IBM COBOL for AIX, V5.1 and COBOL Runtime Environment for AIX, V5.1

IBM

Enable the integration of business critical COBOL applications with modern web technology

Highlights

COBOL for AIX

IBM® COBOL for AIX® offers the functions that you need for integrating COBOL applications with web services, XML, and Java™. COBOL for AIX includes a compiler, a COBOL library, and a debugger that lets you visually debug programs from your workstation. COBOL for AIX, Version 5.1:

- Enables you to target code generation of your programs to exploit Power Systems™
- Provides improved performance by means of world-class optimization technology shared with other IBM compilers
- Gives you improved performance for COBOL for AIX applications that use:
  - Packed arithmetic and conversion to and from packed-decimal data through enhancements to the binary coded decimal (BCD) library
  - Dynamic calls, external variables, external files, as well as module caching
  - Multiple INSPECT statements
- Gives you the ability to concatenate multiple input files, providing better compatibility with Enterprise COBOL for z/OS®
- Offers an extended source format that lets source text vary in length up to 252 bytes per line
- Simulates generation data groups (GDGs), which simplify the processing of multiple versions of related data, allowing for better compatibility with Enterprise COBOL for z/OS
- Provides a debugger that enables you to conveniently debug programs in 32-bit or 64-bit mode
- Integrates with IBM Rational® Developer for AIX and Linux, AIX COBOL edition and IBM Rational Team Concert™ providing a modern development environment and a collaborative team environment

To remain competitive, you need a complete business strategy to help you modernize, integrate, and manage existing applications, data, and skill sets to ease your organization's transformation into a more flexible business. You need to be able to connect your business components end to end with your suppliers, partners, employees, and customers; and you need to position your organization to quickly take advantage of opportunities and respond to challenges in real time. COBOL for AIX helps you to meet these challenges and lets you use your existing COBOL code while upgrading your applications with the newest technologies.

COBOL Runtime Environment for AIX

In V5.1, COBOL Runtime Environment for AIX is a separately orderable runtime environment product for execution of developed IBM COBOL applications. COBOL Runtime Environment for AIX provides improved runtime performance and functionality.

Note: Starting with COBOL for AIX, V5.1, the runtime libraries are not allowed to be redistributed with the developed COBOL applications. The COBOL Runtime Environment for AIX product is required for the execution of COBOL for AIX V5.1 applications in a production environment.

Features

COBOL for AIX provides features that you can use to upgrade your existing COBOL applications with the newest technologies.

Targets code generation for your Power Systems hardware

The ARCH compiler option lets you selectively target code generation of your programs to either exploit POWER7® systems architecture or to be balanced among all supported Power Systems.

64-bit application development

You can create 64-bit applications by taking advantage of these features of COBOL for AIX:

- The ADDR compiler option lets you indicate whether 32-bit object programs or 64-bit object programs are to be generated.
- Several limits on COBOL data-item size are significantly increased, as described in the section below about support for large XML documents.
- The storage allocation for data items that contain addresses or indexes is increased to 8 bytes for 64-bit object programs, affecting data items that have any of these usages:
  - POINTER
  - FUNCTION-POINTER
  - PROCEDURE-POINTER
  - OBJECT REFERENCE
  - INDEX

Provides improved performance

The performance of COBOL for AIX applications is improved by means of world-class optimization technology shared with other IBM compilers. The back-end optimizer, a component common also to the IBM XL compilers, lets your applications leverage the latest industry-leading optimization technology.

The binary coded decimal (BCD) library provides improved performance of COBOL for AIX applications that use packed arithmetic and conversion to and from packed-decimal data. In addition, the COBOL_BCD_NOVALIDATE environment variable, when set, causes the digit and signed validations done prior to conversion and arithmetic operations to be skipped. Skipping the validation speeds up calculations.

The performance of COBOL for AIX applications, which use dynamic calls, external variables, external files, as well as module caching, is also improved.

The INSPECT statement is enhanced to improve the performance of COBOL for AIX applications, which use multiple INSPECT statements.

File I/O performance for NAT, RSD, STL, and SdU file systems is improved.

COBOL for AIX also provides these file I/O functional enhancements:

- RSD files are no longer limited to fixed-length records
- The record length of a line-sequential file is determined by the requested read length (short reads) or the location of the new line character (\n), even when the line contains binary data
- The RSD file system and the NAT file system supports the ADVANCING phrase and the LINAGE clause
- The NAT file system (line sequential), RSD file system, STL file system (sequential files) and SdU file system (sequential and relative files only) use file status 2 with a unified format that shows the error code and description for most errors

Unicode support

With COBOL for AIX support of national (UTF-16) data, several additional kinds of data items can be described implicitly or explicitly as USAGE NATIONAL:

- External decimal (national decimal) items
- External floating-point (national floating-point) items
- Numeric-edited items
- National-edited items
- Group (national group) items, supported by the GROUP-USAGE NATIONAL clause

Many COBOL language elements support the processing of national data, making it practical to develop COBOL programs that exclusively use Unicode for all application data.

