

Enable the integration of business critical PL/I applications with modern web technology

Highlights

- Enables the creation, maintenance, and modernization of business-critical PL/I applications on z/OS® systems
- Utilizes the latest IBM® zEnterprise™ EC12 hardware architecture
- Delivers enhanced middleware support through SQL preprocessor improvements
- Leverages productivity with new or changed options, built-in functions, and statements
- Integrates with IBM Rational® Developer for System z® and IBM Rational Team Concert™ providing a modern development environment and a collaborative team environment

To make your business as agile and responsive as possible, you need to be able to connect your business components end to end with your suppliers, partners, employees, and customers, and you need to position your organization to quickly take advantage of opportunities by responding to challenges in real time. Unfortunately, many IT systems were not designed to address these objectives or to support web services and service-oriented architecture (SOA) that are essential for transforming an enterprise into a flexible business with an open, integrated operating environment. You could rewrite your applications in a different programming language in order to address these objectives, but rewriting your applications would be expensive and risky, and it could potentially create downtime that you just cannot afford. To remain competitive, you need a complete business strategy to help you modernize, integrate, and manage existing applications, data, and skill sets to ease your organization's transformation into a more flexible business.

Integrates, modernizes and manages assets with web services capabilities

With Enterprise PL/I for z/OS V4 you can leverage more than 30 years of IBM experience in application development to facilitate your new On Demand Business endeavors, helping integrate PL/I and web-based business processes in web services, XML, Java, and PL/I applications. This compiler's interoperability lets you capitalize on existing IT investment while smoothly incorporating new, web-based applications as part of your organizations infrastructure.

Enterprise PL/I for z/OS is an integral part of the comprehensive application development environment delivered with IBM Rational Developer for IBM System z software—providing a robust, integrated development environment (IDE) for PL/I and connecting web services; Java Platform, Enterprise Edition (Java EE) applications; and traditional business processes.

IBM Enterprise PL/I is a leading-edge, z/OS-based compiler that maximizes middleware by providing access to IBM DB2®, CICS®, and IMS™ systems.

Enterprise PL/I for z/OS V4 underscores the continuing IBM commitment to the PL/I programming language on the z/OS platform.

Facilitates web interoperability using XML parsing and generation

Enterprise PL/I for z/OS allows existing PL/I transactions to process inbound and outbound XML data directly within the applications. It provides a high-speed parser that enables PL/I programs to parse XML documents in Extended Binary Coded Decimal Interchange Code

(EBCDIC), American Standard Code for Information Interchange (ASCII) or Unicode Transformation Format (UTF)-16. Using the IBM PL/I Simple API for XML (SAX) parser, this XML can then be passed to other applications, even those running on other platforms—including IBM IMS and IBM CICS environments.

Enterprise PL/I for z/OS also supports the generation of XML using a built-in function, so you are able to dump the contents of a structure as XML into a buffer. You can use this XML code to enhance existing high-performance IMS and CICS transactions that have been written in PL/I. By enabling these transactions to send and receive XML documents, you are better positioned to support a business-to-business (B2B) environment.

Utilizes the latest IBM zEnterprise EC12 hardware architecture

For improved application performance, Enterprise PL/I for z/OS V4.3 utilizes instructions that are available on the IBM zEnterprise EC12 models. Specifically, the machines add new instructions that are supported by the following facilities:

- Execution-hint
- Load-and-trap
- Miscellaneous-instructions-extension

The compiler also uses some of these new instructions to improve the performance of some conversions from PICTURE to FIXED BIN and from PICTURE to FLOAT.

The V4.3 release also provides these additional performance improvements:

- The compiler generates inline code:
 - For VERIFY and SEARCH when they have 3 arguments and the second is a single character
 - For additional conversions from PICTURE to DFP
 - For additional conversions from BIT to CHAR
 - For additional conversions from BIT to WIDECHAR
- The compiler generates faster code for TRIM of FIXED DEC.
- The compiler gets and sets nonnative string lengths faster.

Delivers enhanced middleware support through SQL preprocessor support

In Enterprise PL/I for z/OS, with the integrated SQL preprocessor, it is not necessary to run a separate job step that precompiles EXEC SQL statements into PL/I code. Instead, the compile step will handle EXEC SQL statements in the same way that it handles any use of the MACRO facility. Also, because debugging is against the source code fed to the compiler, you can debug against the source you wrote (rather than what the SQL preprocessor produced).

In Enterprise PL/I for z/OS V4.3, the SQL preprocessor:

- Supports the ONEPASS SQL option
- Supports the DEPRECATE option so you no longer need to use the following EXEC SQL statements:
 - EXPLAIN
 - GRANT
 - REVOKE
 - SET CURRENT SQLID

Several other improvements in this release provide enhanced middleware support:

- Host variable declarations can use some restricted expressions.
- Variables declared with the LIKE attribute can be used as host variables.
- The listing of the EXEC SQL statement is now displayed in a readable format that is similar to the original source.
- Missing and extraneous END statements are now flagged to make it easier to track syntax errors that cause problems in resolving host variable references.
- EXEC SQL DECLARE statements are allowed at the PACKAGE level of a program.

