOS launcher
- Benefit from the improved security of new Java keystores now protected by AES encryption
- Realize general performance improvements in JRE and hardware that improve application code
- Improve support for processing native data records and types directly from Java code
- Use enhanced monitoring and diagnostics
- Use additional RAS enhancements
- Enable your Java applications to exploit the z13, zEC12, or zBC12 instruction sets

IBM plans for z/OS V2.2 to include support for exploiting new features of new z13 hardware. This new support is also planned to be available for z/OS V2.1 with PTFs in February 2015. Also, workloads that run with Java 8, such as IBM WebSphere Liberty Profile and WebSphere Full profile, are expected to benefit from these features. Refer to the [Statement of general direction](#) section for additional information. This support includes:

- Exploitation of the new vector extension facility (SIMD) instructions in IBM z13 to accelerate text processing and business analytics workloads.
- Exploitation of Simultaneous-Multi-Threading (SMT) facility for zIIP processors is expected to provide significantly more throughput for Java applications. You can use SMT capabilities to address the growing volume of zIIP-eligible work, such as Java-based, IBM full profile WebSphere Application Server for z/OS and XML parsing.
- Java 8 workloads that use encryption, such as those leveraging the IBM Encryption Facility for z/OS V1.2 (5655-P97), are expected to benefit from both the zEnterprise Data Compression (zEDC) and the Faster CP Assist for Cryptographic Function (CPACF) processor.
- Java 8 performance improvements for default IBMJCE security provider in Block ciphering, Secure Hashing and Public Key Cryptography will significantly improve throughput of WebSphere applications in secure mode.
- Java 8 exploitation of Runtime Instrumentation Facility in zEC12 and z13 to replace software-based sampling in JVM are expected to reduce CPU time consumption and improve ramp-up of IBM full profile WebSphere Application Server for z/OS.
- Java 8 exploitation of new z13 general instructions such as Load-and-zero-rightmost-byte, conditional load/store will benefit 64-bit compressed references JVMs.
- Java 8 JIT compiler will use the new z13 Instruction scheduler modelling for Java applications running on z13.

IBM plans for maintenance roll-ups of IBM 31-bit and 64-bit SDK to support z13; these maintenance releases are planned for 1Q2015.

- SDK7 for z/OS Java Technology Edition, Version 7 Release 1 and Version 7 (5655-W43 and 5655-W44)
- SDK6 for z/OS Java Technology Edition Version 6.0.1 and Version 6 (5633-R31 and 5655-R32)

Exploitation of z13 instructions

- Exploitation of the new vector extension facility (SIMD) in IBM z13 accelerates text (array) processing and business analytics workloads. Text processing accelerations include vectorization of code page conversion and array compare operations. These operations will be vectorized as a part of internal implementation of java.lang.String class. For example, methods like compareTo(), toLower(), toUpper(), and so on, will be implemented using SIMD instructions. In addition, similar operations on Java arrays in the user code will possibly be recognized and vectorized as well.
- Business analytic workload improvements include auto-vectorization of simple data parallel loops. Currently, loops that operate on arrays of doubles and do not have branches are supported. Support for other types and code patterns are planned for the future.
- Java 8 exploitation of Runtime Instrumentation Facility in z13 and zEC12 to augment software-based sampling in JVM is expected to reduce CPU time consumption and expected to improve ramp-up for most large Java workloads like IBM full profile WebSphere Application Server for z/OS.
- Java 8 is designed to reduce CPU consumption by JIT Compiler threads through improved JIT compilation heuristics and AOT code quality improvements.
- Java 8 exploitation of new z13 general instructions such as Load-and-zero-rightmost-byte, conditional load/store will benefit 31-bit compressed references JVMs.

- Java 8 JIT compiler will use the new z13 Instruction scheduler modeling for Java applications running on z13.

IBM plans for maintenance roll-ups of IBM 31-bit and 64-bit SDK to support z13; these maintenance releases are planned for 1Q2015.

- SDK7 for z/OS Java Technology Edition, Version 7 Release 1 and Version 7 (5655-W43 and 5655-W44)
- SDK6 for z/OS Java Technology Edition Version 6.0.1 and Version 6 (5633-R31 and 5655-R32)

This release offers improved integration of Java with core z/OS workload management facilities. It provides new Java APIs, exploiting the WLM SYSEVENT QRYCONT macro, which supports adaptive concurrent online and batch workloads in Java-based processing environments such as WebSphere Compute Grid.

IBM MXBeans for virtualized environments

New extensions are available to provide information about virtualized environments that JVMs are running in, for increased ability to self-adapt.

