Micro Focus Academic Program 4.0

Release Notes

2018-08-07

Contents

Micro Focus Academic Program 4.0 - Release Notes

These release notes contain information that might not appear in the Help. Read them in their entirety before you install the product.

Overview

The Micro Focus Academic Program brings contemporary software development tools and technologies to COBOL development helping to bridge the gap between the old and the new.

COBOL applications still run many of the world's business systems, therefore teaching the COBOL language is a great way to prepare your university's students for a robust IT career in today's economy.

The Micro Focus Academic Program is designed to support the education and use of the COBOL language within the academic setting. This program supports our academic partner community through the use of our COBOL development tools and materials within the classroom.

This program will enable your university to quickly join this growing league of similar academic organizations in support of the promotion and education of the COBOL language.

Welcome! We're excited to have you join our growing academic community.

Product Description

The Micro Focus Academic Program Edition package comprises the following products:

- Visual COBOL - delivers the richest development experience for COBOL programming. On Windows, Visual COBOL is available for use with Microsoft's Visual Studio or with the Eclipse integrated development environments. On UNIX or Linux, it is available for use with Eclipse. Visual COBOL supports the development and deployment of both JVM COBOL and .NET COBOL, and of native COBOL applications.

  Variants of Visual COBOL include:

  - Visual COBOL for Visual Studio 2013, Visual Studio 2015 or Visual Studio 2017
  - Visual COBOL for Eclipse (Windows)
- Enterprise Developer - a contemporary development suite for Microsoft Visual Studio or for Eclipse that enables mainframe developers to maintain, develop and modernize mainframe applications regardless of whether these are to be deployed back on the mainframe or onto an alternative platform. Enterprise Developer supports IBM COBOL, IBM PL/I, IBM Assembler, IBM CICS, IBM IMS, IBM JCL, IBM DB2, IBM z/OS file formats and common batch utilities including SORT. This means you can develop and maintain the core mainframe online and batch applications under Enterprise Developer, then deploy them back on the mainframe or migrate them onto one of the Micro Focus production platforms available on UNIX, Linux, or Windows. Variants include:

  - Enterprise Developer for Visual Studio 2013, Visual Studio 2015 or Visual Studio 2017
  - Enterprise Developer for Eclipse

Micro Focus Academic Program differs from the full version of these products in a number of ways. The differences are:

- You cannot deploy applications on other machines, so Micro Focus COBOL Server and Enterprise Server are not supplied.
- An authorization code for the Micro Focus Rumba 3270 terminal emulator is not supplied.

Note: Micro Focus Academic Program is supplied for Academic use only. It is not to be used for any commercial purposes. You must be a registered Micro Focus Academic Program Partner in order to use this software.

For more information, follow the link in the Electronic Product Delivery email for the End User License Agreement.

Reporting Issues

- For the latest information and discussions on this product, or to report issues, visit the *Micro Focus Community* Web site.

Note:

- This document contains a number of links to external Web sites. Micro Focus cannot be responsible for the contents of the Web site or for the contents of any site to which it might link. Web sites by their nature can change very rapidly and although we try to keep our links up-to-date, we cannot guarantee that they will always work as expected.
- Check the *Product Documentation* section of the *Micro Focus SupportLine Web site* for any updates to the documentation which might have been uploaded.

Upgrading from earlier Micro Focus products

Version 4.0 of your product is dependent on a later version of the Microsoft C run-time system than earlier Micro Focus products. This means that COBOL executables (.exe) built with an earlier version of your product might not be compatible with version 4.0 run-time products. If the behavior of your application changes with version 4.0, we strongly recommend that you relink the main executable with version 4.0. This will ensure that the COBOL run-time system fully handles any run-time error conditions that might occur.

A new executable that is fully compatible with version 4.0 can be produced without recompiling the application, as long as the original object code is available and it is relinked with version 4.0.

To allow your executables to benefit from the product's latest programming and performance enhancements, we recommend a full recompilation of your source code.

If you are using Visual Studio, you can configure the IDE to automatically check whether applications created with older releases must be relinked. If the application uses an older version of the C run-time system, Visual COBOL can automatically relink the existing executable or .dll to the new version of the C run-time system without the need to recompile the application first. If a project needs relinking, Visual Studio displays a message in the status bar (Visual Studio 2015 and 2017) or a dialog box (Visual Studio 2013) providing an option for you to choose and relink the project.

If you are using Eclipse, Visual COBOL 4.0 can automatically relink existing projects created with Visual COBOL 3.0 that have executable link artefacts. Eclipse displays a warning in the **Problems** view that the project requires relinking. It then offers a Quick Fix action for you to execute that will link your project with the most recent version of the Run-Time System.

What's New

This release provides enhancements in the following areas:

- *Integration with Visual Studio*
- *Integration with Eclipse*
- *Application Server JCA Support for Enterprise Server*
- *Application Workflow Manager*
- *AppMaster Builder*
- *Build Tools for Windows*

- *Code Coverage*
- *Codeset support*
- *Compiler directives*
- *Data File Tools*
- *Database Connectors*
- *Debugging*
- *Docker*
- *Documentation on working with large applications*
- *Enterprise Server*
- *Enterprise Server for .NET*
- *File Handler*
- *HCO for DB2 LUW*
- *IMS support*
- *JCL support*
- *Mainframe Access*
- *Managed COBOL*
- *Library routines*
- *Micro Focus Unit Test Framework*
- *OpenESQL*
- *Platform support*
- *PL/I support*
- *Web Service Clients*

Integration with Visual Studio

Back to Top

This release includes the following editor improvements:

- Inline rename refactoring - overwriting a variable name directly in the editor now invokes rename refactoring so you no longer need to select **Refactor** from the editor context menu.
- **Extract to section** - a new quick action (Visual Studio 2015 and later only) is available in the editor. It enables you to refactor your code by adding more sections in the code. This can help you create more entry points that you can use during unit testing.
- Automatic insertion of END-EXEC, END-TRY and END-PERFORM statements - the closing statements are now automatically inserted after you have typed the opening statements.
- IntelliSense filters (Visual Studio 2017 and later only) - when IntelliSense displays a list of suggestions, a number of icons at the bottom of the IntelliSense window now enable you to filter the suggestions.

Working with files:

- Copybook graphs - a context menu command, **Show Copybook Graph**, in Solution Explorer enables you to display the graphical representation of the copybook dependencies of COBOL programs.
- **Open Folder** mode (Visual Studio 2017 only) - support is now available for editing, compiling and debugging files opened in Solution Explorer in Open Folder mode without having to create projects.
- The file property pages now display a list of all Compiler directives that apply to the file.

New IDE configuration option:

- You can use the **Limit IntelliSense Search Scope** setting in **Tools > Options > Text Editor > Micro Focus COBOL > Advanced** that helps improve the editor performance.

Relinking existing applications in Visual Studio:

- You can now configure Visual COBOL to check whether applications created with older releases must be relinked. If the application uses an older version of the C runtime, Visual COBOL can automatically

relink the existing executable or .dll to the new version of the C runtime without the need to recompile the application first.

If a project needs relinking, Visual Studio displays a message in the status bar (Visual Studio 2015 and 2017) or a dialog box (Visual Studio 2013) providing an option for you to choose and relink the project.

Integration with Eclipse

Back to Top

This release provides the following general enhancements:

- Support for Eclipse 4.7 Oxygen (64-bit) and 64-bit project templates - the 64-bit Eclipse 4.7 is now installed by default. Project templates are available for both 32-bit and 64-bit applications. You can set a default project template (either 32-bit or 64-bit) to use so that all future new projects will use that as the preference. On platforms only capable of building to 64-bit, the 64-bit templates are the default ones.

  The 32-bit Eclipse is still supported on 64-bit Windows platforms, however you need to manually install it and a 32-bit Java.

