IBM WebSphere Application Server for z/OS, V8.5 drives innovation for hybrid applications through ease of connecting and integrating cloud services

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Overview

As organizations move to cloud computing as a means to help create more efficient and cost-effective data centers, they recognize that it is impossible and impractical to accommodate all business needs at the same speed and with the same priority. The emerging application workloads that consist of cloud, mobile, and social applications require much greater speed and agility to keep pace with the evolving landscape than the traditional enterprise workloads. CIOs must balance the needs of mission-critical systems and fast-paced new development of cloud and mobile applications. This drives the requirement for IT to support multispeed capabilities that enable the delivery of diverse business requirements at speeds that offer optimal business outcome. Hybrid enterprise applications, which strive to deliver a considerable competitive advantage for the businesses in the API economy, place new requirements on IT to support environments that enable on-premises applications to securely and easily connect to and from hosted, value-added cloud services.

IBM® WebSphere® Application Server Liberty for z/OS®, V8.5, with its lightweight and composable characteristics, delivers several new features to simplify your organization's movement to the cloud:

- Liberty quick start tool that helps accelerate development of new applications to support new architectures, such as microservices
- Best practices and methodologies to refactor Java™ app components into microservices to meet requirements of cloud, mobile, and social workloads
- Tools to enable publishing, consuming, and managing APIs that use integrated API Connect services, which enable participation in the API economy to reach new clients
- Ease of integrating Watson™ cognitive capabilities to Java apps to help make better business decisions
- Ease of enhancing existing applications through the use of rich features and fully managed cloud data services without the cost, complexity, and risk of managing your own infrastructure

WebSphere Application Server for z/OS, V8.5 traditional, also known as WebSphere full profile, is now enhanced to support Java Platform, Standard Edition 8 (Java SE 8). Java SE 8 is already supported for WebSphere Application Server Liberty for z/OS. Delivery of this feature fulfils the previously announced Statement of general direction in Software Announcement 215-420, dated September 1, 2015.
The WebSphere Application Server V9.0 beta is updated for download and testing on z/OS. This is in addition to the existing preconfigured service hosted on IBM Bluemix®. The beta is also refreshed with additional Java EE 7 features.

Key prerequisites

Refer to the Technical requirements section.

Planned availability date

March 18, 2016

Description

Reduce complexity and achieve richer engagement experiences with Microservices Architecture

WebSphere Application Server Liberty for z/OS is a world-class platform for creating new applications and microservices to help you respond to your business needs. Microservices are a software architectural style in which complex applications are made up of small, loosely coupled services that communicate with each other using simple application-programming interfaces (APIs). Building applications as microservices eliminates long-term commitments to a technology stack, ensures faster time to market, and provides efficient DevOps integration. In Microservices Architecture, applications are organized around business capabilities that help make it easy to measure return on investment. Applications are aligned more closely with consumer needs, which results in improved customer service.

Accelerate development and deployment of microservices

WebSphere Application Server Liberty for z/OS delivers guidance on starting points, rules of engagement, and decomposition best practices to support microservices application development and deployment.

• Guidance on getting started.
  Introduction of WebSphere Liberty quick start tool. The WebSphere Liberty quick start tool is a service hosted on IBM Bluemix that gives the user a starting point to build a WebSphere Liberty application. It provides developers with a menu-driven approach to create Java-based microservices using different technologies. Included for each is a self-contained, runnable sample, complete with maven build files that can build the application, run tests on WebSphere Liberty, and pull in the correct dependencies and features. Running Spring Boot applications on WebSphere Liberty is included.

• Best practices.
  A factor-by-factor guide to creating a 12-factor application on WebSphere Liberty for z/OS. Following the 12-factors methodology enables you to build a portable application that is ideal for running on the cloud and can be maintained easily in a continuous delivery pipeline. This helps provide a smoother transition to a Microservices Architecture.