Leverages productivity with new or changed options

With the 4.3 release, the Enterprise PL/I for z/OS compiler provides the following new or changed options and suboptions:

Table 1. New or changed options and suboptions

New or changed option and suboption	Description
CASERULES	Allows the user to specify casing rules for PL/I keywords
DEPRECATE(STMT)	Allows a wide range of statements to be deprecated
DEPRECATENEXT	Allows staged deprecation of any items in the DEPRECATE option
IGNORE(ASSERT)	Instructs the compiler to ignore ALL ASSERT statements
MSGSUMMARY	Lets the user request that the listing include a brief summary of what messages were produced in a compilation and, optionally, where those messages appeared
RTCHECK	Expanded to allow checking for dereferencing of pointers equal to the old NULL() value (that is, pointers with the hexadecimal value of 'FF00000')
RULES	Enhanced so that you can flag the use of the following items: <ul style="list-style-type: none"> • CONTROLLED variables by using its NOCONTROLLED suboption • RECURSIVE procedures by using its NORECURSIVE suboption • Nested procedures occurring in between executable code by using its NOLAXNESTED suboption • Assignments of the form $x = y = z$ as part of its NOLAXIF suboption

Other productivity enhancements

With the 4.3 release, the Enterprise PL/I for z/OS compiler also has the following productivity enhancements:

- The new built-in functions UTF8, UTF8TOCHAR, and UTF8TOWCHAR
 - Provide the ability to convert between CHAR and UTF-8 with sensitivity to the CODEPAGE option
 - Simplify conversions between UTF-8 and UTF-16
 - Allow users to create UTF-8 literals and to initialize static variables with UTF-8 data
- The new ALLCOMPARE built-in function supports comparing structures.
- The new ASSERT statement helps make it easier to verify the correctness of a program.
- The maximum length of WIDECHAR strings is increased to 32767 so that it matches the limit for CHAR and BIT.
- The SUPPRESS attribute can now be used on PROCEDURE statements so that you can direct the compiler not to flag selected procedures when the procedures are unreferenced or in violation of RULES(NOLAXNESTED).
- The support of handles is enhanced as follows:
 - Comparing handles with the same associated type
 - Adding to and subtracting from handles with sensitivity to the associated structure type
 - Computing the difference of two handles with sensitivity to the associated structure type

Other Enterprise PL/I for z/OS features

Provides compatibility for PL/I programs and Java components

Because it supports the Institute of Electrical and Electronics Engineers (IEEE) decimal floating point standard, the Enterprise PL/I for z/OS compiler can receive, manipulate and send Java data without any translation.

Built-in functions provide support for UTF-8 and UTF-16. One example is the ULENGTH function, which returns the number of UTF-8 or UTF-16 characters in a CHAR or WIDECHAR string, respectively. A second important example is the USUBSTR function which returns the UTF-sensitive substring of a CHAR or WIDECHAR string.

To further improve Java interoperability, Enterprise PL/I for z/OS provides a thread-safe PL/I library and multithreading statements (ATTACH, WAIT, DETACH) as part of the PL/I language supported by the compiler.

Ease into migration

Enterprise PL/I for z/OS gives you a migration path from OS PL/I V2 and PL/I for MVS™ and VM compilers. Our Compiler and Runtime Migration Guide provides you with all the information that you might need to move your applications to a new run-time (run-time migration) and to compile your source programs with the new compiler (compiler migration). Migrating to the new compiler allows your existing applications to take advantage of new functions.

Workstation-based development

Rational Developer for System z provides an interactive, workstation-based environment to help you create, maintain, and reuse applications. Rational Developer for System z includes support

for traditional development using PL/I, but also has the ability to generate web services interfaces from PL/I constructs to ease creation of web services from existing PL/I applications.

Rational Developer for System z provides a workstation interface to Debug Tool, and is also integrated with IBM File Manager and Fault Analyzer. File Manager integration enables you to access Keyed Sequence Data Set (KSDS) files from the Rational Developer for System z workbench, and gives you the ability to browse and update data sets. By integrating with Fault Analyzer, Rational Developer for System z enables you to browse Fault Analyzer ABEND reports on CICS, IMS, batch, Java, WebSphere®, and other run times. Rational Developer for System z supports Enterprise PL/I and helps improve the productivity of PL/I developers. Within the workbench you can show the context-sensitive editor, as well as a compiler listing that indicates errors from a compilation. A simple click on a diagnostic message takes you to the line of source code in error.

IBM Rational Team Concert for System z, also an Eclipse-based offering, allows you to boost programming productivity with a collaborative team environment that makes it easy to manage your distributed software projects and teams.

PL/I across platforms

Enterprise PL/I for z/OS is part of a family of compatible compilers, application development tools, and maintenance tools. Along with Enterprise PL/I for z/OS, IBM offers PL/I compilers for multiple platforms as well as IBM File Manager, IBM Fault Analyzer, and Debug Tool. As mentioned previously, the recommended workstation-based development environment is Rational Developer for System z.