  Support for Eclipse 4.4 and 4.5 has been discontinued.
- Support for SUSE 12 - only the 64-bit SUSE 12 platform is supported and you can only use the 64-bit Eclipse with 64-bit projects on it.
- (Native COBOL projects only) The **Project Settings** page in the project's properties now include a search option. This enables you to find files and build configurations that have settings different from the ones set at project level.
- **Remove File Directives** - a context menu command in the explorer view enables you to reset a file's directives.
- IVP diagnostic tool enhancements - it is now possible to run the server-side IVP diagnostic tool for diagnosing issues with a remote connection from within Eclipse installed at the client side. The IVP tool now also performs a check for whether XTERM is installed on the remote machine.
- IMTK service mappings are now automatically regenerated if you make a change to the interface fields in the underlying program.

The following enhancements are available for JVM COBOL projects and package handling:

- New wizards for creating ENUM, DELEGATE and VALUETYPE types.
- Additional code snippets for Method-Id and Property-Id.
- Showing and grouping packages in the COBOL Explorer view - use the **COBOL JVM Project Presentation** command from the **View** menu in the explorer to either display COBOL categories or packages.
- Refactoring by renaming the package name - available from the context menus in the COBOL Editor and in COBOL Explorer.
- Refactoring by moving source folders, packages or compilation units - available from the explorer context menu.
- Support for switching off the package name mapping using the **Each part of the package name corresponds to a subdirectory** option in the **Build Configuration** page.
- Support for packaging .class files in a .jar file when building COBOL JVM projects.
- **Open Type Hierarchy** and **Open Call Hierarchy** context menu commands - available in the COBOL editor, COBOL Explorer and in the outline views while seeing the packages presentation in the IDE.

The following editor improvements are available:

- A **Properties** context menu command - enables you to access a file's properties directly from the editor.
- A **Show In** context menu command - enables you to locate the file in the COBOL or the PL/I Explorer.
- **Edit > Convert Tabs to Spaces** command - enables you to convert any tabs in your COBOL source files to a specified number of spaces.

Automatic relinking of applications created with Visual COBOL 3.0:

- Visual COBOL 4.0 can automatically relink existing projects created with Visual COBOL 3.0 that have executable link artefacts. Eclipse displays a warning in the Problems view that the project requires relinking. It then offers a Quick Fix action for you to execute that will link your project with the most recent version of the run-time system.

Application Server JCA Support for Enterprise Server

Back to Top

This release includes the following enhancements:

- COBOL Resource Adapters now support WebSphere 9.0 and WebLogic 12.2.1.
- Tomcat 7.0 support for servlet generation with J2SEBeans.
- NullSearch utility - for COBOL resource adapters, this new utility provides assistance in locating NULL fields in mappings passed to Enterprise Server. When a large number of arguments is provided in the parameters passed to Enterprise Server, it is difficult to locate NULL fields, which are not allowed. The NullSearch utility isolates NULL fields, so the Java application can be corrected.

Application Workflow Manager

Back to Top

Improvements have been made in the following areas:

- Model editor - now includes:

  - A new **Edit** action. Enables you to edit any model component instead of working with the Properties view. The new action enables you to change the attribute values of several model components at a time.
  - An Outline and a Relationship Hierarchy view.
  - Improved backwards and forwards navigation in the model.
  - Automated sequence numbering in the model.
  - The context menu of the model editor has been restructured for more clarity.
  - Context help.
  - Tool creation has been improved. Dependent components are generated from the function package tool definition.
- Development of models:

  - Newly created empty models now contain all categories. The new models also validate without any errors or warnings.
  - A new AWM system type, "Custom System", is available. This system type supports the model development process by facilitating the creation, change, load and reload of a model.
- New modelling features:

  - The "Return Property Value" tool in the function package now supports several additional use cases.
  - The "Transfer File" tool in the function package offers improved support for mass processing.
  - Support for properties with an application-wide scope.
  - A modelling capability to structure the local file cache for copybooks and include files downloaded by the background parser in the editor. Additional tools are provided to check the existence of or clear the file cache for copybooks and include files.

- The product help includes some tutorials showing how to create new models and extend the functionality of existing models. See the *Tutorials Guide*.
- A number of template models are now available and can be used as a base to develop your own models.

AppMaster Builder

Back to Top

This release includes the following new features:

- AppMaster Builder is now available in the Team Developer Perspective (Technology Preview) - this perspective provides a development environment for your AMB projects that includes much of the functionality available from the AppMaster Builder perspective plus access to the AMB Endevor Interface (Technology Preview).
- AMB Endevor Interface (Technology Preview) - enables you to share and synchronize resources between an AMB project and mainframe Endevor datasets.
- A re-number/un-number feature in the Data Structure Editor.

Build Tools for Windows

This release includes Visual COBOL Build Tools for Windows, a separately-installable component of Visual COBOL that has been designed to be used in environments where you want to work with your COBOL and PL/I projects but you don't want the overheads associated with either the Visual Studio or the Eclipse IDE.

Build Tools provide a lightweight, easy-to-install development environment that is well-suited for use in Docker containers and continuous integration or continuous delivery systems.

Code coverage

This release provides the following enhancements:

- Support has been added in Eclipse for code coverage for procedural copybooks.

- In Visual Studio, the Micro Focus Code Coverage window now offers a File View in addition to the existing Program View.

Codeset support

Support has been added to enable codeset mapping to additionally be configured to use IBM's Conversion Tables directly instead of the Micro Focus supplied tables. You need to download IBM's conversion tables from IBM's Web site. Then you can use the MFCODESET environment variable to convert between IBM's CCSIDs.

Compiler directives

The following Compiler directives are new in this release:

- **DISPSIGN** - determines the display output of numeric fields with included signs, under an IBM mainframe dialect only.
- **GNTLITLINKSTD** - stops the suppression of call-convention 8 when both call-convention 2 and call-convention 8 are in effect for a `.gnt` file in an Intel x86 32-bit environment.
- **ILSMARTANNOTATE** - adds attributes to the items generated by ILSMARTLINKAGE, based on their data type, which can be used to identify the size or range of the item in COBOL.
- **ILSMARTTRIM** - trims any trailing spaces from a string item returned by the get property associated with an alphanumeric item processed by ILSMARTLINKAGE.
- **MAINFRAME-FLOATING-POINT** - specifies the format of a program's floating point data items: either IBM hexadecimal format or IEEE format. This directive is supported in managed code only.

The following Compiler directives contain new parameters in this release:

- **CHECKDIV** - a new parameter 'ACOS' now emulates a divide by zero operation on an ACOS mainframe system: the quotient and the remainder are set to the value of the dividend.

- **OOCTRL** - a new parameter, **L**, specifies whether to include directory location comments in `.cls` and `.ins` inheritance files.
- **NUMPROC** - a new parameter 'ACOS' provides partial compatibility with the behavior of NEC ACOS COBOL processing of invalid data in USAGE DISPLAY data items and invalid sign information in USAGE COMP-3 data items.

Data File Tools

Back to Top

It is now possible to export any filtered results. When filtering a data file, you can use the results to create a new data file - click **Search** > **Export Results** when a filter is applied to save the filtered records to a new file. You can:

- Save the filtered records to a new file.
- Save the records that match the specified filter (such as customer information or orders).
- Download a subset of the data from a remote file.
- Save a small portion of the data for testing purposes.

Database Connectors

Back to Top

Debugging

Back to Top

This release includes the following enhancements:

- Enhanced .NET debugging in Visual Studio 2017 - a number of advanced debug features are now available when debugging .NET COBOL code. Features include support for performance tips, backwards debugging, an expression evaluator, integration with the Diagnostic Tools window, remote debugging of .NET COBOL applications, as well as support for IntelliSense in the debug windows (such as the Immediate, Watch, and QuickWatch windows).

- Debugging CICS channels and containers - you can now debug CICS COBOL applications that use channels and containers. The debugger now enables you to view the contents of any channels and containers, and to change content as you debug.