• A pathway to refactor existing Java application code.
  Refactor components of Java EE applications to meet new needs. When weighing the benefits versus the challenges of moving to Microservices Architecture, the monolith does not necessarily need to be thrown away. Instead, you can start slowly, and extend your monolith by building new features as microservices around it. Using WebSphere Liberty for z/OS, a Java developer can transform an existing, large, monolithic JEE business application to microservices and make it usable by new mobile, social, and cognitive applications.
• Guidance on how to create new cloud-native applications and methodologies.
  IBM provides an example application, **Game On!**, to help you quickly get
  started writing a new microservices application.

• A new **landing page** dedicated to microservices provides a one-stop shop for all
  the WebSphere Liberty microservices code samples, best practices, and getting
  started guides. This page serves as a collection of all the resources described
  above, and explains the value of using a microservices-based architecture.

Microservices offer the following benefits:

• Better collaboration with Business Partners and consumers
• Richer systems of engagement experiences (mobile, and more)
• Capability to introduce new products quickly to market that easily move to new
  geographic markets and acquire new clients
• Potential for top line growth due to faster time to market, improved products and
  services, and bottom line improvements due to capital and operational savings

**Enable the API economy (create new and connect to existing APIs)**

In addition to the pre-existing support for calling RESTful Java EE APIs (for example,
using JAX-RS), WebSphere Liberty for z/OS provides you with the capability
to generate (manually, automatically, or a combination of both) Swagger 2.0
documentation that supports the discovery of these APIs. Together, these enable you
to publish, discover, and consume Java Enterprise APIs, either directly or through
the use of an API framework such as IBM API Connect.

API Discovery is a new Liberty server feature that:

• Enables the discovery of REST APIs from a single RESTful endpoint.
• Enables WebSphere Liberty for z/OS to produce Swagger 2.0 documentation,
  which is the industry-leading specification for documenting REST APIs, using
  either JSON or YAML formats.
• Includes support for collectives, and the aggregation of API Swagger
documentation from members of the collective.
• Offers WebSphere Developer Tools support for authoring Swagger documents
  through provided templates or samples. It also provides support for auto-
generating JAX-RS 2.0 clients from either a Swagger document or a URL, which
  generates a client that can be used to connect to any of the exposed APIs.

**Enhance existing applications with cloud services from Bluemix**

Enterprise IT needs the ability to smartly consume and analyze data quickly, and
then make decisions based on informed analytics. As the computing industry
advances and new cloud-only services become increasingly expensive and complex
to develop in house, the ability to connect to off-premises cloud services is becoming
more appealing. Such services offer convenience without the cost of traditional
procurement and up-front expenses. It is one of the core reasons organizations are
exploring a hybrid approach to develop and manage applications, in which value-
added services, regardless of physical location, can be seamlessly integrated and
consumed by any on-premises application and paid for as they are used.

Enhancements to WebSphere Liberty for z/OS include:

• Ease of discovering and binding to various services from Bluemix within on-
  premises enterprise applications
• Ease of integrating enterprise on-premises storage with cloud-based storage for
  unstructured data

**Optimize your IT environment by shifting to cloud**

Cloud technologies are making it possible for companies to innovate and modernize.
They open up numerous possibilities to reduce costs and to implement agile
processes to deliver better client value faster. **WebSphere Application Server for Bluemix** is designed to reduce costs by helping you to implement agile DevOps processes to rapidly prototype and deliver new cloud-based mobile, web, and Internet of Things (IoT) applications. It also provides access to innovative cloud services, such as IBM Watson™, so you can create new applications and enhance existing ones that deliver additional client value with speed and efficiency. Additionally, [http://www.ibm.com/cloud-computing/bluemix/](http://www.ibm.com/cloud-computing/bluemix/) provides pay-as-you-go pricing for a potential cost savings of up to 30% while reducing capital and operating expenses.

**WebSphere Application Server on Cloud** offers single and multi-tenant options, with high performance and security. Moving applications to the cloud without disrupting your applications or processes has several benefits:

- Optimize Capital Expenditure (CAPEX) versus Operating Expenditure (OPEX) budgets through hourly, monthly, and BYOL pricing options and pay-as-you-go pricing.
- Gain capability to use existing applications, skills, and resources to reduce risk.
- Access to hundreds of cloud services to enrich new and existing applications.
- Reduce total cost of ownership by offloading operational expenses for infrastructure and middleware tier.
- Prepare for client data center capacity limitations with elastic growth in the cloud.