Summary of features and benefits

The following table summarizes the features and benefits for Enterprise PL/I for z/OS V4.

Table 2. Summary of new features and benefits

Feature	Benefit
Designed for System z and the zEnterprise System	<p>Utilizes the latest z/Architecture® through EC12 facilities, the UNROLL compiler option and changes to inline code generation for improved application performance.</p> <p>zEnterprise EC12 hardware exploitation has been implemented in the Enterprise PL/I for z/OS compiler through the addition of the ARCHITECTURE(10) option. This option enables the use of new instructions such as Decimal-Floating-Point Zoned-Conversion Facility and tuning of the compiler generated code. These optimizations provide better performance for applications deployed to zEnterprise EC12 server without requiring changes to the application source code. An average performance improvement of 31% was observed for Common CPU-Intensive PL/I benchmarks that run on zEnterprise EC12 over the same benchmarks that run on zEnterprise z196¹.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Performance improvements are based on internal IBM lab measurements using the ARCH(9) and OPT(3) compiler options. Performance results for specific applications will vary; some factors affecting performance are the source code and the compiler options specified.
Maximizes middleware	Delivers enhanced middleware support through SQL preprocessor improvements to facilitate application integration and modernization.
Modernize applications	XML generation through the XMLCHAR built-in function, supports XML attributes and the omission of null values for improved web interoperability.
Improves application debugging	The compiler supports typed structures in the IBM Debug Tool so that you can debug code containing not only untyped structures but also code using HANDLE variables and typed structures.
Leverages productivity with new options and messages	New or changed messages and options improve your programming practices. New or changed rules option gives you more control over your code.
Provides compatibility for PL/I and Java components	<ul style="list-style-type: none"> • Supports the Institute of Electrical and Electronics Engineers (IEEE) decimal floating point standard, so the compiler can receive, manipulate and send Java data without any translation • Supports UTF-8 and UTF-16 through built-in functions. • Provides a thread-safe PL/I library and multithreading statements (ATTACH, WAIT, DETACH) as part of the PL/I language for improved Java interoperability

Table 2. Summary of new features and benefits (continued)

Feature	Benefit
Ease of migration	Gives you a migration path from OS PL/I V2 and PL/I for MVS and VM compilers to easily move your applications to a new run-time (run-time migration) and to compile your source programs with the new compiler (compiler migration). Migrating to the new compiler allows your existing applications to take advantage of new functions.
Integrates with a modern development environment	Rational Developer for System z (a separate product) boosts developer productivity by making it easy to edit, compile, and debug PL/I applications from your workstation.
Integrates with a collaborative team environment	Rational Team Concert (a separate product) unifies development teams by making it easy to manage your distributed software projects and teams.

Software requirements

The following table presents the system requirements for Enterprise PL/I for z/OS V4.3.

Table 3. Software requirements

Operating system	Software	Hardware
z/OS	<p>z/OS V1.12 (5694-A01), or later is a required licensed program.</p> <p>Depending on the functions used, one or more of the following programs might be required:</p> <ul style="list-style-type: none"> • CICS Transaction Server for z/OS, V4 (5655-S97) • CICS Transaction Server for z/OS, V3 (5655-M15) • Enterprise COBOL for z/OS, V4 (5655-S71) • Enterprise COBOL for z/OS and OS/390®, V3 (5655-G53) • IBM DB2 10 for z/OS (5605-DB2) • IBM DB2 10 for z/OS VUE (5697-P31) • IBM DB2 V9 for z/OS (5635-DB2) • IBM DB2 V9 for z/OS VUE (5697-P12) • IBM Debug Tool for z/OS, V12 (5655-W70) • IBM Debug Tool for z/OS, V11 (5655-W45) • IBM Debug Tool for z/OS, V10 (5655-V50) • IBM DFSORT element of z/OS (5694-A01) • IBM High Level Assembler/MVS and VM and VSE (5696-234) • IBM IMS V12 (5635-A03) • IBM IMS V11 (5635-A02) • IBM IMS V10 (5635-A01) • For C/C++ with Enterprise PL/I -- You must use the XL C/C++ feature of z/OS (5694-A01). 	<p>Enterprise PL/I for z/OS, V4.3 will run on the following IBM servers:</p> <ul style="list-style-type: none"> • IBM zEnterprise EC12 • zEnterprise 196 • z10™ Enterprise Class, or follow-on product • IBM System z9® Enterprise Class or z9 Business Class, or follow-on product • zSeries® z990, or follow-on product • zSeries z890, or follow-on product

Upgrade to Enterprise PL/I for z/OS V4.3

Upgrade to the latest Enterprise PL/I compiler and get more out of your zEnterprise investment and stay ahead of competitors on the technology curve.

For more information

To learn more about IBM Enterprise PL/I for z/OS V4.3, contact your IBM representative or IBM Business Partner, or visit: ibm.com/software/awdtools/pli/plizos.

To learn more about IBM Rational Developer for System z software, visit: ibm.com/software/rational/products/developer/systemz/

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