Extensible Markup Language (XML) support

The XML GENERATE statement gives you flexibility and control over the form of the XML documents that you generate. When you use the XML GENERATE statement, you can:

- Specify a namespace by using the NAMESPACE phrase, and a namespace prefix

to be applied to each element by using the NAMESPACE-PREFIX phrase.

- Specify the encoding of the generated document by using the ENCODING phrase.
- Generate XML documents in UTF-8, in UTF-16, or in various ASCII or EBCDIC code pages.
- Use the WITH ATTRIBUTES phrase to specify that eligible items in the XML document will be generated as XML attributes instead of as elements.
- Use the WITH XML-DECLARATION phrase to include the XML version and the encoding information in the generated document.

When you use the XML PARSE statement, you can parse documents that are encoded in UTF-8, in UTF-16, or in various ASCII or EBCDIC code pages.

Delivers the RAW file system

The RAW file system enables you to directly access a QSAM file that you transferred (using z/OS FTP) from z/OS to AIX. This feature also makes it easy to move QSAM files between AIX, Windows, and z/OS platforms. It also eases porting of non-IBM COBOL files to COBOL for AIX.

Provides the WSCLEAR suboption

You can use the compiler option WSCLEAR with a suboption (nnn, where nnn is an integer between 0 and 255) to initialize each byte of WORKING-STORAGE data to a specific value. This feature eases porting of non-IBM COBOL files to COBOL for AIX. It also makes it easier to debug COBOL for AIX applications.

Supports the DB2 file system

The DB2® file system provides enhanced interoperation with CICS® TXSeries®, enabling batch COBOL programs to access CICS ESDS, KSDS, and RRDS files that are stored in DB2, and lets you leverage all the great DB2 data management facilities (backup, compression, encryption, and utility functions, along with a familiar maintenance and administration protocol).

Offers an extended source format

Source text can optionally vary in length from 0 to 252 bytes per line (extended source format), allowing greater flexibility in your code

development, or end at column 72 (fixed source format) as in earlier versions of COBOL for AIX. The extended source format is supported by:

- The SRCFORMAT compiler option lets you indicate whether source files have the new extended format or the fixed format that is compatible with earlier versions
- The scu source conversion utility helps you normalize non-IBM COBOL source and free-format COBOL source so that it can be compiled

Simplifies processing multiple versions of data

Have you ever wanted to simplify the processing of multiple versions of related data? You can do so, because all COBOL for AIX file systems support generation data groups (GDGs). A generation data group (GDG) is a chronological collection of related files.

There are advantages to grouping related files. For example:

- Files in the group can be referred to by a common name.
- Files in the group are kept in generation order.
- Outdated files can be automatically discarded.

Using the gdgmgr utility program, you can easily manage GDG catalogs and generation files.

GDGs facilitate cross-platform compatibility between Enterprise COBOL for z/OS and COBOL for AIX.

Supports concatenation of multiple input files

In COBOL for AIX, you can concatenate input files by separating the individual file identifiers with a colon (:), which simplifies processing multiple files as one.

File concatenation facilitates cross-platform compatibility between Enterprise COBOL for z/OS and COBOL for AIX

Enables compiler message severity customization

Have you ever wanted to change the severity of a compiler diagnostic message, or completely suppress a compiler message? In COBOL for AIX, you can do both! For example, you can now get

return code zero from a compilation that used to return warning messages.

The MSGEXIT suboption of the EXIT compiler option lets you specify a module that is called for each compiler message. Using the MSGEXIT module, you can change the severity of diagnostic messages, suppress diagnostic messages, and convert FIPS (FLAGSTD) messages into diagnostic messages.

Allows the underscore character in user-defined words

In COBOL for AIX, COBOL user-defined words such as data names and program names can now include underscore characters (_). Underscores are also supported in the literal form of program names.

By being able to use underscores in data names and program names, your COBOL code can more easily interoperate with XML, DB2/SQL, and other programming languages.

Provides a source-level debugger

The IBM Debugger for AIX is an interactive source-level debugger. It works on a Windows-based client that is connected remotely to a debugger engine running on AIX. The Debugger for AIX lets you conveniently debug applications that are written in C, C++, and COBOL in 32-bit or 64-bit mode from your workstation.

The debugger displays application source files and the elements in those source files. You can single-step, step through, or step over a specified line; and you can stop execution at a specified line or condition. While controlling execution, you can monitor variables, registers, memory, call stacks, and other elements.

Provides an integrated workstation-based environment

IBM Rational Developer for AIX and Linux, AIX COBOL edition, an Eclipse-based offering, boosts programmer productivity with an integrated development environment that makes it easy for you to edit, compile, and debug applications right from your Windows-based workstation.

