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Micro Focus Visual COBOL 5.0 for Visual Studio

Release Notes

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Contents

Micro Focus Visual COBOL 5.0 for Visual Studio Release Notes

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

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.

Product Overview

Visual COBOL enables you to develop COBOL applications within Microsoft Visual Studio. You use the Visual Studio integrated development environment (IDE) to edit, compile and debug COBOL applications. The IDE provides all the functionality to manage projects and build applications.

The product is available in the following variants - Visual COBOL for Visual Studio 2017 and Visual COBOL for Visual Studio 2019. The execution environment for applications created with any of these product variants is COBOL Server.

Upgrading from earlier Micro Focus products

This version 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 a version earlier than 4.0 might not be compatible with the current version of the run-time products. If the behavior of your application changes with the current version, we strongly recommend that you relink the main executable with the current version. 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 the current version can be produced without recompiling the application, as long as the original object code is available and it is relinked with the current version.

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 providing an option for you to choose and relink the project.

What's New

This release provides enhancements in the following areas:

.NET Core Support

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.NET Core is an open-source development platform that supports multiple operating systems. You can now use Visual COBOL to develop a COBOL application then publish it to be deployed on .NET Core.

The following project templates for .NET Core applications are available - Class Library (.NET Core) and Console App (.NET Core).

COBOL Formatting

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You can now reformat your COBOL code in the editor according to your preference and standards. Formatting sets the indentation based on the configuration options which you can set in **Tools > Options > Text Editor > Micro Focus COBOL > Formatting > Indentation** (for Visual Studio).

You can find the COBOL formatting features on the **Edit > Advanced** menu (for Visual Studio) menu.

Code Analysis

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You can now create the following views for your code:

- Program Flow Graph - enables you to view the overall structure of the COBOL program with nodes representing sections and paragraphs. PERFORM statements between them which affect the program flow are represented by links joining the nodes. External calls to other programs are shown but cannot

be expanded in the Program Flow Graph view. Hovering over the nodes shows a tooltip containing the code representing the respective sections or paragraph. Clicking a node or a link joining said nodes positions the code editor to that point in the source, allowing quick and easy navigation of the program.
- Data Flow Analysis Tree - enables you to select a data item and then either statically trace what might change its value or what other data items it might affect.

Enterprise Server Common Web Administration

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Note: This feature is in Early Adopter Product (EAP) release status.

Visual COBOL now includes a new Enterprise Server Common Web Administration interface (ESCWA). ESCWA is a web user interface and server for modern administration, monitoring and control of Enterprise Server. It offers improved usability that consolidates the different Enterprise Server user interfaces so that native and managed regions, and security stores can be managed in one place. Features include:

- Administering directory servers across multiple hosts.
- Monitoring and control of Enterprise Server instances.
- Configuring and administering a security store, defined in an LDAP-compatible security manager such as Microsoft Active Directory or OpenLDAP.
- Administering the Scale-Out features - enable you to specify logical groups of Enterprise Server instances, and configure and run Performance Availability Clusters (PACs) and their related Scale-Out Repositories (SORs).
- Administering, monitoring and control of Enterprise Server for .NET regions and listeners.
- The use of current web frameworks that have a greater focus on security.
- (Included with 5.0 Patch Update 2) - support for Enterprise Server XA, MQ and PL/I configuration and monitoring. This includes support for XA resources, configuring MQ, Listeners and Writers, PL/I, MFCS console, Region Trace options, displaying the current ESMs on logon page and Local/loopback connections warning changes.

COBOL Language Enhancements

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The following enhancements have been made to the COBOL syntax:

- ISO2002 conditional compilation - an additional mechanism for conditional compilation, the ISO2002 Conditional Compilation method, is now available. This has been implemented as part of the support for Enterprise COBOL 6.2.

  The following compiler directing statements are supported:

  ```
  >>DEFINE
  ```

  ```
  >>IF/>>ELSE/>>END-IF
  ```

  ```
  >>EVALUATE/>>WHEN/>>WHEN OTHER/>>END-EVALUATE
  ```
- The JSON PARSE statement enables you to convert JSON text into COBOL data formats. This has been implemented as part of the support for Enterprise COBOL 6.2.
- Async and await syntax (.NET COBOL only) - support is available for asynchronous programming in .NET COBOL using the async and await syntax.
- INSPECT statement - the performance of INSPECT... CONVERTING has been improved, particularly for cases where `source-alphabet` is long.
- Support has been added for the portable syntax for SET - set[string].

Compiler Directives

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The following Compiler directives are new in this release:

ILNORMALIZENAMES Determines the program elements that are normalized when a program is compiled to .NET or JVM COBOL. Normalization in this context results in replacing all $ and - (hyphen) characters with _ (underscore) characters in the name of the generated class file.

Consolidated Trace Facility (CTF)

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This release provides the following enhancements:

- Dynamic CTF - it is now possible to configure the CTF dynamically from outside the process being traced.

  Using a new command line utility - `cblctd` - you can alter the tracing events of running applications that already have CTF tracing enabled. You can alter trace levels, add or remove components to or from the trace, and also configure the emitters in effect.

  Additionally, there is also a new component that you can trace - mf.mfdbfh enables you to trace activity of the Micro Focus Native Database File Handler.

Data File Tools

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This release provides the following enhancements:

- The Data File Editor now includes a Compare Files tool that enables you to compare the contents of two data files side-by-side.
- Structure files, and the layouts within them, can now be created within the Data File Editor; you no longer need to use the Classic Data File Tools utility to manage your layouts.
- When connecting to a VSAM dataset stored in an enterprise server region, you can store any passwords required for access, for the duration of your current session.
- You can view archived JES spool jobs that have been merged into one spool file using the merging archived spool files process.
- You can now quickly duplicate records in non-indexed files, using the Duplicate Record option.

Database Access

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Enhancements are available in the following areas:

OpenESQL ADO.NET Connection Editor Toolbar

- A new "i" (information) button is available that provides all the details of any installed .NET provider. Provides additional information mitigating resource definition and use within the ADO.NET Connection editor

- Static XA switch modules "Reconnect" - At the beginning of a global transaction, the XA switch will attempt to reconnect temporarily broken connections to the database. If there is a temporary disconnect to the database, there is no need to manually re-enable the XA switch to run transactions.