Performance improvements for Decimal data handling in Data Access Accelerator

Data Access Accelerator is a high-performance data marshalling, conversion, and arithmetic library that handles a range of non primitive and primitive Java types. The library operates directly on raw byte arrays, which removes the requirement for intermediate processing, for improved performance of record processing and data binding. By working in concert with the Just-In-Time compiler, your application can use available hardware acceleration, while remaining platform-independent. Typical use-cases for this feature include:

- Accelerating inter-language communication
- Data marshalling operations
- Nonprimitive arithmetic; for example, packed decimal

For further information, visit

http://www.ibm.com/support/knowledgecenter/SSYKE2_8.0.0/welcome/welcome_javasdk_version.html

Product positioning

Java can be used for developing traditional z Systems commercial applications and also Internet and intranet applications that use standard interfaces.

31-bit SDK for z/OS, Java Technology Edition, Version 8 may benefit application developers who want to take advantage of the Java APIs for z/OS, write or run applications across multiple platforms, or use Java to access z Systems data.

IBM SDK, Java Technology Edition, Version 8 is for users who want to utilize enhanced native record processing and hardware capabilities through Java SE 8 APIs. This release contains the latest virtual machine technology from IBM, and enables you to use Java SE 8 APIs to exploit the new zEC12 capabilities and improve monitoring and diagnostics.

z Systems administrators can provide the SDK for their application developers and users. Building on the existing z/OS Java product, it is intended that companies may continue their deployment of Java while leveraging the benefits of z Systems quality, scalability, and service, including exploitation of zEC12 instructions.

Statement of general direction

IBM intends to exploit 31-bit SDK for z/OS, Java Technology Edition, Version 8 in IBM full profile WebSphere Application Server for z/OS.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remain at our sole discretion.

Reference information

For the most current information on IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8, visit the z Systems Java website

<http://www.ibm.com/systems/z/os/zos/tools/java/>

Program number

Program number	VRM	Program name
5655-DGG	8.0.0	IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8
5655-I48	1.1.0	IBM SDK for z/OS, Software Subscription and Support

Product identification number

Program PID number	Subscription and Support PID number
5655-DGG	5655-I48

Offering Information

Product information is available via the Offering Information website

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

Publications

The publication, *Program Directory for IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8* (GI11-9828) is orderable from the IBM Publications Center at

<http://publibz.boulder.ibm.com/epubs/pdf/ajva1110.pdf>

The IBM Java 8 Knowledge Center website is

http://www.ibm.com/support/knowledgecenter/SSYKE2_8.0.0/welcome/welcome_javasdk_version.html

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, free of charge.

Technical information

Specified operating environment

Hardware requirements

This product currently runs on the following IBM z Systems servers:

- z13
- zEC12
- zBC12
- z196¹
- z114¹
- z10 EC
- z10 BC¹
- z9 EC¹
- z9 BC¹
- z990¹
- z890¹

¹These products are withdrawn from marketing. Specific functions may require specific hardware levels or features.

Software requirements

This product requires z/OS V1.13 (5694-A01), or later. Specific functions may require additional products not included in the z/OS base or in the optional features of z/OS.

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

IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGG) has similar functions to IBM 31-bit SDK for z/OS, Java Technology Edition, Version 7 (5655-W43) with the following differences:

- The X11 libraries are now dynamically linked, instead of being statically linked. z/OS V1.10 Communications Server and later releases of z/OS include the X11 libraries. Java applications do not have to be changed. Dynamic linking will make the z/OS Java SE 7 product consistent with the linking already used on other IBM platform SDKs.
- Compressed references are enabled by default in IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8.
- Pageable large pages are the default when the Flash Express^(R) hardware is installed and available to the JVM.
- Default trace has changed. Level 2 trace points are now switched on after startup, and most level 1 trace points moved to the level 2 set.

For best performance for most clients, the default garbage collection policy remains GENCON, the new default in IBM 31-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 1. However, customers migrating directly from IBM SDK 31-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 0 or earlier will be moving to a product with a different garbage collection policy default (GENCON) and may still require additional garbage collection tuning for optimal performance. For additional information, see the *IBM User Guide for IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8* that will be available at general availability at

http://www.ibm.com/support/knowledgecenter/SSYKE2_8.0.0/welcome/welcome_javasdk_version.html

The following are independently orderable and serviced products that can coexist on the same z/OS system:

- 64-bit SDK for z/OS, Java Technology Edition, Version 8 (5655-DGH).
- 31-bit SDK for z/OS, Technology Edition, Version 8 (5655-DGG).
- 64-bit SDK for z/OS, Java Technology Edition, Version 7 Release 1 (5655-W44).
- 31-bit SDK for z/OS, Java Technology Edition, Version 7 Release 1 (5655-W43).
- 64-bit SDK for z/OS, Java Technology Edition, Version 7 Release 0 (5655-W44).
- 31-bit SDK for z/OS, Java Technology Edition, Version 7 Release 0 (5655-W43).
- 64-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 1 (5655-R32).
- 64-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 0 (5655-R32).
- 31-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 1 (5655-R31).
- 31-bit SDK for z/OS, Java Technology Edition, Version 6 Release 0 Modification 0 (5655-R31).
- 64-bit SDK for z/OS, Java 2 Technology Edition, Version 5 (5655-N99), withdrawn from marketing effective March 11, 2013. **Note:** Service was discontinued September 30, 2013.
- 31-bit SDK for z/OS, Java 2 Technology Edition V5 (5655-N98), withdrawn from marketing effective March 11, 2013. **Note:** Service was discontinued September 30, 2013.
- SDK for z/OS, Java 2 Technology Edition, Version 1 Release 4 (5655-I56), withdrawn from marketing effective September 29, 2008. **Note:** Service was discontinued September 30, 2011.

Most Java applications executed on IBM 31-bit SDK for z/OS, Java Technology Edition, Version 6 (5655-N99) are expected to run unchanged on 31-bit SDK for z/OS, Java Technology Edition, Version 8 Release 1, provided that they do not use

deprecated Java SE 6 APIs. Additionally, in some cases, because of a small number of incompatibilities introduced between Java SE 6 and Java SE 7, some applications may have to change.

Limitations

Input Method Framework (IMF) is not supported.

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/electronicssupport>

Access the IBM Support Portal

<http://ibm.com/support>

Access the online Service Request tool

<http://ibm.com/support/servicerequest>

Planning information

Packaging

You can download 31-bit SDK for z/OS, Java Technology Edition, Version 8 from the System z^(R) Java website or order the program package. 31-bit SDK for z/OS, Java Technology Edition, Version 8 is shipped with the following:

- Basic machine-readable material
- License Information

For additional documentation, visit

<http://www.ibm.com/systems/z/os/zos/tools/java/>

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

31-bit SDK for z/OS, Java Technology Edition, Version 8 uses the security and auditability features of the host z/OS operating system. For more information, refer to Software Announcement [AP13-0290](#), dated July 23, 2013.

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

Charge metric

Program name	Part number or PID number	Charge metric
IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8	5655-DGG	No-charge Unlimited installs
IBM SDK for z/OS Software Subscription and Support	5655-I48	No-charge Unlimited installs

For information on downloading the code from the System z Java website, visit

<http://www.ibm.com/systems/z/os/zos/tools/java/>

Processor Value Unit (PVU)

PVU is a unit of measure by which the program can be licensed. The number of PVU entitlements required is based on the processor technology (defined within the PVU table by processor value, brand, type, and model number at the website below) and the number of processors made available to the program. IBM continues to define a processor, for the purpose of PVU-based licensing, to be each processor core on a chip. A dual-core processor chip, for example, has two processor cores. The PVU table can be found at

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

Licensee can deploy the program using either full capacity licensing or virtualization capacity (sub-capacity) licensing according to the Passport Advantage^(R) Sub-Capacity Licensing Terms (refer to the web page below). If using full capacity licensing, licensee must obtain PVU entitlements sufficient to cover all activated processor cores* in the physical hardware environment made available to or managed by the program, except for those servers from which the program has been permanently removed. If using virtualization capacity licensing, licensee must obtain entitlements sufficient to cover all activated processor cores made available to or managed by the program, as defined according to the Virtualization Capacity License Counting Rules at

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

* 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.

Notes

- 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 PVU entitlements for this program sufficient to cover the processor cores 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 PVU entitlements for this program sufficient to cover the processor cores managed by the program.
- A few programs on an exception basis may be licensed on a referenced basis. In that case, the following applies. Rather than obtaining entitlements for the activated processor cores available to the program, licensee must obtain PVU entitlements for this program sufficient to cover the environment made available

to the referenced program as if the program itself were executing everywhere the referenced program was executing, independent of the basis on which the referenced program is licensed.

Basic license

To order, specify the program product number and the appropriate license or charge option. Also, specify the desired distribution medium. To suppress shipment of media, select the license-only option in CFSW.

Program Name IBM 31-bit SDK for z/OS, Java Technology Edition, Version 8

Program PID 5655-DGG

Entitlement Identifier	Description	License Option/Pricing Metric
S017P9J	IBM 31-bit SDK for z/OS, Version 8	Unlimited Installs Basic No Charge

Orderable Supply ID	Language	Distribution Medium
S017P9K	English	3590 Tape Cartridge

Subscription and Support PID 5655-I48

Entitlement Identifier	Description	License Option/Pricing Metric
S00X7JC	IBM SDK for z/OS Software Subscription and Support	Unlimited Installs SW Subscription and Support Registration, No charge

Orderable Supply ID	Language	Distribution Medium
S00X7H8	English	Paper

Customized Offerings

Product deliverables are shipped only via CBPDO and ServerPac. These customized offerings are offered for Internet delivery in countries where ShopzSeries product ordering is available. Internet delivery reduces software delivery time and allows you to install software without the need to handle tapes. For more details on Internet delivery, refer to the Shopz help information at

<http://www.software.ibm.com/ShopzSeries>

You choose the delivery method when you order the software. IBM recommends Internet delivery. In addition to Internet and DVD, the supported tape delivery options include:

- 3590
- 3592

Most products can be ordered in ServerPac the month following their availability in CBPDO. Many products will also be orderable in a Product ServerPac without also having to order the z/OS operating system or subsystem.