WebSphere Application Server for Bluemix now provides a WebSphere Network Deployment plan, which delivers an advanced, flexible runtime environment for large-scale application deployments and advanced performance and management capabilities for mission-critical applications. New features include:

- Intelligent management and routing features to help deliver reliability and better business results
- Improved operations and resiliency through advanced application availability, elasticity, and quality of service
- Enhanced security and control using integrated management and administrative tools

**Benefit from additional features delivered through continuous delivery in the WebSphere Liberty Repository**

Continuing the iterative delivery of new capabilities that build upon WebSphere Application Server for z/OS, V8.5, the new features offer enhancements to WebSphere Application Server Liberty for z/OS for development and production environments. The enhanced features are optionally installable and are available from the WebSphere Liberty Repository. These new features can be used along with those previously available through WebSphere Liberty Repository.

New packages and features available in the Liberty Repository:

- WebSphere Controller Bundle: A single package that includes all the features required for a server to manage Liberty collectives
- WebSphere Member Bundle: A single bundle that includes all the features required for a server to be clustered and auto-scaled in a Liberty collective

**Migration Discovery tools** now support clients who want to do configuration and application migration from noncloud environments (WebSphere Application Server traditional, JBoss, Tomcat, and WebLogic) to IBM Cloud with guidance of cloud options and insight of migration estimation.

**Migration Toolkit** is enhanced for improved rule selection and to include application connectivity analysis to assist in moving to IBM Cloud.

**Logstash collector**

This feature provides ease of integration of WebSphere Liberty for z/OS servers and applications with Elasticsearch’s Logstash product to monitor and quickly find errors
in application logs, resolve problems, and intelligently search through logs to find the answers to your application problems.

Security enhancements

WebSphere Liberty Repository currently contains several additional security features beyond Java EE7. New enhancements include:

- The Simple and Protected GSSAPI Negotiation Mechanism (SPNEGO) outbound token support to enable Single Sign-on (SSO) mechanism for WebSphere Application Server Liberty for z/OS in Kerberos environments. This feature provides capabilities similar to those available for the WebSphere Application Server traditional, also known as full profile.
- Security Assertion Markup Language (SAML) enhancements for SSO for web services.
- OpenID and OpenID Connect enhancements to help simplify the task of authenticating and authorizing mobile and cloud centric applications.
- System Authorization Facility (SAF) security delegation for z/OS enables you to configure mapping of Java EE run-as role to user in SAF rather than through application bindings.
- Enhancements for Java Authentication and Authorization Service:
  - File-based configuration of custom login modules can be portably included with your application rather than configured through server configuration.
  - Custom login modules enable your code to perform programmatic login to Java 2 connectors. This removes the need to store your user id and password in the server configuration.
  - Support for getting the user credentials (id and password) programatically to simplify authentication to back-end systems.
- Support for hardware PKCS11 cryptographic keystore enables you to leverage externally managed secure hardware keystores.
- Custom password encryption System Programming Interface (SPI) enables you to provide your own password encryption/decryption algorithm, which offers use cases requiring special algorithm, use of external hardware, or storing the cryptographic keys at different locations.

Message logging enhancements

WebSphere Liberty for z/OS adds support for listing messages to the Liberty server's console log where they can be used by z/OS system automation products. Additionally, messages can be redirected from the filesystem to a new MSGLOG DD in the Liberty server's started task procedure.

Java batch enhancement

The Parallel Job Management feature identifies and runs partitioned Java batch job steps in parallel across multiple servers to improve batch job performance supporting JSR 352. This feature is similar to Parallel Job Management features supported in WebSphere Compute Grid and WebSphere Application Server for z/OS, V8.5 traditional.