The following enhancements have been made to reverse debugging and live recording in Eclipse:

- Reverse debugging and live recording have been enhanced significantly, and are now considered GA features. You can now debug using watchpoints and conditional breakpoints, and reset execution points. Debugging multi-threaded applications is now supported, and so are programs that contain OSVS performs and nested programs.
- A command line utility, `cobeslr`, has been introduced to enable you to configure live recording for particular services or application instances of an enterprise server region.
- You can now use the CBL_DEBUG_START and CBL_DEBUG_STOP library routines to start and stop a live recording session.

Docker

Back to Top

This release provides support to enable you to run your COBOL and PL/I applications in Docker containers, taking advantage of the many benefits offered by the Docker platform such as portability, performance, agility, isolation, and scalability.

Documentation on working with large applications

Back to Top

The product help now includes a new section, *Working with a Large Code Base*, that includes recommendations and best practices for working with large applications inside the IDE. It includes tips on how to structure your projects, how to optimize the performance of the IDEs, and step-by-step workflow showing how to move an existing legacy application into Visual COBOL.

Enterprise Server

The following enhancements have been made to Enterprise Server:

- Conversation filtering - the Enterprise Server Communications Process (MFCS) can now restrict access to listeners by client address. You can specify any permitted or forbidden addresses either by IP address, network mask, or domain name, and use wildcards. Filters can be applied to individual listeners, communications processes, or to entire regions. More specific filter rules override any general ones.

- The Enterprise Server Security Facility now starts throttling Verify requests when it receives more than 100 requests per second.

  This can be used to limit the effectiveness of denial-of-service and brute force attacks. You can configure the value where throttling occurs. See *Verify Request Throttling* for more information.

- (Technology Preview only) Support for adding, deleting, and modifying XA resources in a live Enterprise Server region.

  It is now possible to add, edit, or delete XA resources while an enterprise server instance is running. Any changes made come into effect after any in-flight transactions have completed. The ability to make these changes in a live environment comes under the control of the existing enterprise server permissions.

- XA-compliant Resources (XARs) - this release provides enhanced CTF tracing that allows more flexible reporting of warnings and errors on the RM switch module level.

- A new Communications Server resource class - enables you to control the access to the Enterprise Server Console Log and Communications Server Log when external security is in effect for an enterprise server region; see *Resource Classes for Communications Server* for more information.

- Improved catalog availability - there is now an improved resilience to temporary communication issues with the catalog and error reporting enabling a region to stay active if a region has multiple catalogs defined and one of the catalogs is not available.

- Enhanced SSL/TLS certificate support - for communications with TLS (formerly SSL), additional certificate and key file formats are supported. Servers may now be configured with both an RSA and an ECC key and certificate.
- Enhanced SSL/TLS cipher configuration - for communications with TLS (formerly SSL), the permitted cipher suites and their preferred order can now be configured. The minimum size of Diffie-Hellman groups for DH key exchange can also be configured. The defaults have been made more secure.

- The Historical Statistics Facility (HSF) now enables you to write user-defined data to the records produced within a `.csv` file. Use the ES_WRITE_CUSTOM_HSF or ESCSTHSF library routines within your COBOL programs to define the custom data, and use the ES_HSF_CFG environment variable to configure up to five custom fields in the generated record.
- You can also use the ES_HSF_CFG environment variable to configure the number of CICSF, TSQ, and TDQ fields that are written to the record.

Enterprise Server for .NET

This release provides the following enhancements:

- Limited support has been added for TLS (SSL) - you can now configure TN3270 and MFBINP listener channels for TLS (SSL). The seeout command-line utility and the JES public class API also now support TLS.
- Enterprise Developer for Visual Studio includes a new wizard that enables you to convert native MSS projects to managed MSS ones. The wizard is invoked using the **Create Managed Mainframe Project** context-menu command at project level in Solution Explorer.

File Handler

Back to Top

This release provides the following enhancements:

- The DFSORT and SYNCSORT emulations now support the NULLOFL parameter of the OUTFIL statement.
- The **ASCIISOSI** configuration option is now available. It adds the required SOSI characters to the relevant EBCDIC DBCS character strings in order for them to be displayed or written out correctly.

HCO for DB2 LUW

Back to Top

This release includes the following new features:

- Support for CHARSET EBCDIC COBOL stored procedures
- Seamless integration with DB2 LUW SBCS databases, providing various EBCDIC collation sequences
- 64-bit HCO command-line tools are now available across all supported platforms
- HCO DCLGEN enhancements that provide more copybook generation options

IMS support

Back to Top

This release introduces the following new features:

- The IMS Database Forward Recovery feature has been updated to provide point-in-time forward recovery that enables you to recover all database transactions completed up to a specified point in time, including date and time of day.
- IMS support now includes MFS code for Light Pen devices. In your MFS, include a DEV statement with the FEAT=PEN parameter, and set the ATTR property on appropriate fields to DET or IDET to make them detectable by a light pen. See your IBM documentation for details.

    Note: MFS that contains light pen code must be regenerated to take effect if the MFS is part of an Visual COBOL project created using an earlier release.
- Support for export and import of IMS-configured enterprise server regions through Server Explorer.

JCL support

Back to Top

This release introduces the following new features and enhancements:

- Micro Focus FTP utility - you can now configure MFFTP to not process trailing blank spaces for a GET command, by setting the new control variable MFFTP_PROCESS_TRAILS_ONGET=FALSE and setting the LOCSTAT value TRAILINGBLANKS=FALSE.
- A new API has been introduced - MVSSPLPB - that enables you to search all job information held in the JES spool control files. It is more comprehensive that the existing MVSCASPB API, and should instead be used for all new spool enquiries.
- A number of new environment variables have been introduced that enable you to configure the JES startup behavior with regards to opening user catalog files. You can configure JES to open user catalog files only when they are required (and not during system startup), and you can configure JES to retry

opening a catalog file that has failed to open. These changes increase the resilience of the JES system, as you can mitigate against JES startup failures if the user catalog files are not readily available whilst the region starts. See *Configuring Multiple Catalogs* for more information.

- The public catalog API, MVSCATPB, has been enhanced to better report on file errors when opening catalog files. The following new functions have been added to `mfpubcat.cpy`: GCFS, GNFS, STNI, GCFE, and GNFE.

Library routines

The following library routines contain new functionality:

- **CBL_GET_OS_INFO** - this library routine can now detect if the program is running within a Docker container: `cblte-osi-rts-capabilities parameter`, bit 7.
- **CBL_DEBUG_START** and **CBL_DEBUG_STOP** - these library routines have been enhanced to start and stop a live recording session.

Mainframe Access

The installation process has been changed as follows:

- A single installer for both Mainframe Access and the Mainframe Access z/Server support is provided.
- There is now only one XML configuration file for Mainframe Access. There is also a new configuration utility that guides you through the configuration process.
- Specify your own JES console character - it is now possible to configure the Mainframe Access installation to use a different JES console character instead of the default ("$"). To achieve this, use the new JES_CONCHAR configuration parameter.

Enhancements are available in the following areas:

Managed COBOL

Deploying JVM COBOL to an Application Server:

- Running JVM COBOL under WebSphere 9.0 and WebLogic 12.2.1 is now supported.

Micro Focus Unit Test Framework

This release provides support for the following functionality:

- Generation of unit test stubs for selected entry points within your program.
- Support has been added to Visual Studio for unit testing of managed procedural projects.

OpenESQL

This release provides the following new features:

- Support for SQL Server 2017.
- The SQL(TRANSACTION) compiler directive has been enhanced to clearly define transaction boundaries.
- A new SQL(NOWHERECURRENT) compiler directive that allows you to define updateable cursors that do not do positioned updates or deletes with PostgreSQL or MySQL.

- Larger communication area (PID) that accommodates longer plan and program names.
- SQL(OPTIMIZECURSORS) has been enhanced for consistent and better cursor performance across all OpenESQL backends.