Shopz and CFSW will determine the eligibility based on product requisite checking. For more details on the product ServerPac, visit the Help section on the Shopz website at

<http://www14.software.ibm.com/webapp/ShopzSeries/ShopzSeries.jsp>

For additional information on the Product ServerPac option, refer to Software Announcement [AP12-0255](#), dated July 31, 2012.

Production of software product orders will begin on the planned general availability date.

- CBPDO shipments will begin one week after general availability.
- ServerPac shipments will begin two weeks after general availability.

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.

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

Agreement for Acquisition of Software Maintenance

The IBM Agreement for Acquisition of Software Maintenance (Z125-6011) applies for Software Subscription and Support (Software Maintenance) and does not require customer signatures:

These programs are licensed under the IBM Program License Agreement (IPLA) and the associated Agreement for Acquisition of Software Maintenance, which provide for support with ongoing access to releases and versions of the program. These programs have a one-time license charge for use of the program and an annual renewable charge for the enhanced support that includes telephone assistance (voice support for defects during normal business hours), as well as access to updates, releases, and versions of the program as long as support is in effect. IBM System z Operational Support Services - SoftwareXcel is an option if you desire added services.

License Information number

GA76-0438-01

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.

IBM provides you with access to IBM databases containing information on known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, consult the *IBM Software Support Handbook* found at

<http://www.ibm.com/support/handbook>

IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).

Program support

Enhanced support, called Subscription and Support, includes telephone assistance, as well as access to updates, releases, and versions of the program as long as support is in effect. You will be notified of discontinuance of support with 12 months' notice.

Money-back guarantee

If for any reason you are dissatisfied with the program and you are the original licensee, you may obtain a refund of the amount you paid for it, if within 30 days of your invoice date you return the program and its PoE to the party from whom you obtained it. If you downloaded the program, you may contact the party from whom you acquired it for instructions on how to obtain the refund.

For clarification, note that for programs acquired under any of IBM's On/Off Capacity on Demand (On/Off CoD) software offerings, this term does not apply since these offerings apply to programs already acquired and in use by you.

Volume orders (IVO)

No

Passport Advantage applies

No

Software Subscription and Support applies

Yes. All distributed software licenses include Software Subscription and Support (also referred to as Software Maintenance) for a period of 12 months from the date of acquisition, providing a streamlined way to acquire IBM software and assure technical support coverage for all licenses. Extending coverage for a total of three years from date of acquisition may be elected.

For System z, the Subscription and Support entitles you to defect support and no usage or code-related questions. IBM provides assistance via telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM support center. (This assistance is not available to your end users.) IBM

provides Severity 1 assistance 24 hours a day, every day of the year. For additional details, consult your *IBM Software Support Handbook*

<http://www.ibm.com/support/handbook>

Software Subscription and Support does not include assistance for the design and development of applications, your use of programs in other than their specified operating environment, or failures caused by products for which IBM is not responsible under this agreement.

For more information about the Passport Advantage Agreement, visit the Passport Advantage website at

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

System i Software Maintenance applies

No

Variable charges apply

No

Educational allowance available

15%, to qualified educational institution customers.

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

IBM Electronic Services

Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support, all at no additional cost to you.

Now integrated into the base operating system of AIX® V5.3, AIX V6.1, and AIX V7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information 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 resolution by you and the IBM support team. To access the tool main menu, simply type `smitty esa_main`, and select `Configure Electronic Service Agent`. In 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 Agent, refer to

<http://www.ibm.com/support/electronic>

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

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 24x7 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, reporting, and storing the data at IBM. The Electronic Service Agent tool is designed to securely transmit either via the Internet (HTTPS or VPN) or modem 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.

For additional information, please refer to IBM Electronic Service Agent

<http://www-01.ibm.com/support/esa/>

More accurate reporting:Because system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, you are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support:Using the IBM ID entered during activation, you can view system and support information in the My Systems and Premium Search sections of the Electronic Support website at

<http://www.ibm.com/support/electronic>

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent. Reports are available for any system associated with your IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from your system, you are able to see search results that apply specifically to your systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

<http://www.ibm.com/support/electronic>

Prices

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