



# IBM XL Fortran for AIX , V14.1 delivers support for additional programming standards and industry specifications

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## At a glance

IBM® XL Fortran for AIX® is a standards-based, high-performance Fortran compiler with advanced optimizing features. It delivers a number of new features and enhancements:

- Compliance to ISO programming language standards including the Fortran 2003 standard and partial support for the Fortran 2008 standard
- Support for the OpenMP 3.1 industry specification
- Compile-time performance and scalability improvements
- Enhancements to the diagnostic reports that can help you identify opportunities to improve the performance of your applications
- Improved capability for debugging optimized code
- New and enhanced compiler options, directives, and intrinsics

## Overview

IBM XL compilers, such as XL Fortran for AIX are designed to optimize and tune your applications for execution on IBM Power® platforms. They help unleash the full power of your IT investment, create and maintain critical business and scientific applications, maximize application performance, and improve developer productivity. The performance gain from years of compiler optimization experience is seen in the continuous release-to-release compiler improvements that support the POWER4 processor through to the POWER5, POWER6®, and POWER7® processors.

As a standards-based compiler, XL Fortran for AIX, V14.1 is designed to be fully compliant with FORTRAN 77, Fortran 90, Fortran 95, and the Fortran 2003 programming language standards. With this release, XL Fortran for AIX adds initial support for the Fortran 2008 standard as well as full support for the OpenMP V3.1 industry specification.

IBM has a long history of delivering innovative, high-quality compiler products to the marketplace. Over the course of multiple releases, the IBM XL Fortran offered new functions, enhancements, and standards conformance to deliver the tools needed to develop and maintain smarter applications to meet critical business needs.

Enhancements in this compiler release include:

- Full support for the OpenMP3.1 industry standard to allow you to further exploit parallel programming

- Partial support for the latest Fortran 2008 programming language standard to provide you with additional functionality and to allow for maximum portability of your source code
- Compile time and scalability improvements especially for large applications
- Enhancements to compiler diagnostics and profiling reports to further help you improve the performance of your Fortran applications
- Improved capability for debugging optimized code
- New and enhanced compiler options, directives, and intrinsics for added flexibility

For ordering, contact your IBM representative or an IBM Business Partner. For more information contact the Americas Call Centers at 800-IBM-CALL (426-2255). Reference: RE001

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## Key prerequisites

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Systems: IBM Power System servers supported by

- IBM AIX 5.3 TL 5300-07 or higher
- IBM AIX 6.1
- IBM AIX 7.1
- IBM PASE for i V6.1 with PTF SI30636 or higher
- IBM PASE for i V7.1

Required hard disk space: 250 MB

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## Planned availability date

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- May 11, 2012: Electronic software delivery
- May 18, 2012: Physical software delivery on Passport Advantage® by part number
- June 8, 2012: Physical software delivery on Advanced Administrative System by product ID

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## Description

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IBM XL Fortran for AIX continues to deliver additional functionality and enhancements, including:

- Initial support for the latest Fortran 2008 standard
- Full support for the latest OpenMP 3.1 industry specification
- More performance and optimizations improvements
- New diagnostics report capability
- Improved capability for debugging optimized code
- Additional compiler options and directives.

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### Fortran 2008 Standard

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The Fortran 2008 programming language standard is an enhancement to the Fortran 2003 standard. With the last release of XL Fortran for AIX (V13.1), complete support of the Fortran 2003 standard is available. with XL Fortran V14.1, support for the latest Fortran 2008 standard begins with the implementation of selected features as follows:

- **ALLOCATE** enhancements -- The **MOLD=** specifier is added to the **ALLOCATE** statement. In addition, you can omit the bounds in the **ALLOCATE** statement if you provide `source_expr` in the **SOURCE=** or **MOLD=** specifier.

