Improve application performance and developer productivity using the latest IBM z/OS XL C/C++ compiler

Highlights

z/OS® V2R3 XL C/C++ delivers the following features:

- Exploits IBM z14™ (z14) through new vector built-in functions and options for improved application performance
- Provides performance and usability enhancements in Metal C
- Delivers the SOS info utility for diagnosing problems and analyzing the usage of the compiler features
- Provides the STACKPROTECT option to protect against malicious code or programming errors that overwrite or corrupt the stack

The IBM® z/OS XL C/C++ compiler helps you create and maintain critical business applications written in C or C++, maximize application performance, and improve developer productivity. z/OS XL C/C++ can transform C or C++ source code to fully exploit your existing IBM Z® and optimize workloads through smarter computing capabilities with the new IBM z14 hardware. Built-in functions, performance-tuned libraries, and language constructs are some of the features that simplify programming and boost application runtime performance.

IBM works constantly to improve compiler components, including front-ends, high-level optimizers, and low-level optimizers. By upgrading your compiler, you can keep up with new language standards and extensions, advancements in hardware technology, usability features, and advances in optimization with minimal or no source code changes. IBM compilers offer a cost-effective way to get more out of existing technology and stay ahead of competitors on the technology curve.

z/OS XL C/C++ is a leading-edge compiler that maximizes middleware by providing interoperability with IBM DB2®, CICS®, and IMS™ systems.

z/OS V2R3 XL C/C++ reinforces the continuing IBM commitment to the C and C++ programming languages on the z/OS platform.

Exploits IBM z14 through built-in functions and options

z/OS V2R3 XL C/C++ provides the ARCH(12) option to produce code that uses instructions available on z14. The compiler can use the instructions that are supported by the vector enhancement facility 1 and the vector packed decimal facility when the ARCH(12) and VECTOR options are in effect. A number of vector built-in functions are added or extended in z/OS V2R3 XL C/C++ to support the vector float data type under ARCH(12). A new TUNE(12) option is added to generate code that is optimized for z14 processors.

Provides performance and usability enhancements in Metal C

IBM z/OS Metal C delivers performance and usability enhancements for z/OS V2R3. The new flag on bit 2 in Flag Set 4 indicates the presence of the optional field that contains the offset of the end of current CSECT. The new flag on bit 3 in Flag Set 4 indicates the presence of the optional field that contains the offset of the debug data block. A new debug data block is added for each CSECT, which can be used to check whether the debug side file matches the object file. You can also declare a function pointer with the new __fdptr keyword so that this function pointer points to a Metal C function descriptor.

Delivers the SOS info utility for diagnosing problems and analyzing the usage of the compiler features

The SOS info utility decodes Saved Options String (SOS) information from an executable file and produces a list of compiler options that were used to control the code generation of a program.

Using this utility, you can obtain the options information from an executable file without the need to produce and maintain compiler listings to extract the options information. You can use the options information to diagnose problems and analyze the usage of the compiler features. The SOS information is produced for each compilation unit that is compiled with z/OS XL C/C++ V1R10 or later.

Provides the STACKPROTECT option to protect against malicious code or programming errors that overwrite or corrupt the stack

The STACKPROTECT option generates extra code to protect procedures with vulnerable objects against stack corruption. The INFO(STP) option generates a warning message for each procedure that the compiler determines does not need stack protection.

Summary of features and benefits

The following table summarizes the features and benefits for z/OS XL C/C++.

Table 1. Summary of features and benefits

Feature	Benefit
Designed for IBM platforms	• Exploits z/Architecture® systems.
Improved industry language standards compliance	• Facilitates porting from other platforms to z/OS. • Provides compiler diagnostics to help you achieve the level of conformance to a particular programming language standard. • Supports commonly used IBM and non-IBM language extensions.
Improved industry-leading optimizations	• Supports multiple optimization levels to tailor the optimization aggressiveness for your applications. You can use the following advanced optimization techniques to gain significant performance improvements: – High-order transformation (HOT) loop optimization – Interprocedural analysis (IPA) optimization – Profile-directed feedback (PDF) optimization
Enhanced middleware support	• Exploits the latest middleware (DB2, CICS, IMS) to facilitate application integration and modernization.
High-performance mathematical computing support	• Supports IBM Mathematical Acceleration Subsystem (MASS) and Automatically Tuned Linear Algebra Software (ATLAS) libraries for high-performance mathematical computing.
Improved low-level programming support	• Provides system programming capabilities through Metal C. With Metal C you can insert HLASM instructions into C source, specify custom function prologs and epilogs, and generate HLASM source, making it easier to integrate new code with existing HLASM programs.
Exploits hardware support for IEEE 754 decimal floating-point data	• Improves the accuracy and performance of decimal floating-point calculations for commercial applications.

Table 1. Summary of features and benefits (continued)

Feature	Benefit
Additional built-in functions	• Provides access to the newest and most efficient hardware operations at the source level. • Simplifies the development effort for creating and maintaining high-performance applications.
Integrated development environment	• Integrates with IBM Application Delivery Foundation for z Systems (separate product) to provide a modern development environment: – IBM Fault Analyzer for z/OS – IBM Developer for z Systems Enterprise Edition including IBM Debug for z Systems – IBM Application Performance Analyzer for z/OS
Collaborative team environment	• Rational Team Concert™ (separate product) unifies development teams by making it easy to manage your distributed software projects and teams.
IBM service and support	• Provides responsive platform and cross-platform support that meets or exceeds customer expectations. • Teams with subject matter experts in compiler development for dedicated support excellence.

System requirements

The following table presents the hardware requirements for z/OS V2R3 XL C/C++.

Table 2. System requirements

Operating system	Hardware
z/OS V2R3 **Note:** z/OS XL C/C++ is an optionally priced feature of z/OS.	• IBM z14 (z14) • IBM z13™ (z13) • IBM z13s (z13s) • IBM zEnterprise® EC12 (zEC12) • IBM zEnterprise BC12 (zBC12) **Note:** For a complete description of z/OS software prerequisites, see *z/OS Planning for Installation (GA32-0890-30)*.

License options

To help you optimize software licensing costs, IBM can assist in identifying the licenses that best suits your organization. For additional information on the types of licenses available for z/OS, see:

www.ibm.com/systems/z/resources/swprice/index.html

Ordering information

IBM z/OS XL C/C++ is an optional priced feature of z/OS. z/OS XL C/C++ is available through the Shopz website:

www.ibm.com/software/shopzseries

where it is listed as “XL C/C++”.

z/OS XL C/C++ is supported on z/OS at the same level. For more information about the support lifecycle of z/OS, see:

www.ibm.com/software/support/lifecycle/index_z.html

Upgrade now

Upgrade to the latest z/OS operating system and get the latest XL C/C++ compiler to leverage your IBM Z investment and stay ahead of competitors on the technology curve.

For more information

To learn more about the z/OS V2R3 XL C/C++, contact your IBM representative or IBM Business Partner, or visit the z/OS XL C/C++ website:

https://www.ibm.com/us-en/marketplace/xl-cpp-compiler-zos

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