Platform support

Back to Top

Note the following changes in platform support for this release:

- Windows 8 and Windows Server 2012 are no longer supported for developing applications. They are still supported for deployment.

PL/I support

Back to Top

Note: PL/I applications that were created using Enterprise Developer 3.0 and earlier must be recompiled in Enterprise Developer 4.0 to ensure they will compile and execute properly.

Support has been added to Eclipse for the following features in PL/I debugging:

- Displaying complex data structures in the Expressions and Variables views.
- Viewing the console window on non-Windows platforms so that output and input can be seen or entered.
- The Outline view in the default Debug perspective.
- Watchpoints on variables on the line where the variable has been declared.
- Conditional breakpoints.
- Skipping variables a defined number of times before the execution stops.
- Adding expressions to the Expressions view from the Outline view.
- Inspecting variables when referenced as part of a macro argument.
- Signals and conditions.

PL/I compiler and Run-Time System enhancements:

- Support for the following built-in functions - CHARVAL(), COMPARE(), CURRENTSIZE(), EDIT(), PICSPEC(), SOURCEFILE() and SOURCELINE().
- Support for additional DATETIME() format strings.
- Support for the FLUSH FILE(*), ITERATE, and RESIGNAL statement.
- Support for the XMLOMIT and XMOLATTR attributes on variable declarations.
- Support for the MARGINI compiler option.
- Support for the SIZE and STRINGSIZE prefix conditions.
- Improved support for the repeat factor on arrays of AREA variables.
- Improved pointer arithmetic on 64-bit platforms.
- Where necessary, MFPLX now recognizes selected *PROCESS statements and passes them to the appropriate preprocessors.

PL/I EXEC preprocessor:

- The EXEC preprocessor now honors the -margins setting for the output MDECK in addition to the input file. This provides an improved experience in the Eclipse IDE when using the Outline view and other PL/I features provided by the background parser.

PL/I macro preprocessor:

- The Micro Focus macro preprocessor now provides a new default behavior that mimics IBM's RESCAN(ASIS) behavior. In addition, a new option, rescan_upper, has been introduced to enable you to optionally mimic IBM's RESCAN(UPPER) behavior.

Improvements in compatibility with IBM's Macro Preprocessor:

- Allows OTHER as an acceptable abbreviation for OTHERWISE on a macro SELECT statement.
- Supports the SCAN/NOSCAN option on declaration of macro variables.
- Implements the NOSCAN option on ANSWER statements.
- The %NOTE message format has been modified to match IBM's behavior.
- The SYSVERSION built-in function has been modified to always return a value of 22 bytes in length (space padded, if necessary).
- Relaxed diagnostics for scenarios where Enterprise Developer is generating a warning message and IBM does not.

(Technical Preview) Generating PL/I test coverage reports in Eclipse:

- The PL/I Compiler and Run-Time System now support capturing of information showing which lines in the program have been executed, and the generation of human-readable reports at the conclusion of a run.

(Technical Preview) Interaction with COBOL AMODE and 370 Assembler programs (Windows 32-bit only):

- A new compiler option is available which enables Open PL/I to interact with 370 Assembler, and with COBOL programs compiled with AMODE. See the product help for the current limitations to this support.

Web service clients

Back to Top

This release provides the following enhancements for Web service clients:

- Improved support for larger, more-complex WSDL files, including:
  - Configurable generation of variable arrays and repeated structures by specifying the Inline-Array-Size-Limit parameter.
  - Generation selection for service, port, and one or more operations.
- Support for SOAP version 1.2 in addition to version 1.1.

Significant Changes in Behavior or Usage

This section describes significant changes in behavior or usage. These changes could potentially affect the behavior of existing applications or impact the way the tools are used.

Where present, the numbers that follow each issue are the Support Incident Numbers followed by the Reported Problem Incident (RPI) number (in parentheses).

- *Application Server JCA Support*
- *Application Workflow Modeller*
- *CICS Support*
- *Code Coverage*
- *Codeset Support*
- *Common Communications Interface*
- *Communications Server*
- *Compiler*
- *Data Tools*
- *Documentation*
- *Enterprise Server*
- *Enterprise Server Auditing*
- *Executables require relinking*
- *File Handling*

- *HCO for Microsoft SQL Server*
- *IDE*
- *Interface Mapping Toolkit*
- *JCL Support*
- *Mainframe Access*
- *MF Server Administrator (GUI)*
- *Micro Focus Directory Server*
- *PL/I Compiler*
- *Run-Time System*

Application Server JCA Support for Enterprise Server

- With this release, all CICS-related Java artifacts have been delivered using a new directory structure under the `javaee-ccl` directory of your Visual COBOLCOBOL Server installation directory. The `javaee-ccl` directory structure mimics the structure of the `javaee` directory. For example, `mfccl.jar` is no longer located in the `bin` subdirectory, but can be found in the `javaee-ccl \common` directory.

Application Workflow Modeller

Back to the list

- Source or listing files are now opened in read-only mode when a browse action is executed in the ChangeMan attachment model.

  3138354 (1112546)
- A new function package, Micro Focus Background Parser, enables you to define the SYSLIB or PROCLIB concatenation in which to search for COBOL copybooks, PL/I or JCL include files on the mainframe or on network drives. The package also enables you to define any identifiers which determine the structure of the local cache for COBOL copybooks, PL/I or JCL include files.

  3132249 (1111922)
- The Endevor attachment application now validates the input of a CCID or a comment. They must not be blank.
- Added the new "Modeled Edit Sessions Only" AWM model attribute to control whether modeled editor actions should be available in non-modeled edit sessions.

CICS Support

Back to the list

- Starting with version 4.0 Patch Update 2, all applications that use WEB CONVERSE or WEB SEND SESSTOKEN explicitly with the AUTHENTICATE, BASICAUTH, or NONE options, and that do not use a URIMAP that specifies the AUTHENTICATE attribute, must be recompiled. (This does not affect applications that use a URIMAP that specifies the AUTHENTICATE attribute.)

- Client ECI timeouts now propagate CTG requests to ABEND AITH the ECI server program.

- The update resource definition file utility, CASRDTUP, now supports the DELETE command. Note that the REMOVE option is not currently supported.

  2885020 (1108004)

Code Coverage

Back to the list

- Schema changes that affect the test coverage results generated from the `tcutil` utility mean that if you propagate the results to a third-party application (for example, an XSLT processor), and rely on the `<copyFileCoverage>` element, you need to alter your transformations to focus on

`<sourceFileCoverage>` instead. The element was renamed to more appropriately reflect its contents, as `tcutil` now gives global coverage for all source files (not just copybooks).

Codeset Support

- Code-set mappings between ASCII and EBCDIC have been updated when Simplified Chinese is the language in effect. ASCII table 5210 now maps to EBCDIC CCSID 836 for SBCS conversions. This replaces the previously conversion (where ASCII table 1042 was used), which would convert the "\" character to "$".

  3124321 (1111464)
- New single-byte character set tables for MFCODESET have been added in order to improve support for DB2 LUW - both for off-mainframe databases and for access to z/OS DB2. A number of existing MFCODESET mappings have also been updated. See 'Supported Country Codes' for a full listing of ASCII/ANSI <-> EBCDIC mappings.

  3111843 (1109984)

Common Communications Interface

- You can now configure the Micro Focus Directory Server and enterprise server region's listeners to only use the server's configured SSL and TLS protocols and define a priority ordered cipher suite collection. This forces connecting clients to use the server's preferred ordered list of cipher suites when using the specified protocols.

  2866265 (1105526)

- In some circumstances it was possible for a connection to incorrectly accept the identity of an SSL/TLS peer and allow a connection to complete when the connection should have been denied. This occurred due to a failure to check the peer's entire identity certificate chain. This has now been fixed. NOTE: You might need to correct your system's configured certificate chains that fail verification checks at secure connection creation time.
- In some circumstances it was possible to crash the CCITCP module when it was attempting to obtain detailed error information about a closed connection. This has been fixed.