- Complex part designators -- Complex part designators are added in Fortran 2008. Using complex part designators, you can directly access the real or imaginary part of complex entities. You can use the designators instead of the `REAL()` and `IMAG()` intrinsics.
- Implied-shape arrays -- Implied-shape arrays are added in Fortran 2008. An implied-shape array inherits its shape from the constant expression in its declaration.
- Internal procedures as actual arguments or procedure pointer targets -- To conform with the Fortran 2008 standard, procedure pointers can now point to internal procedures. In addition, you can use internal procedures and pointers to internal procedures as actual arguments.
- Intrinsic types in the **TYPE()** type specifier -- The **TYPE()** type specifier is extended to declare entities of both derived type and intrinsic type.
- Pointer dummy argument enhancement -- In Fortran 2008, a dummy argument that has the `POINTER` and `INTENT(IN)` attributes can be an argument associated with a non-pointer actual argument that has the `TARGET` attribute.
- The declaration of multiple type-bound procedures in a single procedure statement -- In Fortran 2008, you can declare multiple type-bound procedures using one type-bound procedure statement.
- The **-qxlf2008=checkpresence** suboption
  - The **-qxlf2008=checkpresence** suboption is introduced to check the allocation status or pointer association status of actual arguments during argument association of optional dummy arguments.
- The **BLOCK** construct -- The **BLOCK** construct is added in Fortran 2008. It defines an executable block that can contain declarations.
- The **CONTIGUOUS** attribute and **IS\_CONTIGUOUS** intrinsic function
  - The **CONTIGUOUS** attribute specifies that the array elements in an array pointer or an assumed-shape array are not separated by other data objects. This guarantees that the array object is stored in contiguous memory.
  - The **IS\_CONTIGUOUS** intrinsic function is used to test whether an array is stored in contiguous memory.
- The **END** statement for internal and module subprograms -- In Fortran 2008, you can omit the **FUNCTION** and **SUBROUTINE** keywords on the **END** statements for internal and module subprograms.
- The **EXECUTE\_COMMAND\_LINE** intrinsic subroutine -- The **EXECUTE\_COMMAND\_LINE** subroutine is added in Fortran 2008. You can use it to pass a command to the operating system for execution.
- The **EXIT** statement -- The **EXIT** statement can now be used to terminate execution of one of the following constructs:
  - ASSOCIATED
  - BLOCK
  - DO
  - IF
  - SELECT CASE
  - SELECT TYPE
- The **HYPOT** intrinsic procedure -- The **HYPOT** intrinsic procedure is introduced to calculate the Euclidean distance between two values.
- The **ISO\_FORTRAN\_ENV** intrinsic module
  - The following constants are added:
    - **CHARACTER\_KINDS**
    - **INT8, INT16, INT32, and INT64**
    - **INTEGER\_KINDS**
    - **IOSTAT\_INQUIRE\_INTERNAL\_UNIT**
    - **LOGICAL\_KINDS**
    - **REAL32, REAL64, and REAL128**
    - **REAL\_KINDS**

- The following functions are added:
  - **COMPILER\_OPTIONS**
  - **COMPILER\_VERSION**
- The **LEADZ** and **TRAILZ** intrinsic procedures -- The **LEADZ** and **TRAILZ** intrinsic procedures are introduced to count the number of leading and trailing zeros in an integer.
- The math intrinsic procedures extension -- The following new intrinsic procedures are introduced:
  - **ACOSH**
  - **ASINH**
  - **ATANH**
  - **ERFC\_SCALED**
  - **LOG\_GAMMA**
- Complex arguments are now supported in the following intrinsic procedures:
  - **ACOS**
  - **ASIN**
  - **ATAN**
  - **COSH**
  - **SINH**
  - **TAN**
  - **TANH**
- The **NEWUNIT=** specifier
  - The **OPEN** statement is updated with the **NEWUNIT=** specifier to specify the unit number automatically. In the **BACKSPACE**, **CLOSE**, **ENDFILE**, **FLUSH**, **INQUIRE**, **OPEN**, **READ**, **REWIND**, and **WRITE** statements, the range of unit values now includes the **NEWUNIT** value.
- The **POPCNT** and **POPPAR** inquiry intrinsic functions
  - The **POPCNT** and **POPPAR** functions are updated to conform with the Fortran 2008 standard. They can now be used in constant expressions.
- The **RADIX=** argument
  - A **RADIX=** argument is added to the **SELECTED\_READ\_KIND** and **IEEE\_SELECTED\_REAL\_KIND** intrinsic procedures.
- The **STOP** and **ERROR STOP** statements -- The **STOP** statement is enhanced to take an integer or character constant expression as a stop code. The **STOP** statement initiates normal termination of a program while the **ERROR STOP** statement initiates error termination.

Support of programming language standards not only provides you with significant functionality but also allows for maximum portability of your source code among a variety of compiler implementations.

### **OpenMP 3.1**

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The OpenMP API supports multi-platform shared-memory parallel programming in Fortran, C, and C++ on many architectures including UNIX™ platforms and Microsoft™ Windows™ platforms. OpenMP is a portable, scalable programming model that provides parallel programmers a simple and flexible, standard interface for developing parallel applications for platforms ranging from the desktop to the supercomputer. The specification is defined by the OpenMP organization, a group of computer hardware and software vendors, including IBM. You can find more information about OpenMP specifications at

<http://www.openmp.org>

In the last release (V13.1), XL Fortran supported the full OpenMP V3.0 industry specification. In this release full support for latest OpenMP V3.1 is available. The

XL Fortran implementation is based on the IBM interpretation of the OpenMP Application Program Interface Version 3.1. The following updates to the V3.0 are made available:

- Adds **FINAL** and **MERGEABLE** clauses to the **TASK** construct to support optimization.
- Adds the **TASKYIELD** construct to allow users to specify where in the program task switching can be performed.
- Adds the **omp\_in\_final** runtime library routine to support specialization of final task regions.
- Extends the **ATOMIC** construct to include **READ**, **WRITE**, and **CAPTURE** forms; adds the **UPDATE** clause to apply the existing form of the **ATOMIC** construct.
- Allows dummy arguments with the **INTENT(IN)** attribute to be specified on the **FIRSTPRIVATE** clause.
- Allows unallocated allocatable arrays to be specified on the **COPYIN** clause.
- Allows Fortran 90 Pointers to be specified on the **FIRSTPRIVATE** clause.
- Adds the **OMP\_PROC\_BIND** environment variable to control whether OpenMP threads are allowed to move between processors.
- Extends the **OMP\_NUM\_THREADS** environment variable to specify the number of threads to use for nested parallel regions.