Auto extract war/ear files

WebSphere Liberty for z/OS now automatically extracts application archives on first deploy. This simplifies the experience when using applications that rely on calling applications that can use a third-party framework, such as Spring Framework.

Plug-in configuration tool

This tool is provided through GitHub and can merge multiple plug-in configuration files together. This tool helps simplify building topologies of multiple servers fronted by a web server.

WebRTC and SIP enhancements
WebSphere Liberty for z/OS now provides the ability to easily install their third-party media server drivers that support the JSR 309 standard (such as Dialogic and Radisys) to enable rapid development of real-time media applications. Capabilities enabled with JSR 309 include record and playback of audio and video media streams, multiway audio mixing, continuous presence multiway video, transcoding, and many other media-related features.

**Features available for WebSphere Liberty beta**

WebSphere Liberty for z/OS provides a fast, lightweight, modular Java application server that supports the latest web and open standards. Additional management features are now available through the Liberty Repository. The latest beta drivers include following features:

**A single management interface for both Java and Node.js**

This provides more efficient DevOps and deployment that creates even greater value from the IBM cloud application development platform. It includes:

- An admin center for visualization and operational control over both Java and Node.js applications
- Scalable clustering for both Java and Node.js applications
- Dynamic routing support (through a WebSphere Application Server plug-in) for Java and Node.js applications
- Scriptable deployment for both Java and Node.js applications

**Cloud-based log analytics service from IBM Bluemix for on-premises applications**

This feature provides ease of integrating cloud-based log analytics with your on-premises WebSphere servers and applications to quickly find errors in application logs, resolve problems, and intelligently search through logs to find the answers to your application problems.

**WebSphere Application Server for z/OS, V9.0 beta**

The WebSphere Application Server V9.0 beta debuted late in 2015 as a preconfigured runtime for WebSphere Application Server traditional (also known as WebSphere full profile) and is hosted on IBM Bluemix. The V9.0 beta now offers the following enhancements:

- Capability to download and test on your premises (including to z/OS platforms) in addition to the existing preconfigured service hosted on IBM Bluemix. Additionally, the following components are also available for download and test:
  - IBM HTTP Server for WebSphere Application Server
  - Web Server Plug-ins for IBM WebSphere Application Server
  - WebSphere Customization Toolbox
  - WebSphere Developer Tools that support Java EE 7 components
  - WebSphere Application Client
- Additional Java EE 7 Web Profile and Full Platform APIs which help to optimize developer and operational productivity

For more information, visit the **WebSphere Application Server V9.0 Beta page**.

**Accessibility by people with disabilities**

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

**Section 508 of the US Rehabilitation Act**
WebSphere Application Server for z/OS is capable as of March 18, 2016, 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) can be requested via IBM’s Product accessibility information website.

**Value Unit-based pricing**

Value Unit pricing for eligible IBM z Systems™ IBM International Program License Agreement (IPLA) programs enables a lower cost of incremental growth and enterprise aggregation. Each z Systems™ IPLA product with Value Unit pricing has a single price per Value Unit and a conversion matrix, called Value Unit Exhibit, for converting from some designated measurement to Value Units. Most commonly, Millions of Service Units (MSUs) is the measurement designated by IBM to be converted to Value Units. Some other measurements are engines or messages. Since MSUs are the most common measurement, that measurement will be used for the remainder of this description.

Value Unit pricing offers price benefits for you. For each z Systems IPLA program with Value Unit pricing, the quantity of that program needed to satisfy applicable IBM terms and conditions is referred to as the **required license capacity**. Each of the various Value Unit Exhibits stipulate that the larger your required license capacity, the fewer Value Units per MSU you will need. Value Unit Exhibits are uniquely identified by a three digit code and referred to using the nomenclature VUExxx, where xxx is the three digit code.

Subsequent acquisitions of Value Unit priced programs offer additional price benefits. The quantity of each z Systems IPLA program that you have acquired is referred to as **entitled license capacity**. If you wish to grow your entitled license capacity for a z Systems IPLA program, the calculation to determine additional needed Value Units is based upon the number of Value Units already acquired.