Database Connectors

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You can now create an identity column in your database by using a new XFD directive - IDENTITY_COLUMN. This must be specified on a numeric field.

Debugging

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This release includes the following enhancements:

- COBOL Visualizer - a new window in Visual Studio enables you to view and edit a data item during debugging in either text or HEX forms. You invoke the window from the DataTip for the data item.
- Conditional watchpoints - you can now specify conditions and hit counts for COBOL watchpoints. A condition can be in the form of an expression or it can be a hit count (for the number of times memory associated with a data item has been updated). The condition is evaluated each time the data item being watched changes. If the condition evaluates to true, then program execution stops. This enables more fine-tuning of the current watchpoint support and is useful when debugging large, complex programs.
- Dynamic core dumps - you can now invoke a core dump programmatically and continue execution of your program. A new library routine, CBL_CREATE_CORE, enables you to produce a core file for the current process or a process owned by the same user that owns the current process.
- Improved visibility of the PERFORM stack - the PERFORM stack and PERFORM range names are visible in system debuggers such as gdb in many cases on 32-bit Linux with Intel architecture and Solaris with Intel architecture. This was already the case on AIX, 64-bit Solaris-Intel, and all other Linux platforms (including 64-bit Linux-Intel).
- In order to include source line numbers in run-time error messages, which makes the diagnosis of issues in your program easier, the COBOL compiler now produces `.idy` files by default when building from the command line, unless the NOANIM directive is specified. You can safely remove `.idy` files after compilation if you do not need them; they do not need to be distributed with your application unless you want to debug your code. However, unless you specify the ANIM directive, generated executables such as `.dll` and `.gnt` will not be debuggable, which is consistent with prior behavior.

  

  Note: Behavior has not changed if you are using an IDE or build scripts generated by an IDE.

Enterprise Server Security

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This release includes the following enhancements:

- Security - security features can now be employed when developers and administrators install new COBOL services (web services and EJBs) into an enterprise server instance over the network. There are a number of authentication and authorization options that can be enabled. See *Deployment Listeners* and *The .mfdeploy File* in your product Help.

- Vault Facility - a new security feature has been added that enables some Enterprise Server components to keep certain sensitive information in a form of storage defined as a vault, accessible via a configurable vault provider. The default vault provider stores data in encrypted format on disk.
- OpenSSL 1.1.1 - the OpenSSL security provider has been updated to OpenSSL version 1.1.1.

  This is the stable Long Term Support version of OpenSSL.

  - Added support for the ratified TLS protocol version 1.3. TLS 1.3 benefits include:
    - Much shorter initial connection negotiation sequence. This reduces the time taken to establish a link before starting to transmit data.
    - Using only the most secure ciphers and hash methods.
    - TLS 1.3 will be negotiated in preference to the older TLS protocols.
  - Added support for new Ciphers and Key Exchange groups in line with TLS 1.3 requirements.
  - The default security level for previously configured endpoints has been moved from Security Level 0 to Security Level 1. This removes the ability to accidentally make use of known-weak elements such as SSL3 and MD5. Similar changes to the default Security Level have recently happened to Java, Chrome, Firefox, and other systems providing secure connections.
- Fileshare Security - the Fileshare Secure TCP/IP transport provider now supports the trusted use of X509 certificates bearing the name of the Fileshare service as the Common Name element of the certificate.

  In previous releases, a secure connection to a Fileshare server was made using a certificate that represented the network location upon which the Fileshare service was located. This method is still supported, but does not distinguish between the exact Fileshare server that is being connected to when more than one service can exist on a single host system. With this change, individual Fileshare services can identify themselves by using a unique certificate. While running on the same host and registered with the same network endpoint.
- Support for Active Directory user groups and group name mapping - the Enterprise Server External Security Facility's MLDAP ESM Module can now use Active Directory user group objects for Enterprise Server user groups. Also, the module can now map long group names to the 8-character-maximum names required for mainframe emulation.
- Selective auditing - administrators can audit only security activity of particular interest, reducing audit overhead and the volume of events. The Enterprise Server External Security Facility's MLDAP ESM Module can now enable ESF Audit events only for particular users, groups, and resources.
- Improved interaction with LDAP client libraries resulting in fewer LDAP-related issues and easier diagnostics - the Enterprise Server External Security Facility's MLDAP ESM Module has improved interoperation with LDAP client libraries:

  - The client library vendor and version information is logged after the library is loaded
  - The module has better heuristics for loading the correct library supplied by the OS vendor, so the "provider" configuration option can generally be omitted
  - For OpenLDAP, the module sets its proprietary "connect timeout" option
- SNI support (requires 5.0 Patch Update 1 or later) - support has been added in Patch Update 1 for the Server Name Identification (SNI) extension to TLS. This helps to avoid connectivity issues related to a growing number of Web services being hosted on SNI servers.

Micro Focus Unit Testing Framework

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This release provides support for the following functionality:

- Data-driven unit tests - a new type of test suited to testing data where values read from a source are passed through the same tests.
- Test output colorization - test output can now include basic colorization for supported terminal emulations. This feature must be run from the command line.

Platform Support

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Support is now available for the following additional or updated operating systems:

- SUSE (Power) 11 SP3, 12
- Red Hat (Power) 7.2, 7.3
- Windows Server 2019

For a full list of supported platforms, check *HTTPS://SUPPORTLINE.MICROFOCUS.COM/PRODAVAIL.ASPX*.

Product Documentation

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The following is new in this release:

- Online context help in Visual Studio - online context Help is now the default setting for Visual COBOL and opens the documentation available on Micro Focus SupportLine.

  Visual COBOL local help is still supported and can be installed manually, if required. See *After Installing* in the product Help for details.
- The *Comparison of COBOL with Other Managed Languages* document has been updated to reflect the recent enhancements in the .NET and JVM COBOL support.

