With IBM® Enterprise PL/I for z/OS® V4R4, you can get more than 30 years of IBM experience in application development to facilitate your new On Demand Business endeavors. Enterprise PL/I helps you integrate PL/I and web-based business processes in web services, XML, Java™, and PL/I applications. This interoperability of the compiler lets you capitalize on existing IT investment while smoothly incorporating new, web-based applications as part of your organization’s infrastructure.

Enterprise PL/I is a leading-edge, IBM z/OS-based compiler that helps you create and maintain mission-critical, line-of-business PL/I applications to execute on your z/OS systems. It offers access to IBM DB2®, IBM CICS®, and IBM IMS™ systems, and other data and transaction systems.

### Highlights

The following enhancements and improvements are added in Enterprise PL/I for z/OS V4R4:

- Improved middleware support for IMS and DB2
- Further exploitation of the zEC12 hardware architecture to help improve the performance of the code generated under the ARCH(10) option
- Improved UTF-16 and multithreading support
- Productivity and usability improvements, many of which are client requested

### Middleware support enhancements

Enterprise PL/I for z/OS V4R4 contains the following enhancements on middleware support:

- The compiler supports the following new built-in functions that perform base 64 encoding and decoding, which can be useful in some XML processing, particularly processing done by IMS:
  - BASE64ENCODE8
  - BASE64ENCODE16
- The compiler supports the following new built-in functions that “clean” and “normalize” XML. These functions enable each of the IMS XML converters to be reduced by more than 64 KB in size.
  - XMLCLEAN
  - WHITESPACECOLLAPSE
  - WHITESPACEREPLACE
- The compiler introduces a new PL/I attribute that creates typed OFFSET variables. That provides for significantly reduced storage usage for sparse arrays such as those often found in structures representing complex XML documents.
- The SQL preprocessor issues better diagnostic messages for incorrect programs and creates, under an option, an empty database request module (DBRM) for programs that contain no SQL statements.

### Performance improvements

Enterprise PL/I for z/OS V4R4 contains the following performance improvements:

- The compiler now generates its assembler listing faster and reduces overall compile time and processor consumption.
- The compiler further exploits the zEC12 processor so that the program generated with the ARCH(10) option is expected to run faster.
- The compiler further exploits the DFP-zoned instructions to help improve the performance of some conversions between PICTURE and FIXED BIN variables when the PICTURE has a precision between 9 and 18 and contains no drifting, no exponent, no overpunch, and no credit symbols.
- This release enhances UTF-16 support by improving the code generated for some WCHAR assignment statements.
Modernization

Enterprise PL/I for z/OS V4R4 contains the following modernization features:

- PL/I now supports UTF-16 with the new WIDEPIC attribute. WIDEPIC variables serve the same purpose as the PICTURE variables with the difference that the data is held as UTF-16 rather than as simple character data.
- The new CANCEL THREAD statement improves the multithreading support in PL/I.

Productivity enhancements requested by compiler users

Enterprise PL/I for z/OS V4R4 contains improvements that help to increase productivity and that are made according to user requests:

- PL/I has supported a subset of the full DEFAULT statement as defined in the PL/I standard. With this release, the compiler supports the full DEFAULT statement that provides you with more control over when and which defaults are applied to the variables.
- The compiler now supports the INDEXR built-in function, which provides the same functionality of indexing into a string with the INDEX built-in function with the difference that INDEXR starts from the right rather than the left.
- The compiler now flags declarations for variables that do not have the STATIC attribute but have more than 100 INITIAL items. This helps you identify variables that probably should be declared as STATIC, and if it would be correct to change them to STATIC, both the compiler and the user code could perform better.
- The ALLOCATE built-in function is extended so that an AREA may be specified as an optional second argument. With this extension, you can allocate arbitrarily sized chunks of storage from AREAs and from heap storage.
- The compiler supports the following new compiler option and suboption to give you more control of their code quality:
  - The NULLSTRPTR suboption of the DEFAULT option prohibits assignments of '' to POINTER variables.
  - The NOINCLUDE option prohibits the use of the %INCLUDE and %XINCLUDE statements outside the MACRO preprocessor.

- The macro preprocessor now supports the new CALL statement. You can use it in macro procedures to invoke other macro procedures that are subroutines rather than functions. This statement increases the usefulness of procedures by using the ANSWER statement and enhances the usage and flexibility of the macro preprocessor.

Specified operating environment for Enterprise PL/I

This section lists the hardware and software requirements for IBM Enterprise PL/I for z/OS, Version 4 Release 4.

