IBM XL C/C++ Enterprise Edition supports POWER5 architecture

Overview

IBM XL C/C++ Enterprise Edition V7.0 for AIX® is an optimizing, standards-based compiler for the AIX operating system running on the PowerPC Architecture™. The compiler is a professional programming tool for creating and maintaining 32- and 64-bit applications in the C and C++ programming languages.

XL C/C++ Enterprise Edition V7.0 for AIX is the follow-on release to IBM VisualAge® C++ Professional V6.0 for AIX. The IBM C/C++ compiler is re-branded from VisualAge C++ to XL C/C++ Enterprise Edition. The XL family of IBM compilers now includes XL C/C++ Enterprise Edition (AIX and PASE), XL C/C++ Advanced Edition (Mac OS X), XL C Enterprise Edition (AIX and PASE), XL Fortran Enterprise Edition (AIX and PASE), and XL Fortran Advanced Edition (Mac OS X). The C/C++ family of products also includes z/OS® C/C++ and C/C++ for z/VM®.

The XL C/C++ compiler has the ability to optimize and tune your application code for superior execution on RS/6000® and IBM @server pSeries® machines supporting the POWER™, POWER3™, POWER4™, and PowerPC® architectures. With V7.0, the XL C/C++ compiler will exploit, optimize, and tune for the latest POWER5™ architecture for the pSeries machines. In addition, V7.0 will also exploit, optimize, and tune for the PowerPC 970 processor within the IBM @server BladeCenter™ JS20.

Starting with V7.0, XL C/C++ ships the IBM Mathematical Acceleration Subsystem (MASS) libraries of tuned mathematical intrinsic functions. Included are the MASS scalar library and MASS vector library.

The XL C/C++ compiler continues to track to the latest international standards:


- XL C/C++ supports OpenMP API V2.0.

The C compiler within XL C/C++ supports the recent C standard committee extensions to the C99 standard with support for the UTF-16 and UTF-32 Unicode data types. The C++ compiler also supports these new data types for compatibility with C.

Additional V7.0 enhancements include:

- Support for Boost libraries and STLport libraries
- Additional language extensions related to GNU C and C++
- Accommodation of third-party C++ run-time libraries
- Documentation ease-of-use improvements
- Additional compiler options
- Installation on Portable Application Solutions Environment (i5/OS PASE)

Key prerequisites

- RS/6000 or pSeries machine supported by AIX 5L V5.1, AIX 5L V5.2, or AIX 5L for POWER V5.3
- Disk space: up to 350 MB

Program number

- 5724-I11
- 5733-M45
- 5733-M46

At a glance

XL C/C++ Enterprise Edition for AIX, the new name for IBM’s C/C++ compiler, exploits the POWER5 architecture and improves ease of use.

New for Version 7.0 are:

- Specific optimizations for the latest POWER5 and PowerPC 970 hardware architectures
- Support for the latest international and industry programming language standards
- Support for OpenMP V2.0
- Inclusion of the IBM Mathematical Acceleration Subsystem (MASS) libraries
- Information Center with searchable HTML documentation files
- Additional support for Unicode data types
- New built-in functions, new pragmas, and additional compiler options

Planned availability dates

- August 31, 2004, for electronic software delivery
- September 17, 2004, for physical delivery of Passport Advantage software ordered via part numbers
- October 1, 2004, for physical delivery of configured software ordered via product ID and feature number
With the re-branding of VisualAge C++ to XL C/C++ Enterprise Edition, the IBM C/C++ compiler continues to get better, especially in the categories of performance and optimization, conformance to industry standards, and ease of use.

**Optimizations exploiting latest POWER5 and PowerPC 970 platforms**

XL C/C++ Enterprise Edition V7.0 for AIX offers a number of new optimization and performance-tuning features that exploit all PowerPC systems, including the latest POWER5 and PowerPC 970 hardware architectures. The -qarch and -qtune options now support optimizations specifically for POWER5 and PowerPC 970. The -qarch option controls the particular instructions that are generated for the specified machine architecture, while -qtune adjusts the instructions, scheduling, and other optimizations to enhance performance on the specified hardware. These options work together to generate application code that gives the best performance for the specified architecture. The coordination of these options has been enhanced in V7.0 to add support for the POWER5 and PowerPC 970 hardware platforms and for greater ease of use.