Visual Studio Integration

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This release includes enhancements in the following areas:

COBOL editor:

- Code snippets - new snippets are available for `$if` and `$region` statements, and for specifying `*cblformat off` which indicates the area of code that is unaffected by formatting.
- Collapsible regions - outlining is now available for IF, EVALUATE and PERFORM statements.
- **Peek Definition** context menu command - this invokes a pop-up window, embedded in the editor, showing the data item definition. You can use the feature both while editing and while debugging.
- IntelliSense suggestions - IntelliSense suggestions for the COPY statement now include directories to add.
- (Introduced in 5.0 Patch Update 1) Choosing a separator for qualified field names - you can configure IntelliSense to either use OF or IN as a separator in qualified field names - e.g. A-COUNT OF A-WORK-1 or A-COUNT IN A-WORK-1. You can specify this in **Tools > Options > Text Editor > Micro Focus COBOL > IntelliSense**, and on the **Completion Lists** page.
- Find All References - the **Find All References** output window for COBOL has been enhanced, so you can now filter results, group results, order results and search results.
- Quick actions - the editor now displays light bulbs for creating a missing section or a paragraph, for adding and sorting $ILUSING statements, and for removing or commenting out dead code.

Visual Studio tool windows:

- The **Error List** window now includes a column for the **Sequence Number**.
- You can use Visual Studio's **Find All References** tool window to search for references in your COBOL projects.

New settings in the project property pages:

- The **Debug** project properties page for managed projects now includes settings for either generating a portable symbol file (.PDB) or for embedding the portable symbol information directly in the assembly.
- The **Smart Linkage** section in the properties of managed projects now offers two new settings for enabling the ILSMARTTRIM and ILSMARTANNOTATE Compiler directives.

New project template categories:

- The COBOL project templates are organized in a new set of categories that better represent the tasks and workloads used in modern development. Some of the categories, such as Azure or .NET Core, only show if you have installed the support for these features in Visual Studio. For more information, see *To install missing features from the IDE* in your product Help.

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).

Common Communications Interface

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- Certificate subject names are now correctly checked against the name the client is attempting to connect to. Certificates registered to "localhost" should now work as expected.
- The default Cipher Suites List now includes @SECLEVEL=0. This indicates that backwards compatibility with old certificates such as MD5 is to be retained. As a result of this change, you need to review your use of the Cipher Suites List and of any old certificates.
- If using Micro Focus Common Client(MFCC) or Micro Focus Communications Server(MFCS) to connect to a non-existent remote host, it was possible to create a connection to a server listening on the same port on the local system. This is no longer possible and a bad address error is reported in the error logs.
- By default, in this and previous releases an SSL/TLS CCI client can trust a server which resides on an IP address that is not an intended connection target. You can now specify the ssl_only_verify_literally option in your CCI.INI file to restrict the certificate check to improve security. See “CCITCP Security Options in the CCI.INI File” in your product Help for more information. When connecting to a non-CCI protocol server, all clients perform strict certificate checking as the new default behavior

Data Tools

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- Accessing a dataset through the Data File Editor now obtains a shared lock on Enterprise Server when you open the file in shared mode.

  3170479 (1115346)

Documentation

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- The ANIM Compiler directive has changed its default when compiling from the command line on Windows platforms. The default is now ANIM. (Compiling from the IDE still defaults to ANIM.)
- The validation of server certificates for TLS (also known as SSL) connections has been corrected. This is likely to cause connection failures in cases where previously connections were incorrectly allowed. For example, if Fileshare is secured with TLS, client applications must be configured to use the

hostname of the Fileshare server as it appears in the server's certificate. If the Micro Focus Directory Server is secured with TLS, then MFDS clients, such as the casstart command-line utility, will need to connect to it using a hostname that appears in the certificate MFDS is using. (Note that a certificate can contain multiple hostnames.) Consult your Certification Authority administrator for more information.

3192497 (1117068)

Enterprise Server

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- A number of audit events now contain some additional information.

  3140310 (1112666)

- Previously, the /x option of the CASRDTEX utility had been duplicated to drive XML output. This prevented the export of transactions which was the original meaning of /x. To generate an XML export, you must now specify the option /xm.

  3180233 (1116108)

- casfhsf could hang when processing HSF files that contain records from tasks that ran in different months.

  3177385 (1115884)

- A new system transaction, CRCN, is now available to monitor the state of XA connections for each resource manager (RM) entry defined in the system. CRCN is a replacement for the former XA Reconnect facility that recycled SEPs on connection loss. The XA Reconnect facility was configured by setting the ES_XA_RECONNECT environment variable. CRCN also uses this environment variable, although its usage differs slightly. For more information see your product Help.

  3174272 (1115727)

- On Windows, any casout and cassub messages are displayed on cassub and casout API invocation if the environment variable ES_CAS_API is not set to "ON".

  3160400 (1114458)

Enterprise Server Auditing

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- Auditing on big-endian platforms now correctly interprets numeric audit data.

File Handling

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- RELFORMAT=MF|RM is now enabled for FOLDER and other filename tags.

  3164916 (1114803)

- The SORT-CONTROL special register is now supported during a SORT statement.

  3159740 (1114389)

- To direct the handling of relative files to a particular file handler (either MF COBOL or RM/COBOL), use the RELFORMAT=MF or RELFORMAT=RM configuration options within the [REL-DEFAULT] tag of the EXTFH.CFG file. (The default is RELFORMAT=MF.)

  3157247 (1114149)

Interface Mapping Toolkit

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- If you try to deploy a stateful EJB SVI from the Visual Studio IDE after unchecking the “Reuse container after application termination” check box (in the Deployment Characteristics tab of the Runtime

Environment Configuration dialog box), you receive a warning message informing you that the “Reuse container after application termination” setting will be set to true for the deployment in order to prevent the crash. In the Eclipse IDE, the unchecking of this option will just be ignored, and the option re-selected. A warning to not uncheck the option for stateful EJB SVIs is also displayed on the prior page (to the dialog box).

2663812 (1090987)

- WSDL and JSON Schema files generated for bottom-up CICS Web services now include a "maxLength" parameter for all string fields.