Hardware requirements

The Enterprise PL/I for z/OS V4R4 compiler runs only on the following (and later) IBM servers:

- IBM zEnterprise® EC12 (zEC12) or zEnterprise BC12 (zBC12), or later
- zEnterprise 196 or zEnterprise 114, or later
- z10™ Enterprise Class or z10 Business Class, or later
- IBM System z9® Enterprise Class or z9 Business Class, or later
- zSeries® or z990, or later
- zSeries or z890, or later

The Enterprise PL/I for z/OS V4R4 compiler generates code that runs only on the following (and later) IBM servers:

- IBM zEnterprise EC12 (zEC12) or zEnterprise BC12 (zBC12), or later
- zEnterprise 196 or zEnterprise 114, or later
- z10 Enterprise Class or z10 Business Class, or later
- IBM System z9 Enterprise Class or z9 Business Class, or later
- zSeries or z990, or later
- zSeries or z890, or later

Software requirements

Enterprise PL/I for z/OS V4R4 runs under the control of, or in conjunction with, the currently supported releases of the following programs and their subsequent releases or their equivalents. For more information about programs listed in the following section that require program temporary fixes (PTFs), see the Program Directory and the preventive service planning (PSP) bucket.
**Required licensed programs**
Enterprise PL/I and its generated object programs run under the following zSeries operating system:
- z/OS, Version 2 Release 1 (5650-ZOS), or later
- z/OS, Version 1 Release 1.13 (5694-A01) or later

**Optional licensed programs**
If you use the following programs with Enterprise PL/I, you must use the minimum release or later as stated in the following list:
- CICS Transaction Server for z/OS, Version 5 (5655-Y04)
- CICS Transaction Server for z/OS, Version 4 (5655-S97)
- CICS Transaction Server for z/OS, Version 3 (5655-M15)
- Enterprise COBOL for z/OS Version 5 (5655-W32)
- Enterprise COBOL for z/OS Version 4 (5655-S71)
- Enterprise COBOL for z/OS and OS/390® Version 3 (5655-G53)
- IBM DB2 10 for z/OS (5605-DB2)
- IBM DB2 10 for z/OS VUE (5697-P31)
- IBM DB2 for z/OS Version 9 (5635-DB2)
- IBM DB2 for z/OS Version 9 VUE (5697-P12)
- IBM Debug Tool for z/OS, Version 12 (5655-W70)
- IBM Debug Tool for z/OS, Version 11 (5655-W65)
- Debug Tool for z/OS, Version 8 (5655-S17)
- Debug Tool Utilities and Advanced Functions for z/OS, Version 8 (5655-S16)
- IBM DFSORT element of z/OS (5694-A01, 5650-ZOS)
- IBM z/OS High Level Assembler/MVS and VM and VSE (5696-234)
- Fault Analyzer for z/OS, Version 12.1 (5655-W69)
- Fault Analyzer for z/OS, Version 11.1 (5655-W46)
- IBM File Manager for z/OS, Version 12.1 (5655-W68)
- IBM File Manager for z/OS, Version 11.1 (5655-W47)
- IBM Application Performance Analyzer for z/OS, Version 12.1 (5655-W71)
- IBM Application Performance Analyzer for z/OS, Version 11.1 (5697-Q03)
- IBM IMS Version 13 (5635-A04)
- IBM IMS Version 12 (5635-A03)
- IBM IMS Version 11 (5635-A02)
- IBM Rational® Developer for System z®, Version 8 (5724-T07)
- OS PL/I Version 2 Release 3 (5668-909, 5668-910, 5668-911)
- PL/I for MVS™ & VM, Version 1 Release 1 (5688-235)
- IBM VS FORTRAN, Version 2 (5668-806, 5688-087)
- For C/C++ with Enterprise PL/I, you must use the XL C/C++ feature of z/OS, Version 2 Release 1 (5650-ZOS), or later.

**Full Function Offering**
As of September 8, 2008, IBM no longer offers the Full Function Offering with any version of the Enterprise PL/I for z/OS compiler.

The debugger functionality can be replaced by Debug Tool for z/OS.

**Security, auditability, and control**
The announced program uses the security and auditability features of the host operating system software. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

**Licensed program materials availability**
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This document is a W3C Recommendation. This fifth edition is not a new version of XML. As a convenience to readers, it incorporates the changes dictated by the accumulated errata (available at http://www.w3.org/XML/xml-v10-4e-errata) to the Fourth Edition of XML 1.0, dated 16 August 2006. In particular, erratum [E09]
relaxes the restrictions on element and attribute names, thereby providing in XML 1.0 the major end user benefit currently achievable only by using XML 1.1. As a consequence, many possible documents which were not well-formed according to previous editions of this specification are now well-formed, and previously invalid documents using the newly-allowed name characters in, for example, ID attributes, are now valid.

This edition supersedes the previous W3C Recommendation of 16 August 2006.

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An implementation report is available at http://www.w3.org/XML/2008/01/xml10-5e-implementation.html. A Test Suite is maintained to help assessing conformance to this specification.

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