A number of new built-in functions are introduced in XL C/C++ Enterprise Edition V7.0 for AIX. For example, four new built-in functions are introduced for floating-point division. These software implementations of the floating-point division algorithms take advantage of the PowerPC Architecture™ and can be significantly faster than corresponding hardware instructions when used in a vector context. While the new built-ins are supplied on all PowerPC systems, on POWER5 systems, the functions use the POWER5 instructions to take advantage of the POWER5 hardware.

New pragma directives are supported in V7.0, especially for loop unrolling optimizations. Also supported are additional optimization utilities related to the profile-directed feedback (PDF) compilation process.

**XL C/C++ adheres to the latest international and industry standards**

XL C/C++ builds on official industry standards, so your code can be ported easily among a variety of platforms and implementations.


Also starting in V7.0, XL C/C++ adds support for unordered associative containers, in conformance with the Draft Technical Report on Standard Library Extensions (TR1).

**OpenMP API 2.0 support for C, C++, and Fortran:** The OpenMP Application Programming Interface (API) is a portable, scalable programming model that provides a standard interface for developing multithreaded, shared-memory parallel applications in C, C++, and Fortran. The specification is defined by the OpenMP organization, a group of major computer hardware and software vendors, which includes IBM. XL C/C++ Enterprise Edition V7.0 for AIX is compliant with OpenMP V2.0. The compiler recognizes and generates code for the following OpenMP V2.0 elements:

- Common delimiter for multiple clauses in the #pragma omp directive
- The num_threads clause
- The copyprivate clause
- The threadprivate static block length arrays
- Redundant declaration of private variables
- Timing routines omp_get_wtime and omp_get_wtick

For more information about the OpenMP specification, visit the OpenMP Web site at http://www.openmp.org

**Enhanced Unicode and National Language Support:** As recommended in a recent report from the C standards committee, the C compiler extends the C99 standard to add new data types to support UTF-16 and UTF-32 literals. The C++ compiler also supports these new data types for compatibility with C.

**Support for Boost and STLport libraries:** The XL C/C++ Enterprise Edition compiler delivers a high level of compatibility with the 1.30.2 Boost and the STLport libraries. These libraries were created to provide a set of reusable, open source C++ libraries that are suitable for standardization. Support for the Boost and STLport libraries provides increased productivity and better portability to these industry popular C++ libraries. For more information on the Boost libraries, see the Boost Web site at http://www.boost.org

For more information on the STLport libraries, refer to the STLport Web site at http://www.stlport.org

**Ease of use**

**New C++ compiler invocation:** The compiler invocation xlc++ has been added for portability among all supported platforms. The invocation is equivalent to the invocation xlC on all platforms and is recommended. The invocation xlC continues to be fully supported.

The compiler invocation gxlC++ is also included for invocation compatibility with gcc.

**Documentation improvements:** XL C/C++ now ships with an Information Center of searchable HTML files. The search engine of the new help system may produce hits with greater relevance per search than that of previous releases. The Information Center can be installed on an intranet. The product help system is also viewable at http://www.ibm.com/software/awdtools/vacpp/library

Starting with V7.0, a man page is provided for compiler invocation commands and for each command-line utility. The man page for the compiler invocations replaces the text help file provided in earlier releases.

**Template registry improvements:** The C++ compiler uses a batch template instantiation scheme that involves a registry of template instantiations. In this release, the compiler adds versioning information to the template registry file that is created. This information is used by the compiler internally to track which version of the template registry file format should be used.
IBM Mathematical Acceleration Subsystem (MASS) libraries included in XL C/C++

Starting with V7.0, XL C/C++ ships the IBM MASS libraries of tuned mathematical intrinsic functions. The MASS scalar library contains an accelerated set of frequently used math intrinsic functions in the AIX system library. The MASS vector libraries contain tuned and thread-safe intrinsic functions that can be used with either Fortran or C applications. The general vector library libmassv.a contains vector functions that will run on all computers in the pSeries and RS/6000 families, while libmassvp3.a and libmassvp4.a each contain a subset of libmassv.a functions that have been specifically tuned for the POWER3 and POWER4 processors, respectively.

Portable Application Solutions Environment (i5/OS PASE) Support

XL C/C++ Enterprise Edition V7.0 for AIX supports i5/OS PASE on IBM @server iSeries™. i5/OS PASE provides a broad set of AIX interfaces, in a runtime that allows many AIX binaries to execute directly on the PowerPC processor of iSeries. An application running on i5/OS PASE is fully integrated with OS/400® and i5/OS work management, security, backup, file systems, and database. As of V5R2 OS/400 and V5R3 i5/OS, i5/OS PASE supports the installation of XL C/C++ Enterprise Edition V7.0 for AIX. You can now compile applications directly within i5/OS PASE—a separate AIX system is not required. Note that a separate and additional user authorization (license) is required for installation and use of the XL C/C++ Enterprise Edition V7.0 for AIX on i5/OS PASE.