  3175039 (1116241)

Micro Focus Directory Server

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- The event codes for several MFDS audit points have changed.
- On Windows, by default, the Enterprise Server Administration Web interface can only be contacted using the loopback address (localhost or 127.0.0.1). You can enable remote access to the Web interface by turning off the loopback mode. See "Using the Loopback Address" in your product Help for more information.

MFCRYPTLIB

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- Passing an incorrect keyfile passphrase no longer results in receiving an RTS115 error in MFDS.

  3181743 (1116186)

Request Packet Interface API

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- The default behaviour for TLS certificate Common Name (CN) matching has changed for release 5.0. It now requires a strict match on the CN value or any Subject Alternate Name (SAN). For example, 127.0.0.1 and localhost are no longer implicitly equivalent, nor are hostname and its IP address or fully-qualified domain name (FQDN) variants. When starting a region from the Enterprise Server Administration Web interface, a resolved IP address is used for the casstart -m parameter value. A resolved IP address is also used even if a hostname is specified on a command line startup.

  To change this behavior and use a resolved hostname value (as determined by the machine TCP configuration, for example, hosts file entries.) set the environment variable MFDS_DNS_RESOLVE=Y. To use an unresolved string literal hostname, for example, a value explicitly passed in via the casstart –m command line parameter, set MFDS_DNS_RESOLVE=N.

  3194613 (1117203)

Known Issues

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

In addition, note the following:

- In Visual COBOL 4.0 and 5.0, in an extremely small and limited set of cases, an issue could occur with running older .NET executables and .dll, and older JVM .class files. This issue only occurred if:

  1. The application performs an IS NUMERIC condition test on a variable declared with USAGE NATIONAL.
  2. The application has been created with Visual COBOL 3.0 or earlier, and executed in Visual COBOL 4.0 or 5.0.

  In these rare cases, the IS NUMERIC test could provide the wrong answer. To resolve the issue, you need to recompile any programs that uses this construct in Visual COBOL 5.0.

  Program that do not use NATIONAL data, or those that have already been recompiled in Visual COBOL 5.0 are not affected.

- If you have Visual Studio 2019 16.0 installed, the **Create a new project** dialog box does not list COBOL in the **Language** field. You can find the COBOL project templates, by searching for either COBOL or PL/I using the search field.

  To resolve this problem and make the COBOL categories visible in the **Language** field, you need to install Visual Studio 2019 version 16.1 or later.

Resolved Issues

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

Adis

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- ERASE EOL no longer stops Keisen attributes being inherited when enabled by x"AF" function 81.

  3169584 (1115178)
- ACCEPT LINE POSITION data-item, where data item has the JUST clause, now works as expected when the ADISCF pre-clear option is selected.

  3126794 (1111471)
- BLANK SCREEN BACKGROUND-COLOR n, where n > 7, now sets the intensity so that the bright version of the color is used to fill the screen.

  2856949 (1103978)

Cob/Cbllink/Cblnames (32-bit PC)

Back to the list

- Creating an executable or shared object with the cob flags -U or -d no longer results in an assembler error message.

Codeset Support

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- Conversions from ASCII to EBCDIC, with null data, no longer get corrupted.

  3155499 (1114114)

Compiler

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- A GO TO statement that references a qualified data name, rather than a procedure name, is now correctly rejected by the Compiler.

  3191922 (1117013)
- A DBCS data item with a VALUE clause specifying ALL NX literal is now correctly rejected by the Compiler.

  3191623 (1116974)
- Large UNSTRING statements no longer produce the following error: "001-f internal error 49".

  3189648 (1116838)
- A SET 88-level TO TRUE statement when the associated field is national is now working as expected.

  3185855 (1116554)
- A valid data declaration with a RENAMES THRU clause referencing other level 66 items no longer produces Compiler error "COBCH0239S First data name does not precede second".

  3184128 (1116376)
- A WHEN OTHER clause directly following another WHEN clause in an EVALUATE statement is now rejected by the compiler when an Enterprise Cobol dialect is specified. This emulates the mainframe behavior.

  3183810 (1116464)
- An RM dialect now supports data names up to 128 bytes in size.

  3182342 (1116261)
- Specifying an inline method invoke inappropriately (such as in a SUBTRACT statement) now receives a Compiler error, as expected. Passing inappropriate operands BY REFERENCE is similarly rejected.

  3180642 (1116128)
- A program compiled with the prexml preprocessor and the directive 'NOQUAL' now compiles as expected.

  3179843 (1116304)
- A REPLACE statement that caused the last token of a copyfile to be replaced with a longer token, and thus caused the creation of an extra line, now works as expected.

  3178437 (1115957)
- A COBOL program compiled with a mainframe dialect should treat mainframe KSDS files correctly. They are of variable length regardless of whether the "record varying" phrase is used in the FD. Previously, this was not being honored and when program A was calling program B using external files, you received an RTS 226 error message.

  3176783 (1115839)

- User-defined functions with LOCAL-STORAGE data now compile and execute as expected.

  3176478 (1115792)
- A DISPLAY statement as the last line of an ON EXCEPTION clause of another statement, with a following NOT ON EXCEPTION clause for the containing statement, and compiled with the RM compiler option, now compiles as expected without internal errors.

  3175442 (1115876)
- An INSPECT CONVERTING statement with hexadecimal literals and compiled with CHARSET(EBCDIC) now executes as expected.

  3174833 (1115673)
- Constructions of type INSPECT CONVERTING ZERO to <variable-name> now produce correct object code and execute as expected.

  3174064 (1115580)
- An SQL program with file declarations and a missing WORKING-STORAGE header now executes as expected.

  3169882 (1115216)
- During compilation, if the LIST directive had been specified and a license error occurred, an RTS error 114 would result. This has been fixed.

  3169377 (1115474)
- During compilation, if the LIST directive had been specified and a licensing error occurred, you received an RTS error 114.

  3169377 (1115319)
- A COPY REPLACING statement spanning multiple lines, with commas on the end of those lines, is now processed as expected; that is, those commas are treated as meaningful characters rather than simply separators.

