IBM z/OS V2R4 XL C/C++

IBM

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

Highlights

IBM® z/OS® V2R4 XL C/C++ delivers the following features:

- Exploits IBM z15™ (z15) through new compiler suboptions, hardware built-in functions, and vector built-in functions for improved application performance
- Generates object code to run with z/OS V2R4 using the new TARGET(zOSV2R4) suboption

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® hardware and optimize workloads through smarter computing capabilities with the new IBM z15 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®, IBM CICS®, and IBM IMS™.

z/OS V2R4 XL C/C++ reinforces the continuing IBM commitment to the C and C++ programming languages on the z/OS platform.

IBM z15 exploitation

z/OS V2R4 XL C/C++ delivers the following enhancements to exploit IBM z15:

Take advantage of new hardware architecture

- The ARCH(13) suboption is added to produce code that uses instructions available on the 8561-xxx (IBM z15) models in z/Architecture® mode.
- The TUNE(13) suboption is added to generate code that is executable on all models, but is optimized for the 8561-xxx (IBM z15) models.

Go beyond the C/C++ language and access more hardware functions

The hardware built-in functions `__mvcrl`, `__popcnt4`, and `__popcnt8` are added and supported at a minimum ARCH level of 13. To learn more about these built-in functions, see "Using hardware built-in functions" in the *z/OS XL C/C++ Programming Guide*.

Get enhanced vector programming support

The following vector built-in functions are added:

- vec_float: Vector Convert from integer to float
- vec_revb: Vector Byte Reverse
- vec_reve: Vector Reverse Elements
- vec_search_string_cc: Vector Search String
- vec_search_string_until_zero_cc: Vector Search String Until Zero
- vec_sldb: Vector Shift Left Double by Bit
- vec_srdb: Vector Shift Right Double by Bit

The following vector built-in functions are extended to support the `vector float` data type at a minimum ARCH level of 13:

- vec_signed: Vector Convert floating point to signed
- vec_unsigned: Vector Convert floating point to unsigned

For detailed information, see the *z/OS XL C/C++ Programming Guide* and *z/OS XL C/C++ User's Guide*.

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 servers and z/OS	• Exploits IBM Z servers (which are listed below in the "System requirements" section) and z/OS V2R4.
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. • Learn more about the language standard support in z/OS XL C/C++ from the *z/OS XL C/C++ Language Reference*.

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.
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	• IBM Application Delivery Foundation for z/OS (separate product) delivers the core set of tools to help accelerate the delivery of z/OS applications, to help perform tasks efficiently while incorporating agile development practices. It includes the following products:
	  – IBM Fault Analyzer for z/OS
	  – IBM Developer for z/OS Enterprise Edition including IBM Debug for z/OS
	  – 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.

Table 1: Summary of features and benefits(continued)	
Feature	**Benefit**
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 V2R4 XL C/C++.

Table 2: System requirements	
Operating system	**Hardware**
z/OS V2R4 **Note:** z/OS XL C/C++ is an optionally priced feature of z/OS.	• IBM z15 (z15) • IBM z14™ (z14) • IBM z14 Model ZR1 (z14 ZR1) • 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 (GA32-0890-40)*.

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:

https://www.ibm.com/it-infrastructure/z/software/pricing

Ordering information

IBM z/OS XL C/C++ is an optional priced feature of z/OS. To purchase z/OS, contact your IBM representative and obtain the product from the IBM Shopz website at https://www-03.ibm.com/software/shopzseries/ShopzSeries_public.wss.

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

Upgrade now

Upgrade to the latest z/OS operating system and get the latest z/OS 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 z/OS V2R4 XL C/C++, contact your IBM representative or IBM Business Partner, or visit the product page of IBM z/OS XL C/C++.

You can also provide feedback or post questions on C/C++ compilers in the IBM Z and LinuxONE Community.