Additional Version 7.0 enhancements

SMP thread binding: Shared memory parallelization (SMP) is implemented by creating user threads that are scheduled to run on kernel threads by the operating system. For some workloads, binding threads to processors can improve performance by avoiding the costs of thread migration. Currently, the AIX operating system takes care of scheduling of a thread. With the SMP thread binding feature, programs that are dynamically linked to the SMP run-time can have their threads bound to processors as specified by the user.

Language extensions related to GNU C and C++: A subset of features related to GNU C/C++ were introduced into the IBM C/C++ compiler in order to help with porting of code that was originally written for GCC. In this release, support for further GNU C features has been added.

Accommodation of third-party C++ run-time libraries: The C++ compiler can compile C++ applications so that the application supports only the core language. In this way the application can link with C++ run-time libraries from third-party vendors. Archive files have been added to the Version 7.0 compiler to enable this function.

Product positioning

XL C/C++ Enterprise Edition V7.0 for AIX is part of the IBM family of C and C++ compilers that support a number of platforms (IBM and non-IBM). It joins XL C for AIX on the pSeries, XL C/C++ for Linux™ on iSeries and pSeries, C/C++ for z/OS, ILE C/C++ for OS/400 on iSeries, C/C++ for z/VM, and XL C/C++ Advanced Edition for Mac OS X on Apple’s Power Mac. The code base for all of these compilers (C and C++) is the same. This will make source-level portability of your applications from these platforms to AIX easier than ever.

In addition, the C and the C++ compilers support the very latest ISO/IEC international standards. The C compiler supports the latest ISO C 1999 (International Standard ISO/IEC 9899:1999) standard. XL C/C++ Enterprise Edition V7.0 for AIX has included the latest C standards committee recommendation for Unicode support. The C++ compiler supports the latest revised 2003 international C++ standard ISO/IEC 14882:2003(E), Programming Languages — C++. With representation from IBM’s compiler development team on the ISO/ANSI C committee and the ISO/ANSI C++ committee, IBM is in a position to understand the latest updates, clarifications, and recommendations to the C and C++ standards. Support of programming language standards allows for maximum portability of your source code among a variety of compiler implementations.

Trademarks

POWER, POWER3, POWER4, POWER5, BladeCenter, PowerPC Architecture, and iSeries are trademarks of International Business Machines Corporation in the United States or other countries or both.
AIX, PowerPC, VisualAge, z/OS, z/VM, RS/6000, the e-business logo, pSeries, and OS/400 are registered trademarks of International Business Machines Corporation in the United States or other countries or both.
Linux is a trademark of Linus Torvalds in the United States, other countries or both
Other company, product, and service names may be trademarks or service marks of others.
Offering Information

Product information is available via the Offering Information Web site

http://www.ibm.com/common/ssi

Also, visit the Passport Advantage® Web site

http://www.ibm.com/software/passportadvantage

Publications

No publications are shipped with this program.

The IBM Publications Center

http://www.ibm.com/shop/publications/order

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. Payment options for orders are via credit card (in the U.S.) or customer number for 50 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries free of charge.

The IBM Publications Notification System (PNS) enables subscribers to set up profiles of interest by order number/product number. PNS subscribers automatically receive e-mail notifications of all new publications defined in their profiles. These may then be ordered/downloaded from the Publications Center

http://service5.boulder.ibm.com/pnsrege.nsf/messages/welcome

The site is available in English and Canadian French.

Displayable softcopy publications: The publications for IBM XL C/C++ Enterprise Edition V7.0 for AIX® are offered in displayable softcopy form.

All unlicensed manuals are included.

The files are shipped on the CD-ROM.