IBM Rational Team Concert, a Jazz-based offering, improves your productivity with a collaborative team environment that makes it easy to manage your distributed software projects and collaborate with teams.

Other COBOL for AIX features

COBOL for AIX also provides these other features.

Integration of COBOL applications with web services

Using COBOL for AIX, you can integrate your COBOL applications with web services, XML, and Java. Such interoperability enables you to capitalize on existing IT investments while smoothly incorporating new, web-based applications into your organization's infrastructure.

STL and SdU files not limited to 2 GB

STL and SdU files created by COBOL for AIX programs have by default a large-format metadata representation (internal control information) that no longer limits them to a 2 GB maximum size. These files can also be processed by COBOL for AIX Version 2 or Version 3 programs that are run with the latest runtime library.

A runtime option, FILEMODE, lets you specify whether newly created files will have the new large-format, or have the small-format metadata representation and 2 GB maximum size that is compatible with files created by COBOL for AIX Version 2 programs.

Support for large XML documents

Several limits on COBOL data-item size are significantly increased. For example, the maximum size of the LOCAL-STORAGE, WORKING-STORAGE, and LINKAGE sections is essentially unlimited (up to the addressing capacity of the machine) if ADDR(64) is in effect.

This support facilitates programming with large amounts of data, for example:

- COBOL XML applications that parse or generate large XML documents
- DB2/COBOL applications that use DB2 BLOB and CLOB data types

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Object-oriented COBOL with Java 7 SDKs

COBOL for AIX applications that use object-oriented syntax for Java interoperability can run with Java 7. Java SDK 1.4.2.275 and later are supported.

COBOL for AIX provides object-oriented syntax to facilitate the interoperation of COBOL and Java programs based upon the facilities of the Java Native Interface, which is the primary means provided by Java for interoperation with non-Java programs. Object-oriented COBOL syntax is designed to enable you to write COBOL code that:

- Creates object instances of classes that are written in Java or COBOL
- Invokes methods on Java or COBOL objects
- Defines classes with methods written in COBOL

Increased programmer productivity

In COBOL for AIX, several features boost your programming productivity:

- Compiler listings cross-reference copybooks to the library names and file names from which the copybooks are obtained.
- Usability enhancements to DB2/COBOL applications are available when you use the integrated DB2 coprocessor, for example, an explicitly coded LOCAL-STORAGE or WORKING-STORAGE section is no longer required.
- Specification of CICS options, and integrated compilation of programs and copybooks that contain CICS statements, are enabled by means of a compiler option (CICS).
- A compiler option, MDECK, causes the updated input source (after processing of statements such as COPY) to be written to a file.

- A callable service, iwzGetSortErrno, makes it possible to obtain the sort or merge error number after each sort or merge operation.
- When you use the REDEFINES clause for data items that are not level 01, the subject of an entry can be larger than the data item being redefined.

Improved application development

COBOL for AIX together with IBM Rational Developer for AIX and Linux, AIX COBOL Edition provides a productive and powerful development environment for building applications. COBOL for AIX includes a COBOL compiler, COBOL libraries, and a debugger. The debugger lets you visually debug programs wherever they're running—as stand-alone jobs, in an SOA service, or as a CICS transaction under TXSeries.

COBOL for AIX provides a set of intrinsic functions that includes string handling, financial functions, statistical functions, and mathematical formulas. COBOL for AIX offers support for recursive calls, structured programming, improved interoperability with other languages, and shared libraries.

COBOL across platforms

COBOL for AIX is part of a family of compatible compilers, application development tools, and maintenance tools. The IBM COBOL family consists of COBOL for AIX, Enterprise COBOL for z/OS, and ILE COBOL (packaged as part of IBM Rational Developer for i).

System requirements

The following table presents the system requirements for COBOL for AIX, V5.1 and COBOL Runtime Environment for AIX, V5.1.

Table 1. Software requirements

Product	System	Disk space
COBOL for AIX, V5.1	• IBM Power Systems servers supported by AIX 6.1.2 or AIX 7.1 • 256 MB (Recommended: 512 MB or higher)	210 MB
COBOL Runtime Environment for AIX, V5.1	IBM Power Systems servers supported by AIX 6.1.2 or AIX 7.1	50 MB

Upgrade to COBOL for AIX, V5.1

Upgrade to the latest COBOL for AIX compiler and get more out of your Power Systems investment and stay ahead of competitors on the technology curve.

Download a trial version at no charge and try COBOL for AIX at http://www.ibm.com/developerworks/downloads/r/cobolaix/.

For more information

To learn more about IBM COBOL for AIX, V5.1, contact your IBM representative or IBM Business Partner, or visit http://www.ibm.com/software/products/en/cobolaix.