  3168125 (1115173)
- PARAGRAPH and CYCLE are now correctly treated as context sensitive reserved words under an Enterprise COBOL dialect, allowing them to also be defined as user data names.

  3167488 (1115004)
- COPY SUFFIXING and COPY PREFIXING syntax now compiles and works as expected for long DBCS words.

  3166159 (1114885)
- The IMTK wizard can now process COBOL source that contains non-standard characters, such as an ampersand.

  3164533 (1115157)
- Syntax involving an EXEC keyword, within an EXEC SQL statement, is now processed as expected.

  3162629 (1115879)
- The INSPECT ... CONVERTING ... TO FUNCTION ... syntax is now working as expected.

  3160325 (1114393)
- Compilation with the CP preprocessor, of a source that has very long lines and unexpanded tab characters at the end of those lines, now works as expected.

  3160255 (1114436)
- A DISPLAY of a group item containing a large table, in a program containing the 'CONSOLE IS CRT' special-name clause now compiles successfully.

  3157068 (1114326)
- The performance of the following syntax has been significantly improved, especially where source-alphabet is long: INSPECT CONVERTING source-alphabet TO target-alphabet

  3157067 (1114137)

- DISPLAY of a SCREEN SECTION sub-group no longer gives a COBRT153 error if there are other sub-groups with OCCURS items with un-initialized indexes.

  3154391 (1113915)
- Printer files under an RM dialect are now emulated correctly.

  3143299 (1113494)
- DISPLAY UPON ARGUMENT-NUMBER now behaves as expected under CHARSET"EBCDIC".

  3116649 (1110478)
- When evaluating a method invoked inline as in the example below, the method was executed for each WHEN statement which could result in undesired side effects. Example:

  ```
  evaluate object::"method"(1)
  when 0
  when 1
  when 2
  ```

  Now, the result is stored in a temporary item and used in any comparisons with the expressions in the WHEN clause.
- An INITIALIZE statement acting on a subscripted group, which itself contains a subsidiary subscripted group, sometimes failed to initialize all elements of that subsidiary group, in the case when the subscript of the original group was expressed as a literal. For example:

  ```
  01 g1.
     03 g2 occurs 3.
       05 g3 occurs 3.
          07 n1 binary-long.
          07 x1 pic xxxx value "ABCD".
       initialize g2(1)
       display g2(1)
  ```

  In this case, only the first occurrence of x1 was initialized to spaces. This is now fixed.

  3186540 (1116571)
- Normally, binlit(boolean) should be switched automatically in the presence of PIC 1 data. However, this was not happening for programs compiled with the ILSOURCE Compiler directive.

  3184579 (1116412)
- Moving from a floating point item to a comp-5 item no longer results in the loss of the most significant digits.

  3177978 (1115909)
- With the directive OUTDD set, a DISPLAY statement referencing an item of zero length could cause an index-out-of-range exception.

  3176176 (1116853)
- An EXIT METHOD in a performed procedure inside a method could be ignored, with the result that control flow returned from the PERFORM, and continued to the next statement. This is now fixed.

  3176170 (1115770)
- If a method included an anonymous method (i.e a code block delimited by delegate/end-delegate), and if the method included local data of generic COBOL type (i.e. a pic x or group data, but not object references or primitive numeric data items), this could result in producing corrupt code.

  3174920 (1115692)
- A RAISE statement (or a GO TO) at the end of the main method could cause a system error. This only occurred when the main method had a native .NET parameter (such as a string object) passed by reference.

  3166049 (1114881)
- When generating managed code, incorrect code was generated when a string property was the target of a STRING statement. This could also happen when a STRING statement with an INTO phrase referencing a PIC X item used string objects in one or more other operands.

3160597 (1114443)

- The syntax SET pointer-1 TO pointer-2 now behaves as expected when AMODE"31" is in effect.

3159008 (1114361)

- When a COMPUTE statement contains no SIZE ERROR clause, and when execution of that COMPUTE statement would cause a size error condition, and when the directive HOSTARITHMETIC is on, then the result stored in the target field is now working as expected.

3155736 (1114028)

- A warning message is now produced if a namespace specified by the ILUSING directive is not found.
- Use of THREAD-LOCAL-STORAGE and THREAD-LOCAL is only permitted in procedural COBOL programs when compiling for managed code.
- Documentation for the ANIM directive has been modified to indicate that NOANIM is still the default for managed compilation on Windows.
- You now receive an error message after background parsing when you specify an invalid directive using the $SET statement. Any error messages with start location will now contain the correct offset.
- When debugging an SQL program, stepping an EXEC SQL OPEN statement could cause the final line of the program to be incorrectly highlighted.

3191710 (1117009)

- In native generated code, on all platforms except Intel x86 32-bit, a COMPUTE statement with fixed-point operands and a floating-point (comp-1 or comp-2) target could give the wrong result if a fixed-point operand was used twice in the expression. This bug has been fixed.

3188676 (1116745)

- On the IBM mainframe, when code is compiled with NOPFD, and when an unsigned COMP-3 item containing an invalid sign nibble (such as 0xD) is the source item in a MOVE to another COMP-3 item, the sign nibble is fixed up to the correct value: 0xC for a signed COMP-3 target, and 0xF for an unsigned COMP-3 target. Micro Focus COBOL now emulates this behavior when code is compiled with SIGNFIXUP.

3173432 (1115972)

- An issue where the COBIDY directive was handled inconsistently between the Compiler and NCG has been fixed.

3163263 (1115112)

- A generate time error where the following message was produced has been fixed: `FATAL ERROR in ../coil/cio_jopt.c:deleting_bc() line 41; expected compare .`

3160837 (1114435)

- For 32-bit generated code on Intel x86 platforms only: A bug has been fixed where a DISPLAY statement in generated code, compiled with LINKCHECK, would not give an RTS 203 error when using an unassigned linkage item.

3159106 (1114292)

- In generated code, a move of the form "MOVE NATIONAL-ITEM TO NATIONAL-ITEM-JUSTIFIED" produced incorrect results when the target item was longer than the source.
- CHAIN <literal> ON EXCEPTION and CHAIN <literal> ON OVERFLOW did not work correctly when the overflow case occurred in native generated code on all platforms, with the exception of Intel x86 32-bit. This has been fixed.

