



Licensed Program Specifications

Enterprise COBOL for z/OS and OS/390

Version 3 Release 2

Program Number 5655-G53

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

- Utilize new debugging functions in Debug Tool.
- Enable interoperability with Java™ when an application runs in an IMS™ Java dependent region.
- 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™.

With Enterprise COBOL, COBOL and Java applications can interoperate in the e-business world.

Specified operating environment

Machine requirements

Enterprise COBOL and its compiled object programs can run on any IBM zSeries processor supported by the operating systems listed under "Programming Requirements."

IBM devices supported by VSAM and QSAM on the above systems can be used with object programs produced by Enterprise COBOL.

When the ARITH(EXTEND) compiler option is in effect, the ESA/390 HFP-extensions package is required for application execution. This package includes support for additional hexadecimal floating-point instructions and provides 16 (rather than four) floating-point registers. Support for this capability is available in G5 or later processors, or through the software emulation provided in z/OS

and OS/390. The software emulation is not recommended for a production environment.

Programming requirements

Enterprise COBOL runs under the control of, or in conjunction with, the following IBM licensed programs and their subsequent releases unless otherwise announced by IBM.

For information about programs listed below that mention the need to apply program temporary fixes (PTFs), see the Enterprise COBOL program directory.

Required licensed programs

Enterprise COBOL and its generated object programs run under the following zSeries operating systems:

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

Language Environment provides the execution environment and library of COBOL run-time services required to compile and run COBOL applications using Enterprise COBOL:

- On z/OS, Version 1 Release 1: z/OS Language Environment element plus PTFs for APAR PQ62947 and PQ52626
- On z/OS, Version 1 Release 2: z/OS Language Environment element plus PTFs for APAR PQ65174 and PQ52626
- On z/OS, Version 1 Release 3: z/OS Language Environment element plus PTFs for APAR PQ65175
- On z/OS, Version 1 Release 4: z/OS Language Environment element plus PTFs for APAR PQ65176
- On OS/390, Version 2 Release 10: OS/390 Language Environment element plus PTFs for APAR PQ62947 and PQ52626

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

- IBM Developer Kit for OS/390, Java 2 Technology Edition, SDK 1.3.1 or later, when executing in an IMS Java environment
- IBM Developer Kit for OS/390, Java 2 Technology Edition, SDK 1.3.0 or later, in other environments.

For installation on z/OS, one of the following is required:

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

For installation on OS/390, one of the following is required:

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

One of the following is required for customization during or after installation:

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

Support for Unicode requires:

- For z/OS, Release 2 or later: Support for Unicode is integrated in the base control program (BCP) in z/OS, Version 1 Release 2.
- For z/OS, Release 1, and OS/390: FMID HUNI2A0 must be installed on your target system. Unicode Conversion Services (HUNI2A0) is a base element of OS/390 and is being delivered through the Web. It can be downloaded from www.ibm.com/downloads.

Support for DB2 integrated coprocessor requires:

- DB2, Version 6 (5645-DB2) or later
- Support for DB2 integrated coprocessor requires DB2 Universal Database, Version 7 (5675-DB2) or later
- Use of Unicode in DB2 COBOL applications requires DB2 APAR PQ61320

To debug Enterprise COBOL code, you must use:

- Debug Tool for z/OS and OS/390, Version 3 Release 1 (5696-H32)

For sorting and merging, you must use the following feature of z/OS and OS/390 or an equivalent product:

- DFSORT, Release 13 (5740-SM1)

Support for the integrated CICS translator requires:

- CICS Transaction Server for z/OS, Version 2 (5697-E93)

Programs with Report Writer statements require:

- COBOL Report Writer, Release 4 (5798-DYR, 5798-DZX)

Support for the execution of mixed Java and COBOL applications execution in IMS Java dependent regions requires one of the following:

- IMS, Version 8 (5655-C56)
- IMS, Version 7 (5655-B01) with PTFs for APARs PQ53944 and PQ54039

For C/C++ with Enterprise COBOL, you must use the C/C++ feature of z/OS and OS/390.