## Reports about compiler optimizations

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With the last release of XL Fortran, listing reports containing key compiler optimization information, are available. You can use this information to change your code so that the compiler can take advantage of additional optimizations for improving performance.

With this release, a number of enhancements are made to the listing reports.

- Compiler reports are now available in HTML format as well as XML format. The **-qlistfmt** option can now be used to generate XML or HTML reports. By default, this option now generates all of the available content if you do not specify the type of content. To view the HTML version of an XML report that was already generated, you can use the **genhtml** tool.
- Enhancements to profiling reports: New sections are added to your listing file to help you analyze your programs. When using the **-qreport** option with the **-qpdf2** option, you can get the following sections added to the listing file in the section entitled **PDF Report**:
  - Relevance of profiling data shows the relevance of the profiling data to the source code during the **-qpdf1** phase. The relevance is indicated by a number in the range of 0 - 100. The larger the number is, the more relevant the profiling data is to the source code, and the more performance gain can be achieved by using the profiling data.
  - Missing profiling data might include a warning message about missing profiling data. The warning message is issued for each function for which the compiler does not find profiling data.
  - Outdated profiling data might include a warning message about outdated profiling data. The compiler issues this warning message for each function that is modified after the **-qpdf1** phase. The warning message is also issued when the optimization level changes from the **-qpdf1** phase to the **-qpdf2** phase.
- Enhancements to **showpdf** reports
  - In addition to block-counter and call-counter profiling information currently provided, you can also use the **showpdf** utility to view cache-miss profiling and value profiling information. Value profiling and cache-miss profiling information can be displayed only in XML format. However, all the other types of profiling information can be displayed in either text or XML format.

In this release, the profile-directed feedback (PDF) information is saved in two files. One is a PDF map file that is generated during the **-qpdf1** phase, and the other is a PDF file that is generated during the execution of the resulting

application. You can run the **showpdf** utility to display the PDF information contained in these two files.

## **Compiler time performance and scalability improvements**

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- Internal improvements to the compiler (for example alias analysis) are made to speed up the gathering of information that is passed between the components within the compiler. This can help you obtain a faster compile time especially for applications that contain Fortran 90 array language and Fortran 90 modules.
- The amount of memory required for internal compiler functions such as pointer analysis and aliasing is reduced to help improve the efficiency of the compiler and subsequently make better use of your machine resources.
- Additional internal compiler components including the optimizer make use of the greater addressability of 64-bit, thereby improving compile time especially for larger applications.

## **Debugging optimized code improvements**

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Debugging information is generated by the compiler for use by a symbolic debugger and makes the program state available to the debugging session at selected source locations. The program state refers to the values of user variables at certain points during the execution of a program.

In this release of the compiler, the **-g** compiler option is extended to improve the debugging of optimized programs. The different **-g** levels allows you to choose the balance between debug capability and compiler performance. Higher **-g** levels provides a more comprehensive debug support, but at the cost of run time and compile time performance. Lower **-g** levels provide higher run time performance, but at the cost of reduced capability in the debugging session.

Full control of the debug capability is available at the **-O2** optimization level. When an optimization level higher than **-O2** is in effect, the debug capability is limited.

## **New or changed compiler options and directives for more flexibility**

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Compiler options can be specified on the command line or through directives embedded in your application source files. The following additional new or changed compiler options are available with this release of the compiler:

### ***New or changed compiler options***

- The **-g** option is extended to improve the debugging of optimized programs.
- **-qassert=minitercnt=n** and **-qassert=maxitercnt=n** are added to specify the expected minimum and maximum iteration counts of loops in the program.
- The **-qfunctrace** option is extended to allow you to specify module procedures and module names.
- **-qhaltonmsg** stops compilation before producing any object files, executable files, or assembler source files if a specified error message is generated.
- The new option **-qinitialloc** is added to initialize allocatable and pointer variables that are allocated but not initialized.
- **-qlanglvl=2008std** and **-qlanglvl=2008pure** are added to enable language level checking for the supported Fortran 2008 features.
- The **-qlistfmt** option is enhanced to generate HTML reports as well as XML reports, containing information about optimizations performed by the compiler and missed optimization opportunities.

The behavior of **-qlistfmt** has changed. In this release, if a particular type of content is not specified, the option generates all the available content, rather than generating none.

- **-qmaxerr** stops compilation when the number of error messages of a specified severity level or higher reaches a specified number.
- The new option **-qoptfile** specifies a file containing a list of additional command line options to be used for the compilation.