Communications Server

- TN3270 conversations to Enterprise Server now correctly handle the receive (idle) timeout setting configured for the listener. There are also two new settings for configuring TN3270 timeouts, "Printers time out" and "Output resets timeout". See the online product documentation for more information.

  3144133 (1113024)
- MFCS listeners can now be SSL-enabled without the need to have DemoCA installed.

  2868627 (1105777)
- MFCS no longer initializes the Security Facility if there are no External Security Managers defined for the region.

Compiler

- Programs containing EVALUATE statements of the form: EVALUATE true | false WHEN conditional-expression where conditional-expression included inline method invokes would give an RTS 114 error when run as .int code, and an "Illegal .int code" error when generated. This has been fixed. Also, short circuit evaluation is now correctly observed, such that when evaluating condition-1 AND condition-2, if

condition-2 contains an inline method invoke and condition-1 is false, then the inline method invoke is not executed. Previously, despite being correctly evaluated, the inline method invoke in condition-2 was being executed. Similar behavior relating to OR evaluations has also been corrected.

3138510 (1112492)

* During compilation, characters within literals that are unknown in the current locale are now less likely to cause spurious errors. However, the correct (and safest) solution is to ensure that the locale has been set correctly, to match the source encoding of these characters. On UNIX, this means setting LANG, LC_CTYPE, or LC_ALL appropriately; each of these variables takes precedence over the former. On Windows, this means setting the system locale in the 'Region and Language' section of Control Panel.

3123935 (1111148)

* The Compiler now produces an E level message - COBCH1888 Typedef is defined differently in another external program - if different external programs have conflicting definitions of the same typedef name. (To restore the previous behavior, where the earlier definition was ignored, use the directive HIDEMESSAGE"1888".)

* An issue with the Compiler has been fixed so that in the RECORD VARYING clause, if the minimum and maximum lengths are specified, the maximum length must be greater than the minimum length.

Data Tools

Back to the list

* Records with an invalid value for a conditional field will no longer result in a match for that conditional layout.

2853226 (1103406)

Documentation

Back to the list

* You can use 'byte' or 'BYTE' as a synonym for the binary-char unsigned data type. As a result, 'byte' and 'BYTE' are now reserved words in Managed COBOL. Use the REMOVE"BYTE" Compiler directive to prevent an error being produced for existing programs that use the reserved word as a user-defined word.

3147576 (1113323)

* As of version 3.0, references to types within an assembly other than mscorlib need to be explicitly referenced. You can achieve this by using the ILREF Compiler directive. (Previously, in certain circumstances, the Compiler would allow access to types within the System.dll assembly without the need for an ILREF"System" directive.

3121002 (1111373)

Enterprise Server

Back to the list

* The External Security Facility (ESF) can now be configured to throttle large volumes of incoming Verify (user authentication / signon) requests to improve resilience to denial-of-service and brute force attacks. See "Verify Request Throttling" for more information.

3113639 (1110160)

* The LDIF files used to create the sample configuration for Enterprise Server LDAP-based security no longer create an empty "PHYSFILE" resource class. Changes in the JCL engine as of ES 3.0 caused most jobs to fail when submitted to a security-enabled region using such a configuration. See the product help for more information.

* The MLDAP ESM Module, part of the Enterprise Server External Security Facility, now supports the Argon2 hash algorithm for creating password verifiers. See MLDAP ESM Module Custom Configuration

Information in the product help for more information. NOTE: The Argon2 hash is optional and not enabled by default.

- The MQ pages in ESMAC are now controlled by a new security resource, MQL. This enables you to either restrict or grant users access. 'MQL*' is a new resource that needs to be added under MFESMAC similar to existing resources such as 'PCT*' or 'XAT*'. The following is a sample export of the LDAP repository:

```
********************************
# Sample security definitions for ESMAC MQ Listeners/Writers pages

######################
###### MQL*        ##
######################
dn: CN=MQL*,CN=MFESMAC,CN=Enterprise Server Resources,CN=Micro
Focus,CN=Program Data,DC=X
changetype: add
cn: MQL*
objectClass: microfocus-MFDS-Resource
microfocus-MFDS-Resource-Class: MFESMAC
microfocus-MFDS-Resource-ACE: allow:SYSADM group:alter
microfocus-MFDS-Resource-ACE: deny:*:execute
microfocus-MFDS-UID: mfuid
#description: Allow full access any ESMAC MQ Listeners/Writers Screen

********************************
```

3143258 (1112990)

- You can now use the ECIResponse.getReturnCode() method to obtain the return code for any errors from Enterprise Server.

3142092 (1113248)

- Communication with the console daemon has been improved. Messages are displayed more quickly and requests are being processed more efficiently and, as a result, times for initialization and shutdown might be reduced.

3136867 (1112483)

- Administrators can now add, delete or modify XA resources in the Enterprise Server Administration Web UI while a region is running.

2589624 (1085625)

- CICS Web services has been updated to include the ES_TRANCLASS_CWI environment variable, which enables you to prioritize and limit Web requests in a TRANCLASS-enabled region. When the ES_TRANCLASS_CWI environment variable has been set to either TCPIPSERVICE (default) or URIMAP, a TRANCLASS-enabled region processes the elected transaction according to its priority and associated TRANCLASS.

    Note: When using CICS® Transaction Server for z/OS®, Version 3 Release 1, and IBM CICS initiates the ATTACH transaction followed by the ALIAS transaction for a single Web request, this is intended to enable the application of different limitations and priorities on these transactions. Enterprise Server does not support this. Instead, a TRANCLASS-enabled region processes the requests as a single ATTACH transaction, and uses the ALIAS transaction for security checks.

3126381 (1111349)

- Web access to the Enterprise Server Console Log and Communications Server Log is now restricted when the enterprise server region is secured using external security. Users will be required to provide a valid username and password in order to view either log file.

    Web access to the logs can be controlled using the standard ACL definitions under the new **Communications Server** resource class, with resources **Enterprise Server Console Log** and **Communications Server Log**. If these resources exist, users require 'read' access to be allowed to

view the logs. If the resources do not exist, the default behavior is to allow 'read' access on entry of a valid username and password.

An example of the new resource class and resource definitions can be found in the `es_default_ldap_msuser.ldf` file, which is located in the `bin` sub-directory of your product directory.

Enterprise Server Auditing

Back to the list

- The maxRetryTime value in the audit configuration file now treats 0 as a no timeout time, and any negative number as an infinite timeout.

  3150566 (1113592)
- Any extra information that was added to the syslog messages will now correctly appear in the structured data items.

Executables require relinking or recompiling

- Due to an internal change in version 4.0 of your product, you must at least relink any executable programs compiled prior to this version, to make them compatible with the latest run-time system. However, a full recompilation of your source code is the recommended action, to allow your executables to benefit from the product's latest programming and performance enhancements.

  Relinking an executable without recompiling means using the original object code with the `cbllink` utility. Original object code is typically the binary file output (usually containing the `.obj` extension) produced during the original compilation process. An application can contain one or more binary files.

File Handling

Back to the list

- In some cases the ESF LDAP Security Administration Web Interface inadvertently removed users from groups when changing their password. This has been fixed.

  3124294 (1111259)
- The ESF LDAP Security Administration Web Interface can now filter by Class and Resource name, description, and ACL. Previously, you could only filter on Class name.

  2871549 (1106119)
- For .NET applications, set XFHLOG=DEFAULT to create the XFHLOG file in the current directory; otherwise it is created in C:\ProgramData\Micro Focus\[ED/VS]\[Release]. From release 4.0 onwards, this variable also has an effect for native applications.

  3115116 (1110323)
- Setting the configuration option ASCIISOSI=ON will adds the required SOSI characters to the relevant EBCDIC DBCS character strings, in order for them to be displayed or written out correctly.

  3113802 (1110183)
- The OPEN mode of SYSOUT files now honors the DISP specified in the JCL.

