Enterprise PL/I for z/OS, Version 3 Release 8 — Program Number 5655–H31

With IBM® Enterprise PL/I for z/OS® V3R8, you can leverage more than 30 years of IBM experience in application development to facilitate your new On Demand Business endeavors, helping you to 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 is a leading-edge, z/OS-based compiler that helps you create and maintain mission-critical, line-of-business PL/I applications you want to execute on your z/OS systems. It gives you access to IBM DB2®, IBM CICS®, and IBM IMS™ systems, and other data and transaction systems.

**Highlights**

Enterprise PL/I for z/OS V3R8 has added the following enhancements and improvements in this release:

- Hardware exploitation including support for z10 architecture
- Performance improvements
- Support for XML System Services
- Improved SQL support
- Numerous new built-in functions
- Numerous user requirements
- New and improved messages

**Performance and hardware improvements**

Enterprise PL/I for z/OS V3R8 contains the following performance and hardware improvements:

- ARCH(8) and TUNE(8) support of the z10 hardware
- PFPO instruction exploitation (to inline conversions between hex, binary and decimal float)
- HGPR option to allow more exploitation of 64-bit registers in 32-bit code
- GOFF object support
- DFP math built-in functions support
- Exploit the MVCLE hardware instruction in code generated for the LEFT built-in function
- Exploit the SRSTU hardware instruction in code generated for the INDEX built-in function when applied to the WIDECIIAR
- CMPAT(V3) and other support of 8-byte array bounds, structure sizes, etc. for stage 1 of 64-bit support

**Support for XML System Services**

Enterprise PL/I for z/OS V3R8 contains the new PLISAXC built-in subroutine which uses the XML System Services parser. This improves on PLISAXB by providing support for:

- XML documents larger than 2 Gigabytes
- documents encoded in UTF-8
- namespaces

**Improved SQL support**

Enterprise PL/I for z/OS V3R8 contains a number of improvements for SQL support:

- **DIMACROSS attribute**
  The DIMACROSS option specifies a DIMENSION attribute on a structure which will be removed from the structure and propagated to its children. This attribute is particularly useful with SQL multi-row fetch.

- **DDSQLOption**
  The DDSQLOption option allows the user to specify a DDNAME that will be used instead of SYSLIB as the DDNAME to searched for files named in SQL INCLUDE statements. This eases the move from the DB2 precompiler to the SQL preprocessor.

- **INCONLY** support in the SQL preprocessor
  The SQL preprocessor will now support an INCONLY option. This option acts similar to the SQLONLY option in the MACRO
preprocessor: under PP(SQL('INONLY')) only EXEC SQL INCLUDE statements will be processed and all other EXEC SQL statements will be left as is.

- **LISTVIEW** option
  The SOURCE, AFTERMACRO, etc. suboptions of the TEST option must now be specified as suboptions of the new LISTVIEW option. This will permit these suboptions to be used without incurring any of the overhead of the TEST option. LISTVIEW(AFTERSQL) is useful with some SQL tools.

- **DBCS** support
  DBCS is now supported by the integrated SQL preprocessor (as it had already been supported by the MACRO and CICS preprocessors).

### Numerous new and improved built-in functions

Enterprise PL/I for z/OS V3R8 contains a number of new built-in functions in addition to improvements for existing built-in functions.

The following new built-in functions will provide better support for UTF-8 and UTF-16:

- **ULENGTH**
  Returns the number of UTF-8 or UTF-16 characters in a CHAR or WIDECHAR string, respectively.

- **ULENGTH8**
  Returns the CHAR length if the UTF-16 characters in a WIDECHAR string were converted to UTF-8.

- **ULENGTH16**
  Returns the WIDECHAR length if the UTF-8 characters in a CHAR string were converted to UTF-16.

- **UPOS**
  Returns the position of the nth UTF-8 or UTF-16 character in a CHAR or WIDECHAR string, respectively.

- **USUBSTR**
  Returns the substring starting with the i’th UTF-8 or UTF-16 character and of length j such characters in a CHAR or WIDECHAR string respectively.

- **UVALID**
  Tests if a CHAR or WIDECHAR string contains valid UTF-8 or UTF-16 data, respectively.

- **UWIDTH**
  Returns the width of the nth UTF-8 or UTF-16 character in a CHAR or WIDECHAR string, respectively.