For each z Systems IPLA program with Value Unit pricing, you should:

- Determine the required license capacity, in MSUs.
- Aggregate the MSUs across the enterprise.
- Convert the total MSUs to Value Units, using the applicable Value Unit Exhibit.
- Multiply the price per Value Unit by the total number of Value Units to determine the total cost.

To simplify conversion from the designated measurement to Value Units or vice-versa, use the Value Unit Converter Tool. For additional information or to obtain a copy of the Value Unit Converter Tool, visit the Value Unit Converter Tool, go to the IBM z Systems Software Pricing website.

Note that Value Units of a given product cannot be exchanged, interchanged, or aggregated with Value Units of another product.

To determine the required license capacity for the z Systems IPLA program you selected, refer to the **Terms and conditions** section.

**Statement of general direction**

Consistent with the previously announced statement of direction, it remains the intent of IBM to certify WebSphere Application Server for z/OS traditional, also known as WebSphere full profile, to Java EE 7 Full Platform. For details, refer to Software Announcement 215-098, dated February 17, 2015.

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 information about WebSphere Application Server for z/OS, V8.5 continuous delivery, refer to Software Announcement 215-420, dated September 1, 2015.

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld(R) ID and password are required (use IBM ID).

BP Attachment for Announcement Letter 216-118

Availability of national languages

All supported languages are available.

Translation information, if available, can be found at the Translation Reports website.

Program number

<table>
<thead>
<tr>
<th>Program number</th>
<th>VRM</th>
<th>Program name</th>
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<tr>
<td>5655-W65</td>
<td>8.5</td>
<td>WebSphere Application Server for z/OS</td>
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Product identification number

<table>
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<th>Program PID number</th>
<th>Subscription and Support PID number</th>
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<tbody>
<tr>
<td>5655-F81</td>
<td>WebSphere Application Server for z/OS - Software Subscription and Support</td>
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</table>

Publications

The latest product documentation for WebSphere Application Server for z/OS, V8.5 is found in IBM Knowledge Center

IBM Knowledge Center is the new home for IBM product documentation. It brings IBM’s technical publications together in a single location, and replaces over 800 individual product Information Centers. IBM Knowledge Center simplifies the user experience, improves search, and refines the overall experience with other enhancements. Locate the desired WebSphere Application Server offering from the product list to obtain the product documentation.

You can find information about installing the continuous delivery features in the WebSphere Application Server product documentation. No hardcopy publications are shipped with this product. Using IBM Knowledge Center, users can define collections and produce custom PDF documents for their collections.

For optimal viewing of this documentation, browser support for JavaScript™ and related technologies is required.
Services

Software Services

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

To learn more about IBM Software Services or to contact a Software Services sales specialist, go to the IBM Software Services website.

Technical information

Specified operating environment

Software requirements

For details, refer to the System Requirements for WebSphere Application Server for z/OS, V8.5.

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.

Limitations

For additional information, refer to the Terms and conditions section of this announcement, or to the license information document that is available on the IBM Software License Agreement website.

Planning information

Packaging

This offering is delivered through the Internet. There is no physical media.

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.

Ordering information

Value Unit exhibit VUE007

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<tr>
<th>Value Units/MSU</th>
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<td>3</td>
</tr>
<tr>
<td>Tier A</td>
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<td>45</td>
</tr>
<tr>
<td>Tier B</td>
<td>46</td>
<td>175</td>
</tr>
<tr>
<td>Tier C</td>
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</tr>
<tr>
<td>Tier D</td>
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<td>+</td>
</tr>
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</table>

Ordering example

The total number of Value Units is calculated according to the following example.
If your required license capacity is 1,500 MSUs for your selected z Systems IPLA product, the applicable Value Units would be:

<table>
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<tr>
<th>Tier</th>
<th>MSUs</th>
<th>Multiplied by Value Units per MSU</th>
<th>Equal Value Units</th>
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</thead>
<tbody>
<tr>
<td>Base</td>
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<td>1.00</td>
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<tr>
<td>Tier B</td>
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<td>.36</td>
<td>46.80</td>
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<td>Tier C</td>
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<td>.27</td>
<td>37.80</td>
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<tr>
<td>Tier D</td>
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<td>.20</td>
<td>237.00</td>
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<td>Total</td>
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<td>343.50</td>
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</table>

When calculating the total number of Value Units, the sum is to be rounded up to the next integer.

