Application development for today's changing marketplace

IBM®

Enterprise COBOL for z/OS and OS/390® Version 3 Release 1   5655-G53

Highlights

IBM Enterprise COBOL for z/OS and OS/390 gives you the COBOL functions that you need to begin to integrate COBOL applications and Web-oriented business processes. With the capabilities of this release, developers can do the following tasks:

- Simplify the componentization of COBOL programs and enable interoperability with Java™ components across distributed applications.

- Promote the exchange and usage of data in standardized formats including XML and Unicode™.

- Facilitate the reuse of existing applications in WebSphere and traditional z/OS and OS/390 environments.

With Enterprise COBOL, COBOL and Java applications can interoperate in the e-business world. As a result of such interoperation, software developers can leverage 30 years' worth of applications in new endeavors.

Enterprise COBOL delivers the following new functions:

- Java interoperability supported by new object-oriented syntax

- Compatibility with WebSphere® tools

- XML support

- Unicode support

- Enhancements to z/OS and OS/390 UNIX System Services support for tolerating threads and asynchronous signals

- CICS translator integration

In addition, Enterprise COBOL provides the benefits of IBM COBOL for OS/390 & VM Version 2 Release 2 except for VM support, SOM-based OO support, and the ANALYZE, CMPR2, FLAGMIG, IDLGEN, and TYPECHK compiler options.

Object-oriented COBOL syntax for Java interoperability

Enterprise COBOL supports Java-based object-oriented syntax to facilitate the interoperation of COBOL and Java programs. The syntax is based upon the facilities of the Java Native Interface, the primary means that Java provides for interoperating with non-Java programs.

Object-oriented COBOL syntax is designed to enable you to write COBOL programs that:

- Create object instances of Java classes.

- Invoke methods on Java objects.

- Define Java classes, with methods implemented in COBOL. You can create object instances of these classes, and invoke methods of these classes, from either Java or COBOL.

A new special register and copybook let you easily call services that the Java Native Interface provides. These services include Unicode- and EBCDIC-based services for handling strings and for managing local and global object references.

WebSphere interoperability

You can use the Java interoperability capabilities of COBOL to access enterprise beans that run on a J2EE-compliant EJB server, such as

WebSphere Application Server. To do this, the client environment must support a Java-based Object Request Broker (ORB). The client COBOL application can use COBOL INVOKE statements to access the following programming interfaces:

- Java Naming and Directory Interface (JNDI) to locate EJB services and components

- Java ORB to invoke methods on enterprise beans

XML support

Enterprise COBOL introduces XML capabilities to COBOL. The support includes a high-speed parser that enables your COBOL programs to:

- Process XML documents in the principal run-time environments, such as CICS, IMS, and MQSeries.

- Validate XML documents to ensure that they conform to established XML standards.

- Populate COBOL data structures with the content of XML documents.

For example, in a business-to-business environment, XML support enhances your existing high-performance IMS transactions written in COBOL, by accepting XML data as input. XML data can be placed in, and retrieved from, the IMS messages queue for all message regions, including MPP, IFP, and BMP.

Support for Unicode

Unicode encodes all of the characters in written human languages. A new national data type, national literals, intrinsic functions, and compiler

options provide basic run-time support for Unicode. There are multiple encoding schemes to represent Unicode, including UTF-8, UTF-16, and UTF-32. Enterprise COBOL supports Unicode using UTF-16. COBOL source programs continue to be encoded in an EBCDIC code page.

You can convert UTF-8 data, or data in many other code pages, to UTF-16 by using the new NATIONAL-OF intrinsic function, and then you can process the data in UTF-16 in your COBOL program. When you have finished processing the data, you can convert it back to UTF-8 by using the new DISPLAY-OF intrinsic function. The new CODEPAGE compiler option lets you specify the code page used for alphanumeric and DBCS data (both data items and literals) in your program.

Through the NSYMBOL compiler option, you can also control whether national or DBCS processing is used for the N symbol in literals and PICTURE clauses.

Support for Chinese character standard
Enterprise COBOL supports the new Chinese character standard GB18030. You can convert GB18030 characters represented in CCSID 01388 to Unicode, process them as Unicode, and then convert them back to the CCSID 01388 representation. GB18030 characters are encoded through the existing Chinese EBCDIC code page, CCSID 01388. This character data can now be converted to Unicode, processed in Unicode, and converted back to the EBCDIC code page.

Toleration support for threads and asynchronous signals
A toleration level of support for POSIX threads and signals is now available in Enterprise COBOL. This support enables an application to contain COBOL programs that run on multiple threads within a process in the following environments:

- OS/390 Version 2 Release 10
- z/OS Version 1 Release 1 or later
- Batch, TSO, IMS, and UNIX

You can call POSIX APIs directly from COBOL to initialize or serialize threads. You can mix threaded COBOL programs with C/C++ and Language Environment®-enabled assembler programs in a multithreaded Language Environment enclave.

The level of support for threads and asynchronous signal toleration in Enterprise COBOL is analogous to that provided by IBM VisualAge COBOL for Windows NT and COBOL Set for AIX.