Enterprise Server

Back to the list

- There is no longer an issue with the order of file retrieval for the list of console logs affecting the calculated maximum log number.

3192214 (1117023)

- LRECL fields are now displayed correctly in Data File Tools when accessing Enterprise Server hosted data files.

  3186524 (1116586)
- An issue with stopping printer terminals has now been resolved.

  3185553 (1116498)
- MQ Security is now used when using DSNRLI.

  3183523 (1116641)
- In Data Files Tools, the performance of opening a PO dataset that is hosted within Enterprise Server has been improved.

  3178780 (1116293)
- An issue that caused CTG requests using SNT users to be rejected has now been resolved.

  3178729 (1115967)
- An issue with IBM PCOM was resulting in different colors in BMS in RUMBA and PCOMM. To work around this, use the new environment variable ES_3270_REMOVE_NULL_COLOR_ATTRIB. Set ES_3270_REMOVE_NULL_COLOR_ATTRIB to y or Y to prevent the color attribute set to null from being sent in a 3270 flow.

  3176924 (1115831)
- The MQ XA switch modules now supports the BATCHONLY option.

  3173781 (1115552)
- Previously, xwbauth user exit was not invoked if URIMAP path was greater than 64 characters.

  3173349 (1115514)
- When a region was configured to use Extended User Storage, the associated memory was not registered with MFPM. This resulted in issues when using GETMAIN SHARED from a program compiled with the AMODE directive.

  3173307 (1115549)
- casout will no longer crash when using the /v option and there are more than 256 initiators/batch printers/mprs.

  Information for approximately 1300 processes can now be returned. If more than that exist, then casout will return as much as it can and set return-code to 4.

  This may be caused by schedulers using the entry point 'casout_getSEPS'. This can be called after using the casout API with the /v option. The signature for this entry point is:

  entry 'casout_getSEPS' using lk-casout-area.

  lk-casout-area is defined in casbout.cpy but can only hold information for up to 256 processes. If there are more than 256 processes then a call to this entry point will return truncated data (that is, 256 instances) and set return-code to 4.

  Since casout /v can now return data for more than 256 processes, a new optional parameter, which is a pointer, has been added to casout_getSEPS:

  entry 'casout_getSEPS' using lk-casout-area lk-casout-user-area-ptr.

  If there is data for more than 256 processes, then this pointer will be set to the address of the entire block of data.

  3171604 (1115376)
- Transaction routing requests from the same terminal to an ISC connected region involving a DPL request to an APPC connected SYSTEM now execute successfully.

  3170073 (1115270)
- Transactions with a timeout that was running over midnight were timing out prematurely at midnight.

  3169194 (1115144)

- Event manager exits that are enabled for SEP termination events are now invoked when a SEP, Initiator, MPR or a printer is stopped cleanly (from ESMAC and casout) and not just when they are killed.

  3168159 (1115051)
- The cursor position is now correctly identified when using floating maps - a map on top of another map.

  3166543 (1114958)
- If created from a previous run, cas_ipcs.lst and cas_ps.lst will now be deleted at the next region startup.

  3165807 (1114872)
- In a heavily loaded Enterprise Server cluster, it was possible for jobs to be dispatched to a printer process instead of to a batch initiator. This would result in the job's lock being permanently held and prevent further submission of jobs of that name.

  3162806 (1116082)
- When Enterprise Server activates an LU62 connection to the mainframe or to another APPC linked system, you can now leave the modename to SPACE. This indicates that the remote side of the APPC connection should use an elected default modename.

  3162296 (1114713)
- The position of a cursor on a map which size is different from that of the terminal size was incorrect. This has been fixed.

  3158745 (1114273)
- In an ESM secure region, when the userid field in a terminal definition was populated, there were issues at region startup or when trying to install the TERMINAL resource.

  3158468 (1115137)
- The environment variable ES_DDBG_PORT_RANGE now supports ports that include less than five characters.

  3158205 (1114237)
- With ES_XA_NB_RETRIES=-1 specified, Enterprise Server would leak SHM if the connection to the XA RM was lost.

  3158011 (1114246)
- An issue where a region would take too long to start up and eventually fail to start has been resolved.

  3153774 (1113875)
- Return codes from file operations on the spool files are now displayed correctly when there is an error.

  3153516 (1113882)
- When Data File Editor accesses files managed by an enterprise server region, users now need UPDATE permissions in order to access the file exclusively.

  3152798 (1113831)
- When connecting a TN3270 to an Enterprise Server instance, if the connection was lost, the printer could not be reconnected. Now you can navigate back to ESMAC, then Clients, and stop the printer in order to reconnect it after a loss of the connection.

  3142113 (1112847)
- Formatting a trace that was captured during the period when the clocks went back an hour will now format the entire trace. Previously, the formatter would exit at the point when the clocks changed.

  2876312 (1106883)
- An issue with exporting PCT resources has been resolved.
- Enterprise Server, LDAP-based security: The use of Active Directory groups, or other group classes that specify membership using LDAP Distinguished Names, now works correctly when the "user ID attribute" configuration option is also used.

  3187284 (1116696)

- The Enterprise Server External Security Facility (ESF) now strips leading and trailing whitespace from the user ID and other relevant fields in Verify (user authentication) requests.

  3185569 (1116548)
- For Enterprise Server LDAP-based security, recent fixes to group processing exposed an issue when multiple LDAP repositories are used and all-groups mode is enabled. This could cause some or all of a user's group memberships to be disregarded, leading to incorrect denial of access to resources. The problem has been corrected.

  3182724 (1116269)
- Enterprise Server's MLDAP ESM Module now supports setting LDAP passwords using salted SHA2-512 hashes. Otherwise known as the SSHA512 LDAP password type.

  3178540 (1116077)
- In Enterprise Server with LDAP-based security where a security configuration uses two or more LDAP-based Security Managers, and use-all-groups mode and group federation are enabled, in some cases group membership was not processed correctly. Messages about "configured number of groups exceeded" could be logged. This issue has been resolved.