For ordering information, refer to Software Announcement 212-106, dated April 24, 2012.

**Charge metric**

<table>
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<th>Program name</th>
<th>Part number or PID number</th>
<th>Charge metric</th>
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<tbody>
<tr>
<td>WebSphere Application Server for z/OS</td>
<td>WebSphere Application Server for z/OS</td>
<td>5655-W65</td>
<td>Value Unit</td>
</tr>
</tbody>
</table>

Ordering information is unchanged by this announcement. For more information, refer to Software Announcement 212-106, dated April 24, 2012.

**Basic license**

Not applicable.

**Customized Offerings**

Product deliverables are shipped only through CBPDO and ServerPac. These customized offerings are offered for Internet delivery in countries where Shopz 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, go to the Help section on the Shopz website.

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. z/OS can be ordered through CBPDO and ServerPac at general availability. 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, go to the Help section on the Shopz website.

For additional information about the Product ServerPac option, refer to Software Announcement 212-272, 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 following agreement applies for Software Subscription and Support (Software Maintenance) and does not require customer signatures:

• IBM Agreement for Acquisition of Software Maintenance (Z125-6011)

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 z Systems Operational Support Services - SoftwareXcel is an option if you desire added services.

License Information number

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

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 about known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, consult the IBM Software Support Handbook.

IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).
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. During the S&S period, for the unmodified portion of a program, and to the extent problems can be recreated in the specified operating environment, IBM will provide the following:

- Defect correction information, a restriction, or a bypass.
- Program updates: Periodic releases of collections of code corrections, fixes, functional enhancements and new versions and releases to the program and documentation.
- Technical assistance: A reasonable amount of remote assistance via telephone or electronically to address suspected program defects. Technical assistance is available from the IBM support center in the customer's geography.

Additional details regarding Technical Assistance, which includes IBM contact information, are provided in the IBM Software Support Handbook.

S&S does not include assistance for:

- The design and development of applications
- Customer's use of programs in other than their specified operating environment, or
- Failures caused by products for which IBM is not responsible under the IBM Agreement for Acquisition of Software Maintenance.

S&S is provided only if the Program is within its support timeframe as specified in the Software Support Lifecycle policy for the program.

System i Software Maintenance applies

No

Variable charges apply

No

Educational allowance available

Yes. A 15% education allowance applies to qualified education institution customers.
Sub-capacity terms and conditions

For each z Systems IPLA program with Value Unit pricing, the quantity of that program needed to satisfy applicable IBM terms and conditions is referred to as the required license capacity. Your required license capacity is based upon the following factors:

- The z Systems IPLA program you select
- The applicable Value Unit Exhibit
- The applicable terms
- Whether your current mainframes are full capacity or sub-capacity

For more information about the Value Unit Exhibit for the z Systems IPLA program you selected, refer to the Ordering information section.

<table>
<thead>
<tr>
<th>Program number</th>
<th>Program name</th>
<th>Terms</th>
<th>Parent, if applicable</th>
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<td>5655-W65</td>
<td>WebSphere Application Server for z/OS</td>
<td>Execution based</td>
<td>Not applicable</td>
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</table>

Full-capacity mainframes

In cases where full capacity is applicable, the following terms apply.

Execution-based, z/OS-based, full-machine-based: The required capacity of a z Systems IPLA program with these terms equals the MSU-rated capacity of the machines where the z Systems IPLA program executes.

For more information about mainframe MSU-rated capacities, visit the IBM z Systems Software Contracts website.

Reference-based: The required license capacity of a z Systems IPLA program with these terms equals the license capacity of the applicable monthly license charge (MLC) program. This MLC program is called the parent program.

Sub-capacity mainframes

In cases where sub-capacity is applicable, the following terms apply.