Integrated CICS translator
Compilation of COBOL programs that contain CICS statements no longer requires a separate translation step: an integrated CICS translator provides an alternative. When you use the new CICS compiler option, the COBOL compiler in conjunction with the integrated CICS translator handles both native COBOL and embedded CICS statements in the source program.

When CICS statements are encountered in a COBOL program, the compiler interfaces with the integrated CICS translator, which indicates to the compiler the native language statements to generate.

The integrated CICS translator approach provides these advantages:

- Enhancements in the interactive debugging of COBOL applications using Debug Tool. Applications can be debugged at the original source level instead of at the level of the expanded source produced by the CICS translator.

- EXEC CICS and EXEC DLI statements can be included in copybooks without the need to translate them separately before compilation.

- Nested programs that contain EXEC CICS statements can be in separate files and can be included through a COPY statement.

- Binary fields in CICS control blocks are generated as USAGE COMP-5 instead of BINARY. Thus, there is no longer a dependency on the setting of the TRUNC compiler option.

The separate CICS translator approach is still supported in Enterprise COBOL.

Improved application development
Enterprise COBOL for z/OS and OS/390 provides a set of intrinsic functions including string handling, financial capabilities, statistical functions, and mathematical formulas. You can also use the COBOL CALL statement to take advantage of Language Environment services for everything from storage management to condition handling. The condition-handling support enables you to write programs in which error handling is done in a separate routine that is loaded only when needed. You do not have to write the error-handling routines in assembler; with Language Environment you can write them in COBOL.

Enterprise COBOL for z/OS and OS/390 offers support for recursive calls in COBOL, structured programming, improved interoperability with other languages, and dynamic link library support. The Enterprise COBOL for z/OS and OS/390 run-time library, Language Environment, also supports PL/I, C/C++, and Fortran programs.

Ease into migration
Enterprise COBOL for z/OS and OS/390 gives you a migration path from OS/VS COBOL, VS COBOL II, IBM COBOL for MVS & VM, and IBM COBOL for OS/390 & VM. Most of your current programs will continue to compile and to run without modification, while you selectively update existing applications to take advantage of the new functions.

COBOL across platforms
Enterprise COBOL for z/OS and OS/390 is part of a large family of compatible compilers, application development tools, and maintenance tools. In addition to Enterprise COBOL, IBM offers IBM COBOL compilers for Windows®, OS/2®, AIX®, VSE®, and AS/400®. Host-based development products include ISPF, File Manager, Fault Analyzer, and Debug Tool. You can also take advantage of IBM's extensive suite of COBOL maintenance tools to improve your existing

applications. These tools assist you with source code conversion from former ANSI standards to ANSI 85 COBOL syntax; code analysis, and reporting; CICS source conversion; Report Writer code support; and regression testing of interactive applications.

Software prerequisites

Enterprise COBOL and its generated object programs run under the following S/390 operating systems:

- z/OS Version 1 Release 1 (5694-A01) or later
- OS/390 Version 2 Release 10 (5647-A01)

VM/CMS is not supported.

The following provide the execution environment and library of COBOL run-time services required to compile and run COBOL applications using Enterprise COBOL:

- On OS/390 Version 2 Release 10: OS/390 Language Environment element plus PTFs for APAR PQ52338 and PQ52626
- On z/OS Version 1 Release 1: z/OS Language Environment element plus PTFs for APAR PQ52338 and PQ52626
- On z/OS Version 1 Release 2: z/OS Language Environment element plus PTFs for APAR PQ53034 and PQ52626

Support for object-oriented COBOL syntax (Java interoperability) requires:

- IBM Developer Kit for OS/390, Java 2 Technology Edition, SDK 1.3.0 or later

For installation on OS/390:

- OS/390 SMP/E element
- SMP/E Version 8 Release 1 (5668-949), if you are using MVS to maintain your OS/390 products

For installation on z/OS:

- z/OS SMP/E element
- SMP/E Version 8 Release 1 (5668-949), if you are using MVS to maintain your z/OS products

One of the following is required for customization:

- OS/390 High Level Assembler or
- z/OS High Level Assembler

Support for Unicode requires:

- For OS/390: OS/390 Support for Unicode (5647-A01)
- For z/OS: z/OS Support for Unicode (5694-A01)

Support for CICS requires:

- CICS Transaction Server for OS/390 Version 1 Release 3 or later
- Support for integrated CICS translator requires CICS Transaction Server Version 2 Release 1 or later

The following prerequisites are needed for DB2:

- DB2 for OS/390 Version 6 (5645-DB2) or later
- Support for DB2 integrated coprocessor requires DB2 Version 7 (5675-DB2) or later

The following prerequisite is needed for IMS:

- IMS Version 6 (5655-158) or later

The following prerequisite is needed for Debug Tool:

- Debug Tool Version 1 Release 2

For more information

See your client representative or call IBM DIRECT at 1-800-IBM-CALL in the US and Canada. To learn more about these tools, visit the COBOL Web site at www.ibm.com/software/ad/cobol

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