- **-qplic=large** now enables large table of content (TOC) access and prevents TOC overflow conditions when the TOC is larger than 64 kb.
- The default value for **-qshowpdf** is changed from **-qnoshopdf** to **-qshowpdf**.
- The new suboption **-qxlf2008=checkpresence** is added so that you can check dummy argument presence according to the Fortran 2008 standard.
- The new suboption **-qxlf2003=dynamicacval** is added to control whether you can use unlimited polymorphic entities for array constructors, and whether dynamic types of array constructor values are used.

### ***New or changed directives***

- Using the **ALIGN** directive, you can specify the alignment of your variables in memory.
- You can use the **ASSERT** assertions **MINITERCNT(n)** and **MAXITERCNT(n)** to specify the minimum and maximum number of iterations for a given loop.

### **Accessibility by people with disabilities**

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A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

### **Section 508 of the US Rehabilitation Act**

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XL Fortran for AIX, V14.1 is capable as of May 11, 2012, when used in accordance with associated IBM documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be requested on the following website

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

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## **Product positioning**

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At a basic level, compilers are a bridge between your applications and the hardware architectures on which you run your business. IBM compilers are designed to unleash the full power of IBM processors, including those for the different architectures shipped in the popular IBM Power Systems™.

IBM compilers are designed to improve programmer productivity. The state-of-the-art compilation technology enables programmers to exploit leading-edge performance of the new hardware without source code changes. Developers need to focus only on the logic of the applications and let the compiler figure out the best way to transform and optimize the code generation for the system the application will run on.

### **Harness the power of parallel computing**

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Parallel programming with IBM XL Fortran exploits the advantages of multiprocessor systems, while maintaining full binary compatibility with existing single-processor systems. With XL Fortran you can use any of the following to develop your parallelized applications:

- An extensive range of OpenMP directives and non-OpenMP SMP directives
- Message passing interface (MPI)
- The POSIX threads (Pthreads) library module

For high-bandwidth data processing and algorithmic-intensive applications, XL Fortran can leverage VMX and VSX instructions and automatic SIMDization to improve program performance. By processing multiple pieces of data at once, the

speed of executed code can increase, with the added benefit that the source code may not need to be rewritten.

## **Powerful, no-hassle performance optimization**

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Well-written and thoroughly debugged code, fully conformant to its language standard, can take maximum advantage of the optimizing technology in XL Fortran and may provide an increase in performance. The optimization and hardware features in XL Fortran help improve developer productivity. The compiler is able to generate code that exploits the leading-edge performance in existing and new hardware, often with minimal source code changes.

IBM XL Fortran supports several levels of increasingly aggressive code transformations. Advanced optimization techniques such as inter-procedural analysis (IPA) and profile-directed feedback (PDF) are available only at high levels of optimization but can result in increased performance improvements. IPA analyzes and optimizes your application as a whole, rather than on a file-by-file basis. PDF generates information that instructs the optimizer to focus on trade-offs that favor code that executes more frequently.

Get more performance from the POWER® platform with minimal or no source code changes. Upgrade to the latest IBM XL Fortran compiler, which incorporates the latest advances in optimization and hardware technology support.

## **Multiple-Platform XL C/C++ and Fortran**

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IBM XL Fortran for AIX, V14.1 is part of a larger family of IBM Fortran, C, and C++ compilers which supports multiple platforms such as AIX, z/OS® (C/C++), z/VM® (C/C++), IBM Power Systems, Linux™ on Power, Blue Gene/L™, and Blue Gene/P™.

The modular structure of these compilers delivers optimizations and functionality on all platforms and to all languages. Further, each product derives from a common code base, so features and optimizations are tested in multiple languages and on multiple platforms. A common code base, along with compliance with international standards, make source-level portability of applications between IBM platforms easier.

Built on a common architecture XL Fortran, XL C, and XL C/C++ compilers promote consistency and reliability on many IBM platforms.

## **Programming language standards, industry specifications, and other language influences**

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### ***Programming language standards***

IBM XL Fortran supports the Fortran 77, 90, and 95 standards. With Version 13.1, XL Fortran supports the full Fortran 2003 standard including the object-oriented programming model. With Version 14.1, XL Fortran makes available partial support for the latest Fortran 2008 standard.

IBM XL Fortran consists of the following:

- The full American National Standard Fortran 90 language (Fortran 90) as defined in:
  - American National Standard Programming languages - Fortran, ANSI X3.198-1992
  - Information technology - Programming languages - Fortran, ISO/IEC 1539-1:1991(E)
- The full ISO Fortran 95 language standard (Fortran 95) as defined in Information technology - Programming languages - Fortran - Part 1: Base Language, ISO/IEC 1539-1:1997.



- Extensions to the Fortran 95 standard:
  - Common industry extensions found in Fortran products from various compiler vendors
  - Extensions specified in SAA Fortran
- The full Fortran 2003 language standard including full support of the object-oriented programming model with parameterized derived-types.
- Partial support for the Fortran 2008 language standard.