Technical information

Hardware requirements

- For XL C/C++ Enterprise Edition V7.0 for AIX:
  - System: RS/6000® or pSeries® machine supported by AIX® 5L V5.1, AIX 5L V5.2, or AIX 5L for POWER™ V5.3
  - Disk space: up to 350 MB

Software requirements

- For XL C/C++ Enterprise Edition V7.0 for AIX:
  - AIX 5L V5.1, AIX 5L V5.2, or AIX 5L for POWER V5.3
  - Common Desktop Environment (CDE):
    -- CDE is required for applications and tools with an AIX graphical interface.
  - Viewers to access and display the documentation such as:
    -- Frames-capable browser to access HTML documentation
    -- A PDF viewer

- For XL C/C++ Enterprise Edition V7.0 for AIX using i5/OS PASE:
  - V5R2 OS/400® or V5R3 i5/OS
  - 5722SS1 Option 33 —i5/OS PASE
  - 5799-PTL — iSeries Tools for Developers PRPQ contains PERL, which is required for compiler installation

Planning information

Web information

- For information regarding IBM XL C/C++ and VisualAge® C++, visit
  http://www.ibm.com/software/awdtools/vacpp

- For information regarding IBM application development, visit
  http://www.ibm.com/software/awdtools/

Packaging: The IBM XL C/C++ Enterprise Edition V7.0 for AIX package contains:

- One CD-ROM containing the XL C/C++ Enterprise Edition V7.0 for AIX compiler support
- Passport Advantage Customer Letter
- Passport Advantage Media Pack Pointer Sheet

Security, auditability, and control

IBM XL C/C++ Enterprise Edition V7.0 for AIX uses the security and auditability features of the host hardware or software. The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.
Ordering information

This product is only available via Passport Advantage. It is not available as shrinkwrap.

- Product Group: IBM XL C/C++
- Product Identifier Description: IBM XL C/C++
- PID: 5724-I11
- Product Category: XL C/C++

IBM XL C/C++ Enterprise Edition V7.0 is a server product that has one charge unit: Authorized User.

It is available in fixed order quantities of one authorized user.

Passport Advantage

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<th>Program name/description</th>
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Passport Advantage customer: Media pack entitlement details: Customers with active Maintenance or Subscription for the following products are entitled to receive the corresponding media pack.

Entitled maintenance offerings description

VisualAge C++

Media pack description | Part number |
-----------------------|-------------|
XL C/C++ Enterprise Edition V7 Media Pack Multilingual | BA0CXML     |

Basic license: To order the programs described in this announcement for 5724-I11, specify the type-model number and the applicable features from the following tables. The medium feature (CD-ROM) only needs to be specified as required.

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Single Pallet Delivery: Single Pallet Delivery consolidates RS/6000 hardware, AIX, and selected AIX licensed program orders into a single delivery.

IBM XL C/C++ Enterprise Edition V7.0 for AIX will be included in Single Pallet Delivery. The IBM XL C/C++ Enterprise Edition V7.0 for AIX product will have its media consolidated with the RS/6000 system unit into a single delivery. The software orders affected are those ordered using the program number 5724-I11 "Built-to-Order" structure, designated as Single Pallet Delivery and tied to the same preinstalled RS/6000 system order.

IBM XL C/C++ Enterprise Edition V7.0 for AIX is not available preinstalled. This product will be included as part of Single Pallet Delivery but must have the feature number 3483 designated on the individual program product (5724-I11) orders.

Single Pallet Delivery feature number

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This software license includes Software Maintenance, previously referred to as Software Subscription and Technical Support.

Extending coverage for a total of three years from date of acquisition may be elected. Order the program number, feature number, and quantity to extend coverage for your software licenses. If maintenance has expired, specify the After-license feature number.

The following tables contain the PIDs and feature numbers for VisualAge C++ V6.0 that were previously announced in 2002 (refer to the reference information that follows). The information is presented again for your convenience during the ordering process.

For additional information on IBM VisualAge C++ V6.0, refer to Software Announcement 202-162, dated July 2, 2002.

Maintenance IASP PID: 1 Year 5733-M45

Use Authorizations: (to be ordered in quantity)

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Maintenance IASP PID: 3 Year 5733-M46

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**Maintenance offering customer:** Media supply entitlement details: Customers with active Software Maintenance (5733-M45 or 5733-M46) for VisualAge C++ V6.0 are entitled to receive XL C/C++ Enterprise Edition V7.0 for AIX at no additional charge. Eligible customers should add the applicable CD-ROM media supply feature number from the following table to their existing maintenance record.

**Entitled maintenance offerings description**

VisualAge C++ Professional for AIX

**Description**

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**Customization options:** Select the appropriate feature numbers to customize your order with delivery options desired. These features can be specified on the initial or MES orders.

**Example:** If publications are not desired for the initial order, specify feature number 3470 to ship media only. For future updates, specify feature number 3480 to ship media updates only. If, in the future, publication updates are required, order an MES to remove feature number 3480; then, the publications will ship with the next release of the program.