Optional licensed programs for OS/390 and z/OS

If you use the following programs with Enterprise COBOL, you must use the minimum release or later as stated below:

- CICS Transaction Server for z/OS, Version 2 (5697-E93)
- CICS Transaction Server for OS/390, Version 1 Release 3 (5655-147)
- DB2 UDB for OS/390, Version 6 (5645-DB2)
- DB2 UDB for OS/390 and z/OS, Version 7 (5675-DB2)
- Debug Tool Utilities and Advanced Functions for z/OS and OS/390, Version 3 Release 1 (5655-J18)
- High Level Assembler MVS & VM & VSE, Release 4 (5696-234)
- IBM COBOL Report Writer Precompiler, Release 4 (5798-DYR)
- IMS/ESA, Version 6 (5655-158)
- IMS/ESA, Version 7 (5655-B01)

- OS PL/I, Version 2 Release 3 (5668-909, 5668-910, 5668-911)
- PL/I for MVS & VM, Release 1.1 (5688-235)
- VisualAge PL/I for OS/390, Version 2 Release 2 (5655-B22)
- Enterprise PL/I for z/OS and OS/390, Version 3 Release 1 (5655-H31)
- VS FORTRAN, Version 2 Release 6 (5668-806, 5668-087)

Industry standards

Enterprise COBOL supports the following industry standards.

ISO standards

ISO 1989:1985, Programming Languages - COBOL.

ISO/IEC 1989/AMD1:1992, Programming Languages - COBOL: Intrinsic Function Module.

ISO/IEC 1989/AMD2: 1994, Programming Languages - COBOL: Correction and Clarification Amendment for COBOL.

ISO 1989:1985 is identical to ANSI INCITS 23-1985, Programming Languages - COBOL.

ISO/IEC 1989/AMD1:1992 is identical to ANSI INCITS 23b-1989, Programming Languages - Intrinsic Function Module for COBOL.

ISO/IEC 1989/AMD2:1994 is identical to ANSI INCITS 23b-1993, Programming Language - Correction Amendment for COBOL.

For supported modules, see American National Standards below.

International Reference Version of the ISO 7-bit code defined in *International Standard 646, 7-Bit Coded Character Set for Information Processing Interchange*.

American National standards

ANSI INCITS 23-1985, Programming Languages - COBOL.

ANSI INCITS 23a-1989, Programming Languages - Intrinsic Function Module for COBOL.

ANSI INCITS 23b-1993, Programming Language - Correction Amendment for COBOL.

The 7-bit coded character sets defined in American National Standard X3.4-1977, Code for

Information Interchange.

All required modules are supported at the highest level defined by the standard. In the following list, the shorthand notation for describing module levels is shown in parentheses. For example, to summarize module information for sequential input and output, the shorthand notation is (2 SEQ 1,2). The first digit indicates the level of language elements within the module supported by Enterprise COBOL. Next is the three-character abbreviation of the module name as used in the standard. Finally, the two digits separated by a comma indicate the minimum and maximum levels of the module. For example, (2 SEQ 1,2) means that Enterprise COBOL supports the sequential I-O module at level 2, while the range of levels in the module is from 1 (minimum) to 2 (maximum).

- Nucleus (2 NUC 1,2)

Provides internal processing of data within the four basic divisions of a program and the capability for defining and accessing tables.

- Sequential I-O (2 SEQ 1,2)

Provides access to records of a file in established sequence. The sequence is established as a result of writing the records to the file.

- Relative I-O (2 REL 0,2)

Provides access to records in either a random or sequential manner. Each record is uniquely identified by an integer specifying the record's logical position in a file.

- Indexed I-O (2 INX 0,2)

Provides access to records in either a random or sequential manner. Each record in an indexed file is uniquely identified by the value of a key within that record.

- Sort-Merge (1 SRT 0,1)

Orders one or more files of records, or combines two or more identically ordered files of records, according to a set of user-specified keys.

- Inter-Program Communication (2 IPC 1,2)

Allows a COBOL program to communicate with other programs through transfers of control and access to common data items.

- Source Text Manipulation (2 STM 0,2)

Allows the insertion of source program text as part of the compilation of the source program. COBOL libraries contain texts which are available to the compiler at compile time and which can be treated by the compiler as part of the source program.

In addition, the following optional modules of the standard are supported:

- Intrinsic Functions (1 ITR 0,1)

Provides the capability to reference a data item whose value is derived automatically at the time of reference during the execution of the object program.

- Debug (1 DEB 0,2)

Monitors object program execution through declarative procedures, special debugging lines, and a special register, DEBUG-ITEM, which gives specific information about execution status.

- Segmentation (2 SEG 0,2)

Refreshes independent segments when required.