### **Industry specifications and other language influences**

The IBM XL family of compilers is deeply involved in parallel computing and high-performance computing. The XL compilers implement both the AltiVec/VMX programming interface and the OpenMP 3.1 specification for shared memory programming model. With the Version 13.1 release, the Vector Scalar Extension (VSX) instruction set within the POWER7 architecture is also supported.

IBM is a member of the Standard Performance Evaluation Corporation (SPEC). The mission of SPEC is to identify and maintain standardized benchmarks that will drive high-performance computing for many years. SPEC released SPEC CPU2006 in 2006. CPU2006 is a benchmark focused on a system's processor, memory subsystem, and compiler. IBM continues to participate in the SPECCOMP suite which measures the performance of parallel benchmarks using OpenMP.

Support of programming language standards allows for portability of your source code among a variety of compiler implementations.

### **Business Partner information**

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If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=212-121>

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### **Program number**

Program number	VRM	Program name	Ordering channel
5725-C74	14.1.0	IBM XL Fortran for AIX	PA
5765-J04	14.1.0	IBM XL Fortran for AIX	AAS

### **Product identification number**

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Program name	Program number
XL Fortran for AIX, V14.1	5765-J04
XL Fortran for AIX SW S&S 1 year after license	5648-F41
XL Fortran for AIX SW S&S No Charge Registration/ 1-year Renewal	5648-F44
XL Fortran for AIX SW S&S 3-year Registration	5648-F43

XL Fortran for AIX  
SW S&S 3-year Renewal 5648-F42

XL Fortran for AIX  
SW S&S 3 year after licence 5648-F40

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## Offering Information

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Product information is available via the Offering Information website

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

Also, visit the Passport Advantage website

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

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## Publications

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No hardcopy 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 20 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.

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## Technical information

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### **Specified operating environment**

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#### **Hardware requirements**

- For XL Fortran for AIX, V14.1
  - System: IBM Power Systems servers supported by AIX 5.3, AIX 6.1, or AIX 7.1.
  - Disk space: 250 MB.
- For XL Fortran for AIX, V14.1 Portable Application Solutions Environment for i (IBM PASE for i): IBM i or AS/400® RISC model server

#### **Software requirements**

- For XL Fortran for AIX, V14.1
  - AIX 5.3 TL 5300-07 (or later), AIX 6.1, or AIX 7.1
  - Required software for documentation:
    - HTML browser to access HTML documentation
    - Portable Document Format (PDF) viewer to view PDF files
- For XL Fortran for AIX, V14.1
  - IBM PASE for i 6.1 PASE V6.1 with PTF SI30636 or later
  - IBM PASE for i V7.1 PASE V7.1

The program's specifications and specified operating environment information may be found in documentation accompanying the program, if available, such as a README file, or other information published by IBM, such as an announcement

letter. Documentation and other program content may be supplied only in the English language.

## **Planning information**

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### **Web information**

For information regarding IBM XL Fortran, visit

<http://www.ibm.com/software/awdtools/fortran>

For information regarding IBM Application Development, visit

<http://www.ibm.com/software/awdtools/>

### **Packaging**

The IBM XL Fortran for AIX, V14.1 package contains:

- One CD-ROM containing the XL Fortran for AIX, V14.1 product
- XL Fortran for AIX, V14.1 Quickstart Guide
- Passport Advantage customer letter
- Passport Advantage media pack pointer sheet

This program, when downloaded from a website, contains the applicable IBM license agreement and License Information, if appropriate, and will be presented for acceptance at the time of installation of the program. For future reference, the license and License Information will be stored in a directory such as LICENSE.TXT.

### **Security, auditability, and control**

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IBM XL Fortran for AIX, V14.1 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.

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## **Software Services**

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IBM Software Services has the breadth, depth, and reach to manage your services needs. You can leverage the deep technical skills of our lab-based, software services team and the business consulting, project management, and infrastructure expertise of our IBM Global Services team. Also, we extend our IBM Software Services reach through IBM Business Partners to provide an extensive portfolio of capabilities. Together, we provide the global reach, intellectual capital, industry insight, and technology leadership to support a wide range of critical business needs.

To learn more about IBM Software Services or to contact a Software Services sales specialist, visit

<http://www.ibm.com/software/sw-services/>

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## **Ordering information**

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Product Group: IBM XL Fortran

Product Identifier Description: IBM XL Fortran for AIX

PID: 5765-J04 and 5725-C74

Product Category: XL Fortran

## Charge metric

Program name	Part number or PID number	Charge metric
For build to order XL Fortran for AIX, V14.1	5765-J04	Authorized User Concurrent User
For build to plan XL Fortran for AIX, V14.1	5725-C74	Authorized User Concurrent User
For build to plan XL Fortran for AIX, V14.1	BA14FML	Authorized User Concurrent User

This program is licensed and charged based upon either the Authorized User or Concurrent User charge metric.