**Description**

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<td>Customer expedite process charge ($30 charge for each product)</td>
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</table>

Expedite shipments will be processed to receive 72-hour delivery from the time IBM Software Delivery and Fulfillment (SDF) receives the order. SDF will then ship the order via overnight air transportation.

**Terms and conditions**

This product is only available via Passport Advantage. It is not available as shrinkwrap.

**Licensing:** IBM International Program License Agreement. Proofs of Entitlement (PoE) are required for all authorized use. Part number products only, offered outside of Passport Advantage, where applicable, are license only and do not include Software Maintenance.

This software license includes Software Maintenance, previously referred to as Software Subscription and Technical Support.

The following agreements apply for maintenance and do not require customer signatures:

- IBM Agreement for Acquisition of Support (Z125-6011)
- Addendum for Support (Software Maintenance) for Select iSeries and pSeries Programs (Z125-6495)

**Limited warranty applies:** Yes

**Warranty:** This program has warranty for a minimum of one year from acquisition from IBM or authorized IBM Business Partner. The warranty provided to the customer, for at least one year from acquisition, is access to databases (read Web sites) for program information and FAQs, including any known fixes to defects, which the customer can download or obtain otherwise and install at leisure.

**Program technical support:** Technical support of a program product will be available for a minimum of three years from the general availability date, as long as your Software Maintenance is in effect. This technical support allows you to obtain assistance (via telephone or electronic means) from IBM for product-specific, task-oriented questions regarding the installation and operation of the program product. Software Maintenance also provides you with access to updates, releases, and versions of the program. Customers will be notified, via announcement letter, of discontinuance of support with 12 months’ notice. If you require additional technical support from IBM, including an extension of support beyond the discontinuance date, contact your IBM representative or IBM Business Partner. This extension may be available for a fee.

**Money-back guarantee:** If for any reason you are dissatisfied with the program, return it within 30 days from the invoice date, to the party (either IBM or its reseller) from whom you acquired it, for a refund. This applies only to your first acquisition of the program.

**Copy and use on home/portable computer:** Yes

**Volume orders (IVO):** Yes, contact your IBM representative.

**Passport Advantage applies:** Yes, and through the Passport Advantage Web site at [http://www.ibm.com/software/passportadvantage](http://www.ibm.com/software/passportadvantage)

**Software Maintenance applies:** Yes.

Software Maintenance, previously referred to as Software Subscription and Technical Support, is now included in the Passport Advantage Agreement. Installation and technical support for the product announced in this letter is provided by the Software Maintenance offering of the IBM International Passport Advantage Agreement. This fee service enhances customer productivity by providing voice or electronic access into the IBM support organizations.
IBM includes one year of Software Maintenance with the initial license acquisition of each program acquired. The initial period of Software Maintenance can be extended by the purchase of a renewal option.

While your Software Maintenance is in effect, IBM provides you assistance for your routine, short duration installation and usage (how-to) questions; and code-related questions. IBM provides assistance via telephone and, if available, electronic access, only to your information systems (IS) technical support personnel during the normal business hours (published prime shift hours) of your IBM support center. (This assistance is not available to your end users.) IBM provides Severity 1 assistance 24 hours a day, every day of the year. For additional details, consult your IBM Software Support Guide at

http://techsupport.services.ibm.com/guides/handbook.html

Software Maintenance does not include assistance for the design and development of applications, your use of programs in other than their specified operating environment, or failures caused by products for which IBM is not responsible under this agreement.

For more information about the Passport Advantage Agreement, refer to the IBM International Passport Advantage Agreement Software Announcement 201-202, dated July 10, 2001, or visit the Passport Advantage Web site at

http://www.ibm.com/software/passportadvantage

All distributed software licenses include Software Maintenance (Software Subscription and Technical Support) for a period of 12 months from the date of acquisition, providing a streamlined way to acquire IBM software and assure technical support coverage for all licenses. Extending coverage for a total of three years from date of acquisition may be elected. For additional information, refer to Changes to Distributed Software Products Model for Products Outside Passport Advantage Software Announcement 201-201, dated July 10, 2001.

AIX/UNIX® upgrade protection applies: No

Entitled upgrade for current AIX/UNIX upgrade protection licensees: No

Variable charges apply: No

Educational allowance available: Yes, 15% education allowance applies to qualified education institution customers.

### Prices

#### Passport Advantage

For Passport Advantage information and charges, contact your IBM representative or authorized IBM Business Partner. Additional information is also available on the following Passport Advantage Web site

http://www.ibm.com/software/passportadvantage

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<th>Description</th>
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