More user control of built-in function behavior provided by:

- the new **HEX** suboption of the **USAGE** option
- the new **SUBSTR** suboption of the **USAGE** option
- the new **FOFLONMULT** suboption of the **DECIMAL** option

New or improved built-in functions include:

- **ONLINE** built-in function
  The ONLINE built-in function returns a FIXED BIN(31) value which is the user source line number where a condition was raised.

- **REG12** built-in function
  This built-in function returns the current value of register 12.

- **FLOATDEC, FLOATBIN, FIXEDDEC, FIXEDBIN** built-ins
  These built-in functions are useful in specifying with one built-in function the attributes desired for a numerical result. They can be particularly useful in avoiding the two conversions that might result if, for example, the DECIMAL and then the FLOAT built-in function were used to convert a FIXED BIN to FLOAT DEC. They are also particularly useful with decimal floating point (DFP).

- **RE_PATTERN** improvements
  These three additional DB2 date-time formats will be supported:
  - YY-MM-DD
  - MM/DD/YY
  - DD.MM.YY

### Numerous user requirements

Enterprise PL/I for z/OS V3R8 satisfies these user requirements:

- **Remove calls to null procedures**
  Some programming practices cause the production version of the code to contain calls to procedures consisting of only a PROCEDURE and an END statement (although their test version may have debugging or logging code, for example). The compiler will now detect if any internal procedures are null and then eliminate any calls to them.

- **Support INCDIR under batch**
This function allows hfs files to be included in batch compilations.

- Widen listing header to all of listing
  Instead of truncating the listing header to 25 bytes, the compiler will now place the first 43 bytes from line one in the header line of all pages after page one.
- Support NOINIT on substructures
- Allow for trailing OPTIONAL arguments to be omitted in calls to internal procedures
- NULLSTRADDR suboption to DEFAULT

New and improved messages

Enterprise PL/I for z/OS V3R8 contains these new and improved messages:

- Subdivide message IBM2610
  Message IBM2610 flags built-in references where one argument is FIXED DEC and the other is FIXED BIN or FLOAT. This message will be subdivided to cover the following three scenarios:
  - IBM2610 now flags only the mixing of FIXED DEC and FIXED BIN
  - IBM2631 will flag the mixing of FIXED DEC and FLOAT BIN
  - IBM2632 will flag the mixing of FIXED DEC and FLOAT DEC

- Suppress uninitialized warnings
  The new SUPPRESS attribute will allow a suboption of UNINIT and/or UNREF to be specified. When specified, these will cause the compiler to suppress any messages saying the associated variables are uninitialized or unreferenced, respectively.

- NOLAXENTRY suboption to the RULES option
  The RULES option will be expanded to have a new suboption: (NO)LAXENTRY. Under RULES(NOLAXENTRY) unprototyped ENTRY declares will be flagged with message IBM2434.

- Operations producing FIXED(p,q) with q > p
  The compiler will now flag with a warning message code where the result of a FIXED operation has a scale factor greater than its precision.

- LINESIZE - RECSIZE mismatches
  The compiler will now flag with an error message code where an OPEN specifies a LINESIZE that is too large for the LRECL, etc. specified in the file’s declare.

- POINTER / FIXED BIN overlays

The compiler will now flag with a warning message code where a POINTER or an OFFSET is declared as BASED on the ADDR of a FIXED BIN (or vice versa). This will help identify code that will need to be changed before moving to 64-bit.

- OR, NOT or QUOTE with no valid characters
  The compiler will now recognize and flag this error with a severe message.

- INITIAL with PARAMETER
  The compiler will now flag this error with a unique error message.

- INITIAL with DEFINED
  The compiler will now flag this error with a unique error message.

- Allocations where an aggregate is mapped via a library call
  The compiler will now flag such code with an informational message.

Specified operating environment for Enterprise PL/I

This section lists the hardware and software requirements for IBM Enterprise PL/I for z/OS, Version 3 Release 8.

Hardware requirements

Enterprise PL/I for z/OS V3R8 will run only on the following (and follow-on) IBM servers:

- z10 Enterprise Class
- IBM System z9 Enterprise Class or z9 Business Class
- zSeries® z900 or z990
- zSeries z800 or z890

Machine requirements

Enterprise PL/I and its compiled object programs can run on any IBM zSeries processor supported by the operating systems listed under “Programming Requirements.”

Programming requirements

Enterprise PL/I for z/OS V3R8 runs under the control of, or in conjunction with, the currently supported releases of the following IBM programs and their subsequent releases or their equivalents unless otherwise announced by IBM.