## Authorized User

Authorized User is a unit of measure by which the program can be licensed. An Authorized User is a unique person who is given access to the program. The program may be installed on any number of computers or servers and each Authorized User may have simultaneous access to any number of instances of the program at one time. Licensee must obtain separate, dedicated entitlements for each Authorized User accessing the program in any manner directly or indirectly (for example, via a multiplexing program, device, or application server) through any means. An entitlement for an Authorized User is unique to that Authorized User and may not be shared, nor may it be reassigned other than for the permanent transfer of the Authorized User entitlement to another person.

**Note:** Some programs may be licensed where devices are considered users. In that case, the following applies. Any computing device that requests the execution of or receives for execution a set of commands, procedures, or applications from the program or that is otherwise managed by the program is considered a separate user of the program and requires an entitlement as if that device were a person.

## Concurrent User

Concurrent User is a unit of measure by which the program can be licensed. A Concurrent User is a person who is accessing the program at any particular point in time. Regardless of whether the person is simultaneously accessing the program multiple times, the person counts only as a single Concurrent User. The program may be installed on any number of computers or servers, but licensee must obtain entitlements for the maximum number of Concurrent Users simultaneously accessing the program. Licensee must obtain an entitlement for each simultaneous Concurrent User accessing the program in any manner directly or indirectly (for example, via a multiplexing program, device, or application server) through any means.

**Note:** Some programs may be licensed where devices are considered users. In that case, the following applies. Any computing device that requests the execution of or receives for execution a set of commands, procedures, or applications from the program or that is otherwise managed by the program is considered a separate user of the program and requires an entitlement as if that device were a person.

## Passport Advantage

Program name/Description	Part number
XL Fortran for AIX, V14.1 Media Package Multilingual	BA14FML
XL Fortran for AIX Authorized User Lic + SW S&S 12 Mo	D5APSL

XL Fortran for AIX Authorized User Annual SW S&S Rnw1	E1APULL
XL Fortran for AIX Authorized User SW S&S Reinstate 12 Mo	D5APVLL
XL Fortran for AIX Concurrent User Lic + SW S&S 12 Mo	D043TLL
XL Fortran for AIX Concurrent User Annual SW S&S Rnw1	E04U9LL
XL Fortran for AIX Concurrent User SW S&S Reinstate 12 Mo	D043ULL

### Passport Advantage trade-up

Customers who have originally acquired licenses for Authorized User can trade-up their Authorized User licenses to an equivalent or appropriate number of Concurrent User licenses (previously known as Floating User).

Below is a list of precursor product

s and their associated Authorized User part numbers for which you must have already acquired a license, in order to be eligible to acquire the equivalent Concurrent User licenses using the trade-up part number.

Precursor product	Trade-up product	Trade-up part number
XL Fortran for AIX Authorized User single entitlement	XL Fortran for AIX Concurrent User single entitlement	D0CNXLL to trade-up from single Authorized User to single Concurrent User

Consult your IBM representative if you have any questions.

### Passport Advantage Customer: Media Pack entitlement details

Customers with active Maintenance or Subscription for the products listed below are entitled to receive the corresponding media pack.

Entitled Maintenance Offerings  
Description

XL Fortran for AIX

Media Pack Description	Part Number
XL Fortran for AIX, V14.1 Media Pk Multilingual	BA14FML

**Basic License:** To order the programs described in this announcement for 5765-J04 specify the type-model number and the applicable features from the tables below. The medium feature (CD-ROM) need only be specified as required. To request the media package (CD-ROM), specify media supply features 6657 and 3410.

When placing an ESD order in econfig, specify a billing feature, the media feature 6657, and the ESD feature 3450.

Description	Program number	One- Time Charge feature number	Medium	Medium feature number
XL Fortran for AIX, V14.1 OTC with 1-year SW S&S - per Authorized User - per Concurrent User	5765-J04	0001 0002		
Media Package			CD-ROM CD-ROM	6657 3410
Expedite Fee charge to Branch				3445

Customization features:	
Electronic software delivery	3450
Do not ship pubs	3470
Do not ship media	3471

## Electronic Software Update Orders

Entitled Software Update (ESU) is a way for customers to self order their POWER software release upgrades via the Entitled Software Support (ESS) website without the need to go to their seller to place the upgrade order. Entitled Software Update (ESU) orders for Electronic Software Delivery (ESD), will now be available in all countries. ESU orders for POWER software including IBM XL Fortran for AIX, V14.1 will be placed on the Entitled Software Support (ESS) website

<http://www.ibm.com/servers/eserver/ess>

Customers should generally select electronic delivery when ordering via ESU, but do have the ability to select physical delivery. Programs ordered for ESD will have the same download images provided as provided on the CD media shipped for physical orders.

ESU customers placing ESD software orders will receive an e-mail with software order information. The ESU customer will be able to immediately proceed to the "Downloads" website support for program access, instead of waiting for delivery of a physical package shipped from IBM.

Customers choosing physical delivery will also have the electronic images available for ESD download.