The following optional module of the standard is supported with the optional IBM COBOL Report Writer Precompiler (5798-DYR):

- Report Writer

The following optional modules of the standard are not supported:

- Communications
- Debug (2 DEB 0,2)

Federal standard

FIPS Publication 21-4, Federal Information Processing Standard 21-4, COBOL high subset.

Terminology: The term “COBOL 85 Standard” is used in this document to refer to the combination of the following standards:

- ISO 1989:1985, Programming Languages - COBOL.
- ISO/IEC 1989/AMD1:1992, Programming Languages - COBOL: Intrinsic Function Module.
- ISO/IEC 1989/AMD2:1994, Programming Languages - COBOL: Correction and Clarification Amendment for COBOL.
- ANSI INCITS 23-1985, Programming Languages - COBOL.

- ANSI INCITS 23a-1989, Programming Languages - Intrinsic Function Module for COBOL.

- ANSI INCITS 23b-1993, Programming Language - Correction Amendment for COBOL.

The term “COBOL 74 Standard” is used in this document to refer to X3.23-1974, American National Standard for Information Systems - Programming Language - COBOL.

Restrictions: Enterprise COBOL has the following restrictions related to industry standards:

- OPEN EXTEND is not supported for ASCII encoded tapes (CODESET STANDARD-1 or STANDARD-2).
- When division by zero occurs in an arithmetic expression and an ON SIZE ERROR phrase is not specified, processing abnormally terminates.

Compatibility features

Compatibility with Enterprise COBOL for z/OS and OS/390, Version 3 Release 1

Enterprise COBOL is fully source and object compatible with Enterprise COBOL for z/OS and OS/390, Version 3 Release 1.

Compatibility with COBOL for OS/390 & VM, Version 2 Release 2

Enterprise COBOL is fully source and object compatible with COBOL for OS/390 & VM Version 2 Release 2 except in the following cases:

- CMPR2 compiler option has been removed.
- There are new reserved words: EXECUTE, FACTORY, FUNCTION-POINTER, JNIENVPTR, XML, END-XML, XML-EVENT, XML-CODE, XML-TEXT, and XML-NTEXT.
- SOM-based object-oriented COBOL is no longer supported.

Compatibility with COBOL for

OS/390 & VM, Version 2 Release 1

Enterprise COBOL is fully source and object compatible with COBOL for OS/390 & VM Version 2 Release 1 except in the following cases:

- CMPR2 compiler option has been removed.
- There are new reserved words: COMP-5, COMPUTATIONAL-5, EXEC, EXECUTE, END-EXEC, FACTORY, FUNCTION-POINTER, JNIENVPTR, XML, END-XML, XML-EVENT, XML-CODE, XML-TEXT, and XML-NTEXT.
- The behavior of the TRUNC(BIN) option has changed for unsigned binary fields that contain values larger than the corresponding signed binary field could have contained.
- SOM-based object-oriented COBOL is no longer supported.

Link-editing requirements

If any part of a load module is compiled with Enterprise COBOL, the load module must be linked with the OS/390 Language Environment or z/OS Language Environment. With Enterprise COBOL, relinked load modules are not self-contained.

Debugging considerations

Programs that are compiled with Enterprise COBOL can be debugged using Debug Tool, Version 3 Release 1, which is included with Enterprise COBOL if you order the Full Function offering. Enterprise COBOL and Language Environment do not support COBTEST or TESTCOB.

Debug Tool can also be used to debug programs that have been compiled with the TEST option using:

- VS COBOL II (Release 3 and Release 4 only) running under Language Environment
- COBOL/370
- IBM COBOL for MVS & VM
- IBM COBOL for OS/390 & VM

The following products also contain Debug Tool: Full Function offerings of the OS/390 or

z/OS C/C ++ optional feature; IBM PL/I for MVS & VM, Version 1; IBM VisualAge PL/I for OS/390, Version 2; IBM Enterprise PL/I, Version 3; and IBM COBOL for OS/390 & VM, Version 2.

Licensed program materials availability

Restricted materials—No. This licensed program is available without source licensed program materials. It is available in object code only.

Supplemental terms

Designated machine identification

Designated Machine Identification Required—Yes.

Testing period

- Basic License: Two months.
- DSLO License: Not applicable.

Installation or location license

Not applicable. A separate license is required for each machine on which the licensed program will be used.

Usage restriction

Not applicable.

Type and duration of program services

- Central Service.
- Until discontinued by IBM with a minimum of six months' written notice.

Authorization for copy and use on home or portable computer

Not applicable.

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September 2002

Printed in U.S.A.

GC27-1411-01