  3109432 (1109745)
- OPEN I-O of a virgin ESDS file now correctly returns a file status of 35, as it does on the mainframe.

  2887724 (1108443)
- The TO parameter is now supported for TOT|TOTAL, MIN, MAX, and AVG in the TRAILER3 trailer item.

  3135298 (1112194)
- The OUTFIL statement of a SORT operation now supports the NULLOFL parameter.

  3110364 (1109822)

- The MFJSORT OUTFIL emulation now supports the VLTRIM parameter.

  3107105 (1109820)

HCO for Microsoft SQL Server

- The HCOSS Manage Connections tool was incorrectly limited to using the default CCSID for mainframe DB2 connections, causing problems when mainframe database did not use the default CCSID of 37. This has been corrected by the addition of a text box that enables the setting of a specific CCSID value for the connection.

  3130137 (1112180)
- When using the DIALECT=MAINFRAME setting, the OpenESQL STRICTPARSE SQL compiler directive option is now turned on by default for ODBC (DBMAN=ODBC). This ensures strict compliance with z/OS DB2 syntax.

  If your applications require the OpenESQL preprocessor to behave as it did in an earlier release, compile using NOSTRICTPARSE.

IDE

- New functionality to support the debugging of CICS channels and containers has been added to this release.

  2810448 (1098047)

- Code blocks in PL/I editor can now be folded. You can configure the PL/I editor to fold various block types. To do this, click Window > Preferences > Micro Focus > PL/I Editor > Folding, and check the options that you require.

  2867993 (1105654)

Interface Mapping Toolkit

- Refresh Resources functionality has been added to regenerate existing service interfaces for COBOL programs whose linkage section has been updated after the service interface was initially created.

  2849403 (1103036)
- Due to changes made to the **Configure Runtime Environment** dialog box in this release, after you upgrade your system, you must reenter all previously set values on this dialog box before running a service.

JCL Support

- You can now configure MFFTP to not process trailing blank spaces for a GET command, by setting the new control variable MFFTP_PROCESS_TRAILS_ONGET=FALSE and setting the LOCSTAT value TRAILINGBLANKS=FALSE.

  3138375 (1112486)
- ICEGENER now does not copy the RECFM from SYSUT1 to SYSUT2 if SYSUT2 RECFM is not specified in JCL and when SYSUT1 is VSAM. It defaults to F/FB if SYSUT2 is non-VSAM, or V/VB if SYSUT2 is VSAM.

  3131268 (1111805)
- An error in identifying the IDENT in IEBGENER when the record included high values at the start of the record has been corrected.

3109443 (1109759)

- FOR ED 2.3.2 HF7: The following changes have been made to the MF_UCC11 environment variable: MF_UCC11=Y - when running a job with DISP=(NEW,CATLG), it will not result in job failure caused by the data set already being cataloged. MF_UCC11=YR - when restarting a job with DISP=(NEW,CATLG), it will not result in job failure caused by the data set already being cataloged. For ED 3.0 HF1: The following changes have been made to the MF_UCC11 environment variable: The default behavior of MF_UCC11=Y has changed: DISP=NEW is changed to DISP=MOD only when the job is restarted. MF_UCC11=YA reverts to the old behavior of changing DISP=NEW to DISP=MOD even when the job is first run.

3107409 (1109722)

- The introduction of a new environment variable, ES_OLD_DYN_PDS, has changed the resulting behavior of dynamic PDS members when specified in a JCL DD statement. Default behavior (ES_OLD_DYN_PDS=N) no longer creates physical files or catalogs the PDS members when specified in a JCL DD statement. Set this variable to Y to enable the previous default behavior of creating the physical files and cataloging PDS members when specified in a JCL DD statement.

2845176 (1102528)

- To prevent unintended deletion of a GDG Bias, a GDG in use by one job may not be accessed by a second job until the first job has completed.

2816745 (1101569)

Mainframe Access

Back to the list

- Calling mfmon2.exe with the following options has the given effect:
  1. If you do not specify "EXTENSION" or specify "EXTENSION=" it will result in files downloaded without an extension.
  2. If you specify "EXTENSION=*" you will get an extension that matches the last part of the data set name. For example, if the source data set is a.b.c.d then the file extension will be .d.
  3. Everything else results in the extension specified. For example, "EXTENSION=txt" will result in files downloaded with a .txt extension.

MF Server Administrator (GUI)

Back to the list

- The total number of active sessions or clients in MFDS is now limited to 2000.

Micro Focus Directory Server

Back to the list

- The mfds -g options D, O, and S have been added to the product Help.

2848627 (1102864)

- MFDS now disables and limits the scope of Web listeners on add. It also emits a warning if any insecure Web listeners are displayed in the validate and listener tables.

PL/I Compiler

Back to the list

- Previously, storing PL/I named constants in big-endian form was incorrect and impaired some instances of restricted expression evaluation. In ED 4.0, named constants are stored in native form when the -bigendian compiler option is in effect.

3150931 (1113613)

- Open PL/I now supports the FLUSH statement.

  3134294 (1112117)
- The %PROCESS statement now includes new compile-time options, -pporder and -options. See the product help for more information.

  3107667 (1109861)
- Pointer subtraction in 64-bit mode now works as expected.

Run-Time System

Back to the list

- The run-time system now produces a more precise error message if a shared object of the wrong bitism is loaded.
- scan64 is no longer available. This has been superseded by the COBOL Analysis functionality in the IDE.

Known Issues

Refer to the *Known Issues and Restrictions* topic in the *Product Information* section of your product Help.

In addition, note the following:

- *CICS*
- *Commuter licenses*
- *Enterprise Server*
- *Installation*
- *Micro Focus Rumba*
- *OpenSSL*

CICS

EXEC CICS VERIFY PASSWORD has a failure scenario that doesn't exist on the mainframe. It is currently not possible to distinguish this failure from an incorrect password on the command itself via the returned EIBRESP and EIBRESP2.

Under Enterprise Server, the following options mean that an admin LIST request to ESF is necessary to acquire the appropriate information:

    CHANGETIME
    DAYSLEFT
    EXPIRYTIME
    INVALIDCOUNT
    LASTUSETIME

If no users are signed on to CICS, then this admin request will be made as the default CICSUSER which will be rejected.

The VERIFY PASSWORD command will return NOTAUTH 2, "The supplied password is wrong".

This is misleading because it implies that the value for PASSWORD on the command itself is incorrect. Note that in that case, CICS returns NOTAUTH 2 as per the mainframe.

The aggregated return code from ESF to CICS for the admin request is identical in both cases and so CICS has no way of distinguishing between these two failure scenarios. We therefore cannot return a new EIBRESP or EIBRESP2 for this particular case.

To allow CICSUSER to make admin LIST requests, the anonymous list option needs to be enable in the region's security manager configuration (not the Security Manager):

```
[Admin]
allow-list=yes
```

Commuter licenses

If there are a number of entries displayed in the License Administration tool, these might be either for different products or for the same product but for different serial numbers, for example.

When a commute request is made using the license manager, that request is serviced from a pool of licenses that could be provided by any number of Micro Focus product licenses stored on that server. The commute request cannot target a particular RMS license by product name, serial number, or number of cores.

The products to which you apply the commuter licenses will be licensed correctly but the number of licenses left in the License Administration tool might appear to be less than expected. This issue is more likely to occur with multiple entries for the same product.

If you are using a number of different products, Micro Focus recommends that you use a different licensing server for each product in order to help minimize the issue.

Enterprise Server

- On Windows 10, if you are using Microsoft's EDGE browser to access the Enterprise Server Administration GUI, issues with EDGE can cause the automatic refresh feature to display a dialog asking whether you want to resubmit a form. To work around this issue, cancel the resubmit request and then refresh the server list page or the Home page of Enterprise Server Administration. You can also turn off the automatic refresh by setting the **Auto-refresh interval** setting on the Home page of Enterprise Server Administration to 0.