ESD help (instructions on how to use)

[http://www.ibm.com/systems/support/software/delivery/en\\_US/downloadinfo.html](http://www.ibm.com/systems/support/software/delivery/en_US/downloadinfo.html)

ESD sign-in (must have Customer number & POWER software entitlements to get in)

<http://www.ibm.com/servers/eserver/ess/OpenServlet.wss>

List of POWER software products that are available for electronic download

[http://www.ibm.com/systems/support/software/delivery/en\\_US/supportedproducts.html](http://www.ibm.com/systems/support/software/delivery/en_US/supportedproducts.html)

## Maintenance Offering Customer: Media supply entitlement details

Customers with active Software Maintenance for XL Fortran for AIX or XL Fortran Enterprise Edition for AIX are entitled to receive the media supply corresponding to XL Fortran for AIX, V14.1 or a previous level of the program as long as the level of the program continues to be active.

Eligible customers should add the applicable CD-ROM media supply feature number from the following table to their existing maintenance record. To request the media package (CD-ROM), specify the media supply features 6657 and 3410.

When placing an ESD order in econfig, specify a billing feature, the media feature 6657, and the ESD feature 3450. Note that these ESD features are also applicable to the compiler products:

- XL Fortran for AIX, V14.1 (5765-J04)
- XL Fortran for AIX, V13.1 (5724-X15)
- XL Fortran for AIX, V12.1 (5724-U82)

Entitled maintenance offerings description

XL Fortran for AIX

Description		Medium feature number
XL Fortran for AIX, V14.1 for PID 5765-J04	CD-ROM Media Supply	6657
	CD-ROM Media Supply	3410
Expedite fee charge to Branch		3445
Customization features:		
Electronic software delivery		3450
Do not ship pubs		3470
Do not ship media		3471
XL Fortran for AIX, V13.1 for PID 5724-X15	CD-ROM Media Supply	5809
	CD-ROM Media Supply	3410
Expedite fee charge to Branch		3445
Customization features:		
Electronic software delivery		3450
Do not ship pubs		3470
Do not ship media		3471
XL Fortran for AIX, V12.1 for PID 5724-U82	CD-ROM Media Supply	5809
	CD-ROM Media Supply	3410
Expedite fee charge to Branch		3445
Customization features:		
Electronic software delivery		3450
Do not ship pubs		3470
Do not ship media		3471

**Trade-up from Authorized User to Concurrent User**

Customers who have originally acquired licenses for Authorized User can trade-up their Authorized User licenses to an equivalent or appropriate number of Concurrent User licenses.

Below is a list of precursor products and their associated Authorized User part numbers for which you must have already acquired a license, in order to be eligible to acquire the equivalent Concurrent User licenses using the trade-up feature code.

Precursor product	Trade-up product	Trade-up feature code
XL Fortran for AIX Authorized User single entitlement	XL Fortran for AIX Concurrent User single entitlement	Is used to trade-up from single Authorized User to single Concurrent User

Consult your IBM representative if you have any questions.

Description	One-time charge program number	Feature number
XL Fortran for AIX, V14.1 - trade up from single Authorized User entitlement to single Concurrent User entitlement	5765-J04	0003

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

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.

Feature description	Feature number
5765-J04 - XL Fortran for AIX, V14.1	
Per Authorized User with 1-year SW S&S	0001
Per Concurrent User with 1-year SW S&S	0002
5765-J04 - XL Fortran for AIX, V14.1	6657
Multilingual, CD ROM	3410
5648-F44 - IBM XL Fortran for AIX	
Per Authorized User SW S&S NoCharge Registration	0001
Per Authorized User SW S&S 1-year Renewal	0002
Per Concurrent User SW S&S NoCharge Registration	0003
Per Concurrent User SW S&S 1-year Renewal	0004
5648-F41 - IBM XL Fortran for AIX	
Per Authorized User SW S&S 1 year after license	0001
Per Concurrent User SW S&S 1 year after license	0002
5648-F43 - IBM XL Fortran for AIX	
Per Authorized User SW S&S 3-year Registration	0001
Per Concurrent User SW S&S 3-year Registration	0002
5648-F42 - IBM XL Fortran for AIX	
Per Authorized User SW S&S 3-year Renewal	0001
Per Concurrent User SW S&S 3-year Renewal	0002
5648-F40 - IBM XL Fortran for AIX	
Per Authorized User SW S&S 3 years after license	0001
Per Concurrent User SW S&S 3 years after license	0002

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## Terms and conditions

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The information provided in this announcement letter is for reference and convenience purposes only. The terms and conditions that govern any transaction with IBM are contained in the applicable contract documents such as the IBM International Program License Agreement, IBM International Passport Advantage Agreement, and the IBM Agreement for Acquisition of Software Maintenance.

### ***Licensing***

IBM International Program License Agreement including the License Information document and Proof of Entitlement (PoE) govern your use of the program. PoEs 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 Subscription and Support (also referred to as Software Maintenance).