Execution-based: The required capacity of a z Systems IPLA sub-capacity program with these terms equals the capacity of the LPARs where the z Systems IPLA program executes.

z/OS-based: The required license capacity of a z Systems IPLA program with these terms equals the license capacity of z/OS on the machines where the z Systems IPLA program executes.

Reference-based: The required license capacity of a z Systems IPLA program with these terms equals the license capacity of the applicable monthly license charge (MLC) program. This MLC program is called the parent program.

Full-machine-based: The required license capacity of a z Systems IPLA program with full machine based terms equals the MSU-rated capacity of the machines where the z Systems IPLA program executes.

For more information about mainframe MSU-rated capacities, refer to The IBM z Systems Machines Exhibit, (Z125-3901), or visit the Mainframes section of the z Systems Exhibits website.

For additional information for products with reference-based terms, z Systems IPLA sub-capacity programs with reference-based terms adds value to the parent program across the environment, regardless of where in the environment the z Systems IPLA program executes.
An environment is defined as either a single or stand-alone machine or a qualified Parallel Sysplex(R). You may have one or more different environments across the enterprise. To determine the required license capacity for each z Systems IPLA program with referenced-based terms, each environment should be assessed separately.

When a z Systems IPLA sub-capacity program with reference-based terms is used in a qualified Parallel Sysplex environment, the required license capacity of the z Systems IPLA program must equal with the license capacity of the parent program across the Parallel Sysplex. Qualified Parallel Sysplex refers to one where MLC pricing is aggregated across the sysplex.

**Sub-capacity eligibility**

To be eligible for sub-capacity charging on select z Systems IPLA programs, you must first implement and comply with all terms of either sub-capacity Workload License Charges (WLC) or sub-capacity Entry Workload License Charges (EWLC). To implement sub-capacity WLC or EWLC, a machine must be z Systems (or equivalent). On that machine:

- All instances of the OS/390(R) operating system must be migrated to the z/OS operating systems.
- Any licenses for the OS/390 operating system must be discontinued.
- All instances of the z/OS operating systems must be running in z/Architecture(R) (64-bit) mode.

For that machine, you must create and submit a Sub-Capacity Report to IBM each month. Sub-Capacity Reports must be generated using the Sub-Capacity Reporting Tool (SCRT). For additional information or to obtain a copy of SCRT, refer to the z Systems Software Pricing website.

You must comply with all of the terms of the WLC or EWLC offering, whichever is applicable:

- The complete terms and conditions of sub-capacity WLC are defined in the IBM Customer Agreement - Attachment for z Systems Workload License Charges (Z125-6516).
- The complete terms and conditions for sub-capacity EWLC are defined in the IBM Customer Agreement - Attachment for EWLC, TWLC, zELC, and z/OS.e License Charges (Z125-6587).

Additionally, you must sign and comply with the terms and conditions specified in the amendment to the IPLA contract - Amendment for Amendment for IBM z Systems Programs Sub-Capacity Pricing (Z125-6929). Once the amendment is signed, the terms in the amendment replace any and all previous z Systems IPLA sub-capacity terms and conditions.

**Sub-capacity terms and conditions**

IBM Getting Started Sub-capacity Pricing for z/OS IPLA Software applies. IBM z Systems Collocated Application Pricing for z/OS may also apply. For more details, refer to Software Announcement 215-174, dated April 07, 2015.

**Sub-capacity utilization determination**

Sub-capacity utilization is determined based on the product's own execution as reported to IBM in accordance with the requirements for reporting sub-capacity utilization for products.

**On/Off CoD**
To be eligible for On/Off CoD pricing, you must be enabled for temporary capacity on the corresponding hardware, and the required contract, Attachment for IBM z Systems On/Off Capacity on Demand (Z125-7883) must be signed prior to use.

**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 lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective.

**Important:** IBM does not warrant that any systems, products, or services are immune from, or will make your enterprise immune from, the malicious or illegal conduct of any party.

**Prices**

The prices are unchanged by this announcement.

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