Installation

- Installing this product fails if Micro Focus License Manager version 10000.2.02070 (April 2015) or older is already installed on your machine. The setup files does not upgrade the License Manager automatically to the latest version. You must uninstall the existing version before you start the installation.

Micro Focus Rumba

Rumba 9.5 is not supported on Japanese Windows.

OpenSSL

The version of OpenSSL included in Visual COBOL and Visual COBOL 4.0 is intolerant of expired X.509 certificates in the CA Root Certificate collection in some circumstances. Specifically, if you configure a PEM file that contains multiple certificates as the collection of trusted CA certificates, and one or more of the certificates in that file have expired, OpenSSL might not be able to load and use other certificates in the file which are still valid. This can cause certificate validation errors and connection failures for SSL and TLS connections.

To work around this, you need to remove any expired certificates from such collections. If necessary, replaced them with any valid certificates that have the same Distinguished Name and Modulus (key). This is a known issue with OpenSSL. Micro Focus is investigating for other possible workarounds.

Installation

System Requirements

Hardware Requirements

In general, most modern machines will have the required processor and available RAM to run the Micro Focus products under Windows effectively. For planning purposes, you should consider having a minimum of 2GB of RAM though Micro Focus recommends at least 4GB of RAM for optimal performance.

Visual COBOL and Enterprise Developer for Visual Studio

Visual COBOL and Enterprise Developer have the following requirements in addition to the requirements of Microsoft Visual Studio. See the Visual Studio documentation for details of the Microsoft requirements.

The disk space requirements are:

Product	Maximum Disk Space Requirements	Sentinel RMS License Manager
Visual COBOL	1.2GB	75MB
Enterprise DeveloperEnterprise Developer	2.3GB	75MB

Note: This includes the space needed to cache information locally so that you can modify the installation without the original source media.

Visual COBOL and Enterprise Developer for Eclipse on Windows

The disk space requirements are:

Product	Maximum Disk Space Requirements	Sentinel RMS License Manager
Visual COBOL	3.7GB	75MB
Enterprise Developer	4.5GB	75MB

Note: This includes the space needed to cache information locally so that you can modify the installation without the original source media.

Operating Systems Supported

Note: If you are using Visual COBOL or Enterprise Developer on a 64-bit operating system, you can produce either 32-bit or 64-bit applications.

For a list of the operating systems each individual product in this package supports, check the *Product Availability* section on the Micro Focus SupportLine Web site: *http://supportline.microfocus.com/ prodavail.aspx*.

- Visual COBOL for Visual Studio is not supported on versions of Windows earlier than Windows 7.

Software Requirements

Note: This product includes OpenSSL version 1.0.2n.

Windows

Note: The setup file will check your machine for whether the prerequisite software is installed and will install any missing prerequisites and the product components.

Visual COBOL and Enterprise Developer for Visual Studio:

This product requires Microsoft's Visual Studio - either the Visual Studio Integrated Shell or a more advanced version of Visual Studio.

The following advanced editions of Visual Studio are required:

Professional, Premium, Ultimate or Community Edition
Professional, Enterprise or Community Edition

If there is no Visual Studio installed on your machine, the setup file will install the Visual Studio Integrated Shell.

⚠ **Important:**

- A problem with Microsoft's Windows 10 prevents installing the Visual Studio 2013 Shell on that version of the OS. You must install an advanced edition of Visual Studio 2013 on Windows 10 before you start the installation of Visual COBOL for Visual Studio 2013.

- Code generation issues in Microsoft's 64-bit JIT (just-in-time) compiler delivered as part of .NET Framework version 4.6 can result in incorrect execution of some COBOL code compiled to .NET. Version 4.6 of the .NET Framework is currently shipped as default with Visual Studio 2015 and Microsoft's Windows 10. The problems include incorrect execution of MOVE and STRING statements applied to alphanumeric operands, and incorrect execution of the ROUNDED phrase for arithmetic statements.

  Some of these issues only seem to be reproducible in COBOL language applications compiled to .NET and some can be reproduced in other languages (C# or Visual Basic).

  These problems have been reported and acknowledged by Microsoft and it is our belief that they either have resolutions or are working on fixes for all of them. For further information about these issues and guidelines on how to disable the latest version of the 64-bit JIT compiler, see *RyuJIT Bug Advisory* and *Troubleshooting RyuJIT*.

  As of October 2015, Microsoft have released the following updates that address these issues with the .NET Framework 4.6:

  - Hotfix rollup 3088955 for the .NET Framework 4.6 on Windows Server 2012 and Windows 8 - see: *http://www.microfocus.com/docs/links.asp?vc=mskb3088955*.
  - Hotfix rollup 3088956 for the .NET Framework 4.6 on Windows Server 2012 R2 and Windows 8.1 - see: *http://www.microfocus.com/docs/links.asp?vc=mskb3088956*
  - Hotfix rollup 3088957 for the .NET Framework 4.6 on Windows 7 SP1, Windows Server 2008 SP2, Windows Server 2008 R2 SP1, and Windows Vista SP2 - see: *http://www.microfocus.com/docs/links.asp?vc=mskb3088957*.
  - Cumulative update 3093266 for Windows 10: September 30, 2015 (available through Windows Update) - see: *http://www.microfocus.com/docs/links.asp?vc=mskb3093266*.

- Visual COBOL for Visual Studio 2015 does not support Visual Studio 2015 Shell as the Shell has a number of restrictions to COBOL development. The Visual Studio 2015 Shell is not included in the setup for Visual COBOL for Visual Studio 2015 and before you start the installation, ensure that there is an advanced edition of Visual Studio 2015 installed on your machine.

🖊 **Note:**

- On Windows 8.1 RT, Windows 8.1 or Windows Server 2012 R2, you must have the Windows update KB 2919355 before you install Visual Studio 2015. Download KB 2919355 from the *Microsoft Download Center*.
- Microsoft Visual Studio Express Edition is not supported.
- You can download the Visual Studio Integrated Shell from the *Microsoft Download Center*. If you choose to install the Shell, ensure you run the installer to complete the installation - run `vsintshell.enu.exe` from the location where you installed the download.

Note that some Visual Studio features might not be available with the Shell. This includes WCF or the Visual Studio 2013 Connected IDE experience in the Visual Studio 2013 Shell - the help for more details.

The following software is also required:

- Microsoft Windows SDK is required if you are using the Visual Studio Shell. See the *Microsoft Download Center* and search for Windows SDK.
- Microsoft .NET Framework 4.5.1. This is included with Visual Studio 2013.
- Microsoft .NET Framework 4.6. This is included with Visual Studio 2015.

Visual COBOL and Enterprise Developer for Eclipse:

The following requirements apply to both Visual COBOL and Enterprise Developer:

- The setup file installs Visual COBOL and the 64-bit Eclipse 4.7.

  Some earlier versions of Eclipse are also supported. See *Installing Visual COBOL into other instances of Eclipse* in the *Advanced Installation Tasks*.
- Visual COBOL installs fully only on 64-bit Windows platforms. On 32-bit Windows, the setup file does not install some of the components. See *Issues with the Installation* in *Known Issues and Restrictions*.
- Visual COBOL supports both the 32-bit and the 64-bit Eclipse. You can use the 64-bit Eclipse to create both 32-bit and 64-bit applications.

The setup file will check your machine for whether the prerequisite software is installed and will install any missing prerequisites and the product components.

- Oracle's Java Platform (64-bit) version 1.8 or later is required to run the Eclipse IDE; however, the recommended minimum version is Java 1.8.162 (64-bit), which the Windows product installation will install if it detects an older version. Java 7, 8 (32 or 64-bit versions), and Java 9 (64-bit version only) are supported for executing JVM COBOL code and for native COBOL and Java interoperability. You can download Oracle's Java from *Oracle's Web site* and install it anywhere on your machine.