For more information on programs listed below that require program temporary fixes (PTFs), see
the Enterprise PL/I Program Directory and the preventive support planning (PSP) bucket.

**Required licensed programs**

Enterprise PL/I and its generated object programs run under the following zSeries operating system:

- z/OS, Version 1 Release 8 (5694-A01) or later

The use of Decimal Floating Point (or DFP) requires ARCH(7) (or better) machines and z/OS, Version 1 Release 9 (5694-A01) or later.

IBM Language Environment® provides the execution environment and library of PL/I run-time services required to compile and run PL/I applications using Enterprise PL/I.

For installation on z/OS, the following is required:

- z/OS SMP/E element

Support for DB2 integrated coprocessor requires:

- DB2® Universal Database™ for z/OS, Version 9 (5635-DB2)
- DB2 Universal Database for z/OS, Version 8 (5625-DB2)
- DB2 Universal Database for OS/390® and z/OS, Version 7 (5675-DB2)

Support for the integrated CICS preprocessor requires:

- CICS Transaction Server for z/OS, Version 2 (5697-E93)
- CICS Transaction Server for z/OS, Version 3 (5655-M15)

**Optional licensed programs**

If you use the following programs with Enterprise PL/I, you must use the minimum release or later as stated below:

- CICS Transaction Server for z/OS, Version 2 (5697-E93)
- CICS Transaction Server for z/OS, Version 3 (5655-M15)
  
  (CICS TS V2 or CICS TS V3 required if using Integrated CICS preprocessor support.)
- CICS Transaction Server for OS/390, Version 1 (5655-147)
- DB2 Universal Database for OS/390 and z/OS, Version 7 (5675-DB2)
- DB2 Universal Database for z/OS, Version 8 (5625-DB2)
- DB2 Universal Database for z/OS, Version 9 (5635-DB2)
  
  (DB2 V7, DB2 V8 or DB2 V9 Required if using Integrated DB2 preprocessor support.)
- Debug Tool for z/OS, Version 5 Release 1 (5655-M18)
- Debug Tool Utilities and Advanced Functions for z/OS, Version 5 Release 1 (5655-M19)
- Debug Tool for z/OS, Version 6 Release 1 (5655-P14)
- Debug Tool Utilities and Advanced Functions for z/OS, Version 6 Release 1 (5655-P15)
- Debug Tool for z/OS, Version 7 Release 1 (5655-R44)
- Debug Tool Utilities and Advanced Functions for z/OS, Version 7 Release 1 (5655-R45)
- Debug Tool for z/OS, Version 8 Release 1 (5655-S17)
- Debug Tool Utilities and Advanced Functions for z/OS, Version 8 Release 1 (5655-S16)
- OS PL/I V2.3 (5668-909, 5668-910, 5668-911)
- PL/I for MVS™ & VM, Release 1.1 (5688-235)
- Enterprise PL/I for z/OS and OS/390, Version 3 (5655-H31)
- COBOL for MVS & VM, Release 1.2 (5688-197)
- Enterprise COBOL for z/OS and OS/390, Version 3 (5655-G53)
- VS FORTRAN, Version 2 (5668-806, 5668-087)
- z/OS High Level Assembler (5696-234)
- IMS V7 (5655-B01)
- IMS V8 (5655-C56)
- IMS V9 (5655-J38)
- IMS V10 (5635-A01)
- IBM DFSORT™ element of z/OS (5694-A01)

**Full Function VS Alternate Function offerings**

As of September 8, 2008, the Full Function Offering is no longer being offered with any version of the Enterprise PL/I for z/OS compiler. The Enterprise PL/I for z/OS compiler Alternate Function Offering is still being offered.

Depending on the debugger functionality required, the debugger can be replaced by either Debug Tool for z/OS V8.1, Announcement 207-205, dated September 18, 2007, or Debug Tool

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

Restricted materials — No. This licensed program is available without source licensed program materials. It is available in object code only.

Supplemental terms

Designated Machine Identification

Designated Machine Identification Required — Yes.

Testing period

• Basic License: Not applicable.
• DSLO License: Not applicable.

Installation or location license

Not applicable. A separate license is required for each machine on which the licensed program will be used.

Use-based charges/usage restriction

Not applicable.

Usage restriction

Not applicable.

Type/duration of program services

• Central Service.
• Until discontinued by IBM with a minimum of six months’ written notice.

Authorization for copy and use on home/portable computer

Not applicable for this program.

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