  3178071 (1115917)
- With certain Enterprise Server security configurations, the Data File Editor could display a "signon failed" error when attempting to edit a dataset. This has now been fixed.

  3177366 (1116022)
- The cache feature of the Enterprise Server External Security Facility now ignores some metadata when comparing requests with cache entries. This is configurable. By default, the subsystem (CICS, JES, etc.) and facility (terminal name, if any) are ignored. No ESM Modules supplied with the product use that information in making security decisions. This significantly improves the cache hit rate and system performance in some environments. See "Enabling and Configuring Caching" in the product documentation for more information.

  3172719 (1115513)
- When using LDAP-based security for Enterprise Server with an OpenLDAP-based provider (client) library, the "connect timeout" setting now works correctly.

  3172554 (1115522)
- When using Enterprise Server with LDAP-based security, it is now possible to specify an LDAP attribute for user-group objects which specifies an alternative name for the group using the group short name attribute. See "MLDAP ESM Module Custom Configuration Information" in your product Help for more information.

  3171437 (1115364)
- Enterprise Server LDAP-based external security no longer experiences a rare failure ("error code 7") when verifying a user with advanced group processing options enabled.

  3168197 (1115048)
- LDAP-based security for Enterprise Server could produce MD5 password hashes (using the "mode=bind" and "password type=MD5" configuration option; note this is rarely used) which did not use the canonical Base64 encoding. Some LDAP servers did not recognize these password verifiers, resulting in sign-on failures after users changed their passwords. This has been fixed.

  3162441 (1114843)
- In Enterprise Server, the MLDAP ESM Module now supports the short-to-long username mapping option of the External Security Facility (ESF).

  3160464 (1114394)
- Enterprise Server now includes LDIF (LDAP Data Interchange Format) files suitable for configuring LDAP-based security using the OpenLDAP server.

  3147666 (1113475)

- Enterprise Server's optional LDAP-based security (External Security Facility with MLDAP ESM Module) now supports the Microsoft "group" LDAP class, as used by Active Directory and AD/LDS. Consult the online product Help or ask Micro Focus Customer Care for additional information.

  3109881 (1110084)

- An issue which resulted in the DELETE and DETAILS button staying disabled in the casrdo45 page has now been fixed.

  3181230 (1116351)

- Previously, when viewing cataloged datasets or Spool files in ESMAC, it was not possible to view any lines beyond line 99,999. Now the limit for the START field in ESMAC has been increased to hold any number up to 99,999,999.

  3181032 (1116152)

- An RTS error 153 occurred when more than 6400 PCT entries were displayed in ESMAC. This has been fixed.

  3167388 (1115007)

- With some specific LDAP configurations there were problems with accessing datasets from ESMAC where the configuration should have allowed access. This has now been fixed.

  3167364 (1114989)

- The response time for catalog searches using 44 character strings in ESMAC has been improved.

  3162969 (1114933)

- Remove locks is now enabled if the user has authorization in ESMAC.

  3157534 (1114372)

- Deprecation of set-cookie meta tag in newer versions of some browsers such as Chrome or Microsoft Edge caused issues with the cookies used by ESMAC. This has now been resolved.

  3154175 (1113973)

- The esfadmin command-line utility now allows command-line and option-file parameters of any length, up to the maximum command-line length of 8192 bytes. All esfadmin parameters can appear in the option file except -o (which specifies the name of the option file).

  2881372 (1107519)

- When using Enterprise Server with LDAP-based security, with two or more LDAP External Security Managers, with the use-all-groups mode enabled, and with federation either enabled or in compatibility mode (the default), it is no longer necessary to have a definition for each user in each LDAP ESM. Specifically, once one LDAP ESM has identified the user, subsequent ESMs (those specified later in the list of security managers) can specify additional groups for that user without having to define the user again. For example, a security configuration specifies two LDAP security managers, LDAP-A and LDAP-B. LDAP-A contains only user records. LDAP-B contains only group records and resource access rule records. All-groups mode and federation are enabled. This configuration now works as expected.

  2545079 (1081762)

- xa_open in the switch module now returns the correct return-code.

  3171133 (1115386)

- The path of ESDB2XA switch module is not required in the environment variable LD_LIBRARY_PATH when the application is compiled with XAID option and the dynamic switch module is used.

  3164301 (1114734)

- Within the DB2 LUW switch module, issues associated with ESLOGGING xa_open string parameter have been addressed, and better handling of impersonated userid when using USERP has been provided.

  3156639 (1114209)

Data Tools

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- The cursor is now visible in the free-text editing pane when the pane has focus whether it is in Shared or Exclusive mode. The cursor position will start counting from column 1, rather than column 0 as well.

  3154869 (1113954)
- On systems with a Japanese Locale, the Data File Tools utility no longer includes the phrase "Technical Preview" in its title.

Database Connectors

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- The compiler recognizes a new XFD directive that names an identity column. A Database Connectors interface is free to use this information to optimize access to a particular row of a table. Instructions for use:

  The directive can be used on a numeric field, and has the following format: XFD IDENTITY-COLUMN.

  If the directive is used on a non-numeric field, a warning will be displayed and the directive ignored.

  If the directive is used on more than one field of a file, all but the first will be ignored, and a warning issued.

  This directive should only be used once per file, though no warning will display if you specify it multiple times. Behavior in this case is undefined.

  The directive should not be used on a KEY field, though no warning or error will be issued if you do this.

  3184559 (1116426)

Debugging

Back to the list

- The COBOL debugger could fail to determine the correct line to highlight in certain situations such as 'stop run', when run in the Docker environment on Windows.
- It is now possible to debug a minidump from an Enterprise Server environment, in Visual Studio.

  3142342 (1113099)

Dialog System

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- An issue which prevented character mode Dialog System from recognizing ctrl-J and other key combinations has been resolved.

  3189921 (1116908)

Documentation

Back to the list

- The documentation for the compiler option -rc has been updated.

  3184345 (1116419)
- Result precision has been added to the following built-in functions topics in the LRM: INDEX, MAXLENGTH, SEARCH, SEARCHR, VERIFY, VERIFYR.