  ✏ **Note:** To skip installing Java 1.8.162 as part of the product installation, run the setup file with the `skipjre=1` command line option.
- Visual COBOL requires:

  - A 32-bit Java installation if using the 32-bit Eclipse.
  - A 64-bit Java installation if using the 64-bit Eclipse.
- The setup file also installs .NET Framework v4.6.1 and the Microsoft's Visual C++ 2010 and 2012 Redistributables.

Installation Restrictions and Requirements

Before starting the installation you should be aware of the following:

- Visual COBOL and COBOL Server cannot coexist on the same machine.
- Visual COBOL and Enterprise Developer cannot coexist on the same machine regardless of which IDE (Visual Studio or Eclipse) you install.
- If, when you install Visual COBOL for Visual Studio , the machine does not have Microsoft Visual C++ Redistributable Runtime already installed, it is installed as required by Visual COBOL. The installation of Microsoft Visual C++ Redistributable Runtime adds a number of `.dll` files, without digital signatures, into the `winsxs` directory.
- If, when you install Visual COBOL for Visual Studio 2013, the machine does not have Microsoft Visual C++ 2012 Redistributable Runtime already installed, it is installed as required by Visual COBOL. The installation of Microsoft Visual C++ Redistributable Runtime adds a number of `.dll` files, without digital signatures, into the `winsxs` directory.
- You need to be logged in with a user-ID that has write access to the registry structure under HKEY_LOCAL_MACHINE, HKEY_CLASSES_ROOT, and HKEY_CURRENT_USER so the installation

software can set the environment appropriately. You also need to be logged on with Administrator privileges.

- If you are installing this as an upgrade, make sure that none of the product files are in use when you start the installation. Also, the Visual Studio Help Viewer must not be opened.
- You need to be logged in with a user-ID that has write access to the registry structure under HKEY_LOCAL_MACHINE, HKEY_CLASSES_ROOT, and HKEY_CURRENT_USER so the installation software can set the environment appropriately. You also need to be logged on with Administrator privileges.
- Before installing this product , make sure that any existing Micro Focus Directory Server (MFDS) or CCITCP2 Windows service (on Windows) from an existing product is stopped and uninstalled. On Windows, do this as follows:

  1. Stop the service, using either the Windows Service Management Console GUI or from a command line prompt by typing: `net stop mf_ccitcp2` Only one instance of the MFDS or CCITCP2 service can run on a Windows machine.
  2. Uninstall the MFDS or CCITCP2 service.

     For MFDS, from a command line prompt enter: `mfds -u`

     For CCITCP2: `ccitcp2 -u`

  To run an earlier version of MFDS as a service after you have installed a later version:

  1. Stop and uninstall the MFDS service, as described above.
  2. Reinstall the earlier version, as follows:

     a. Open a Visual COBOL command prompt.
     b. Install the service. Enter the following command: `mfds -i`
     c. Start the service. Enter the following command: `net start mf_ccitcp2`

     Note: The two versions use different paths for environment and registry values, so the list of configured Enterprise Servers might be different depending on which version has been started, since, by default, different MFDS data repositories are used.

  MFDS 5.1 and later are able to import or use Enterprise Server configuration data generated by earlier versions of MFDS, but 5.0 or earlier versions of MFDS might not be able to read data generated by later versions.

  It is possible to run MFDS from a command prompt ("mfds") rather than as a service, but by default the "mfcobol" port is used (86) and this can only be used by one process at a time

Downloading the Products

1. Use the download links in your Electronic Product Delivery email.

   For more information follow the links for the installation instructions and the End User License Agreement.

Installing the Products

Use the individual setup files to install each product from the Micro Focus Academic Program package as follows:

Windows

1. Run the *productname*.exe file and follow the wizard instructions to complete the installation.

After Installing

Visual COBOL and Enterprise Developer for Visual Studio

You are now ready to run Visual COBOL or Enterprise Developer. From the Windows taskbar click **Start > All Programs > Micro Focus** *Product Name* **>** *Product Name* **for Visual Studio**. (The Start menu is not available on Windows 8, Windows 8.1, and Windows Server 2012. You use the Start screen to invoke programs.)

Refer to the *Start Here* and *Product Information* sections in your product Help. Here, you will find information on getting started including tutorials and demonstration programs.

Visual COBOL and Enterprise Developer for Eclipse

If you have used Eclipse from the same workspace before, the Eclipse perspective settings are not reset after installing any Micro Focus product. To pick up any new features, you must reset the perspective you are working with after installation:

1. Open the existing workspace with this product.

   You may receive some warnings or errors which you can ignore.
2. Make sure you are in the perspective you need to reset by clicking **Window** > **Perspective** > **Open Perspective** > **Other**.
3. From the **Open Perspective** dialog box, click the perspective you want to reset.
4. Click **OK**.
5. Click **Window** > **Perspective** > **Reset Perspective**.
6. When prompted, click **Yes**.
7. Reapply any customizations.

Installing X Windows on Windows

Some features of Visual COBOL for Eclipse and Enterprise Developer for Eclipse on Windows require an X Windows installation, so Micro Focus ViewNowX is provided with the product. To install, run the file `ViewNow_X_Server.exe` in your Visual COBOL installation. By default this will be in the `%ProgramFiles(x86)%\Micro Focus\Visual COBOL for Visual Studio 2013\ViewNowX` folder.

ViewNowX requires that your client machine has Microsoft Visual C++ 2008 SP1 Redistributable Package (x86) installed. If it is missing from your machine, the ViewNowX installation will offer a link to download the package.

Repairing

Windows

If any product files, registry settings or shortcuts are accidentally removed at any point, you can perform a repair on the installation to replace them.

To repair your installation on versions of Windows Vista or later:

1. From the **Control Panel**, click **Uninstall a program** under **Programs**.
2. Right-click your Micro Focus product and select **Repair**.

UNIX

If a file in the installation of the product becomes corrupt, or is missing, we recommend that you reinstall the product.

Uninstalling

Windows

To uninstall the product, you cannot simply delete its files from your hard disk. To uninstall the product:

1. Log in with the same user-ID as you used when you installed the product.
2. Click **Uninstall a program** under **Programs** in **Control Panel**.
3. Select the product and click **Remove** or **Uninstall** as appropriate.

When you uninstall, the only files deleted are those that the installation software installed. If the product directory has not been removed, delete any unwanted files and subdirectories within it using Windows Explorer.

> **Note:** The installer creates separate installations for Visual COBOL, Enterprise Developer, Enterprise Server for .NET, and Micro Focus License Administration. Uninstalling only Visual COBOL does not automatically uninstall Enterprise Server for .NET, the Micro Focus License Manager or any of the prerequisite software.
>
> Enterprise Server for .NET must be uninstalled before you remove Visual COBOL. To completely remove the product you must uninstall the Micro Focus License Manager as well.
>
> You can optionally remove the prerequisite software. For instructions, check the documentation of the respective software vendor.

Some registry entries are not removed by the uninstallation process and you need to manually delete them.

The following folders might not be removed:

- `Micro Focus Product Name` folder in the Start menu - you can delete it manually.
- `%systemdrive%\Users\Public\Documents\Micro Focus` - includes the binaries and the log files of the samples which you have built.
- `%ProgramData%\Micro Focus` - includes some data files used by the Micro Focus licensing system.
- `%Program Files%\Micro Focus` - you can delete it manually.

Copyright and Disclaimer

Copyright © Micro Focus 2018. All rights reserved.

The only warranties for this product and any associated updates or services are those that may be described in express warranty statements accompanying the product or in an applicable license agreement you have entered into. Nothing in this document should be construed as creating any warranty for a product, updates, or services. The information contained in this document is subject to change without notice and is provided "AS IS" without any express or implied warranties or conditions. Micro Focus shall not be liable for any technical or other errors or omissions in this document. Please see the product's applicable end user license agreement for details regarding the license terms and conditions, warranties, and limitations of liability.

Any links to third-party websites take you outside Micro Focus websites, and Micro Focus has no control over and is not responsible for information on third party sites.