### ***Agreement for Acquisition of Software Maintenance***

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These programs are licensed under the IBM Program License Agreement (IPLA) and the associated Agreement for Acquisition of Software Maintenance, which provide for support with ongoing access to releases and versions of the program. IBM includes one year of Software Subscription and Support (also referred to as Software Maintenance) with the initial license acquisition of each program acquired. The initial period of Software Subscription and Support (also referred to as Software Maintenance) can be extended by the purchase of a renewal option, if available. These programs have a one-time license charge for use of the program



and an annual renewable charge for the enhanced support that includes telephone assistance (voice support for defects during normal business hours), as well as access to updates, releases, and versions of the program as long as support is in effect.

**License Information form number**

L-MCHN-8SBPWU

The program's License Information will be available for review on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

**Limited warranty applies**

Yes

**Limited warranty**

IBM warrants that when the program is used in the specified operating environment, it will conform to its specifications. The warranty applies only to the unmodified portion of the program. IBM does not warrant uninterrupted or error-free operation of the program or that IBM will correct all program defects. You are responsible for the results obtained from the use of the program.

IBM provides you with access to IBM databases containing information on known program defects, defect corrections, restrictions, and bypasses at no additional charge. For further information, consult the *IBM Software Support Handbook* found at

<http://www.ibm.com/support/handbook>

IBM will maintain this information for at least one year after the original licensee acquires the program (warranty period).

**Program technical support**

Technical support of a program product version or release will be available for a minimum of five years from the general availability date, as long as your Software Subscription and Support (also referred to as 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 Subscription and Support (Software Maintenance) also provides you with access to updates (modifications or fixes), releases, and versions of the program. You 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 and you are the original licensee, you may obtain a refund of the amount you paid for it, if within 30 days of your invoice date you return the program and its PoE to the party from whom you obtained it. If you downloaded the program, you may contact the party from whom you acquired it for instructions on how to obtain the refund.

For clarification, note that (1) for programs acquired under the IBM International Passport Advantage offering, this term applies only to your first acquisition of the program and (2) for programs acquired under any of IBM's On/Off Capacity on Demand (On/Off CoD) software offerings, this term does not apply since these offerings apply to programs already acquired and in use by you.

**Volume orders (IVO)**

Yes. Contact your IBM representative.

**Passport Advantage applies**

Yes, and through the Passport Advantage website at

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

**Usage restriction**

Yes. For additional information, refer to the License Information document that is available on the IBM Software License Agreement website

<http://www.ibm.com/software/sla/sladb.nsf>

**Software Subscription and Support applies**

Yes. Software Subscription and Support (also referred to as Software Maintenance), is now included in the Passport Advantage Agreement. Installation and technical support for the products announced in this announcement is provided by the Software Subscription and Support 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 Subscription and Support with the initial license acquisition of each program acquired. The initial period of Software Subscription and Support can be extended by the purchase of a renewal option.

While your Software Subscription and Support 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 Handbook at

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Software Subscription and Support 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 additional information about the Passport Advantage Agreement, visit the Passport Advantage website at

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All distributed software licenses include Software Subscription and 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.

**Variable charges apply**

No

**Educational allowance available**

Yes. A 15% education allowance applies to qualified education institution customers.

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## Statement of good security practices

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IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered destroyed or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

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## Prices

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For additional information, contact your IBM representative.

### Business Partner information

If you are an IBM Business Partner -- Distributor for Workstation Software acquiring products from IBM, you may link to Passport Advantage Online for resellers where you can obtain Business Partner pricing information. An IBM ID and password are required.

<https://www.ibm.com/software/howtobuy/passportadvantage/paoreseller>

Information on charges is available at

<http://www.ibm.link.ibm.com/>

Select "United States" and then click on "IBMLink 2000".

Description	Program number	One-time charge feature number
XL Fortran for AIX, V14.1 with 1-year SW S&S		
- per Authorized User	5765-J04	0001
- per Concurrent User	5765-J04	0002
- trade up from single Authorize User entitlement to single Concurrent User entitlement	5765-J04	0003
XL Fortran for AIX, SW S&S NoCharge Registration		
- per Authorized User	5648-F44	0001
- per Concurrent User	5648-F44	0003
SW S&S 1-year Renewal		
- per Authorized User	5648-F44	0002
- per Concurrent User	5648-F44	0004
XL Fortran for AIX, SW S&S 1 year after license		
- per Authorized User	5648-F41	0001
- per Concurrent User	5648-F41	0002
XL Fortran for AIX, SW S&S 3-year Registration		
- per Authorized User	5648-F43	0001
- per Concurrent User	5648-F43	0002

XL Fortran for AIX,  
SW S&S 3-year Renewal  
- per Authorized User 5648-F42 0001  
- per Concurrent User 5648-F42 0002

XL Fortran for AIX,  
SW S&S 3 years after license  
- per Authorized User 5648-F40 0001  
- per Concurrent User 5648-F40 0002

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## Order now

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