  3183332 (1116336)
- The product help now includes a clarification in the topic "To run a native COBOL application from a network server". It states that you must remove any individual copies of run-time system modules (for

example, cblrtsm.dll) that might have been copied into your application's working directory. This is to avoid issues with running the application such as "245 no valid licenses found" as the run-time system is not loading from the expected location, or where the copied run-time modules are from other versions of the product versions. Removing such modules ensures that any run-time system modules are only loaded from the Enterprise Server instance installed on the server.

3176098 (1116309)

- The Database Connectors for MSSQL publication now includes a full set of configuration options, and installation details.

3173722 (1115542)

- Depending on the environment, you need to export (UNIX) or set (Windows) environment variables in a script. See "To specify environment variables for an application" for more information.

3164533 (1116625)

- The product help now lists some additional requirements when running .NET COBOL applications from a network server. Your workstations must have the Microsoft .NET Framework version 4.5.2 or later and the Microsoft Visual C++ 2017 Redistributable Runtime installed.

3161217 (1114487)

- The documentation now includes the instruction that when deploying a subset of Run-time System files, you must include run.cfg in a sub-directory named 'etc'.

3160902 (1114441)

- The syntax example, listed in the documentation for the ILPARAMS Compiler directive, has been corrected.

3154632 (634308)

- When performing a sort that specifies more than one input file, you cannot specify one of those same files as the output file unless it is the first input file specified.

3153333 (1113833)

- Details of how to use ILBOABN0 have been added to the documentation.

3148996 (1113634)

- The "Tutorial: Creating and Accessing WCF COBOL Services" in the product help has been updated.

3125963 (1114011)

- The documentation (in the COBOL Language Reference) has been updated to clarify the use of the OPTIONAL keyword, and the use of (managed) optional parameters within the Procedure Division Header.

2883545 (1107792)

- The National Locale Support (NLS) Library Routines section of the documentation now contains all available NLS routines.
- The *Significant Changes in Behavior* section of the documentation now includes the default change for FASTINIT. (This change occurred in version 3.0, as stated in the release notes on release.)
- The documentation has been improved for the CBL_LOCATE_FILE library routine concerning the use of space- and null-terminated strings.
- The Rebuild syntax differs between UNIX and Windows platforms. For any of the Rebuild options, UNIX platforms use a hyphen (-) prefix before the letter, and Windows platforms use a forward-slash (/) before the letter.
- The recommended method of high availability for VSAM files in Enterprise Server is to use standalone Fileshare. The documentation has been changed to reflect this.
- The documentation has been updated to reflect that 'DEFAULT' is a reserved word when running under an ENTCOBOL dialect.
- In the documentation, the code example given in the 'Thread-specific Data Handling Routines' topic now compiles cleanly.

- The called program search order, as documented in the 'Backward Compatibility' section of the documentation, has been corrected for Windows platforms.
- The parameter definition for OOCTRL"+/-W" has been clarified in the documentation.
- A link to the IBM documentation added to the 'DSNRLI Functions used for RRSAF' topic - this is to enable you to locate full details on required parameters, and to give examples of its use.

  3184952 (1116524)
- The documentation now states that the section heading when adding environment variables through the Enterprise Server UI is case sensitive.

  3177135 (1115979)
- The documentation explaining the scope for the HOST-NUMCOMPARE directive has been simplified.

  3156368 (1114075)
- The "To specify the location of application files" topic has been updated to clarify the location of IMS copybooks.

  3111136 (1109993)
- Documentation for all Java API classes is now provided in HTML format and contained in an archive file located by default in the %ProgramFiles(x86)%\Micro Focus\<product name>\javaee-ccl\docs directory. See the Java API Classes topic in your product documentation for details.

  3109273 (1109725)
- Documentation for all Java API classes is now provided in HTML format and contained in an archive file located by default in the %ProgramFiles(x86)%\Micro Focus\<product name>\javaee-ccl\docs directory. See the Java API Classes topic in your product documentation for details.

  3109271 (1109724)
- The sample code listed in the CBL_DIR_SCAN_READ documentation has been formatted to enable you to copy and paste the code, ready for compilation.
- The sample in the documentation on 'Using FHRedir and an allocation override rule' has been corrected to show the spool filenames in their correct case (upper case).
- The documentation now includes a definition for the system abend code S913 (which is "Security Violation - the user is not permitted to access the resource").

Embedded HTML Pre-Processor

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- An issue that caused the embedded HTML preprocessor to display incorrect banner information has been corrected.

  3160255 (1114437)

File Handling

Back to the list

- Under certain circumstances, opening a sequential file in the editor could result in the editor throwing an exception during close-down. This has now been resolved.

  3145420 (1113132)
- Warning messages when checking disk space for Fileshare advanced logging are now only displayed when necessary. Previously, a disk space warning was given even if sufficient space was available.

  3174510 (1116078)
- A Fileshare server shutdown no longer leaves files opened or users remaining logged on.

  2837526 (1108076)

- CFLE updating large record no longer results in an RTS252 error with the HA-VSAM configuration.

  3167973 (1115057)
- You will no longer receive an RTS114 error when a failing primary node is restarted and attempts to re-join the HA group (as a standby node), as long as it closed all files successfully before the failure.

  3159872 (1114360)
- Rollback recovery will no longer hang when processing a bad log entry during a scan of the transaction log file.

  3168055 (1115049)
- A new MFJSORT option allows input LSEQ files to be treated as FB through setting the environment variable MFJSLSEQFB=ON.

  3190089 (1116876)
- SORT operations no longer compare field data that is outside of the current record length.

  3187044 (1116633)
- MFJSORT now ignores the RECORD TYPE value if the SORTIN dataset is non-VSAM.

  3163293 (1114669)
- During a SORT, the SUM statement now correctly handles 8-bytes BI fields.

  3161349 (1114540)
- An internal SORT program no longer returns a COBRT252 error for cataloged files when being compiled with AMODE"31" and dialect"entcobol".

  3161100 (1114586)
- SORT no longer produces an RTS114 error when both outfil and sortout datasets are not defined.

  3154290 (1113901)
- MFJSORT now correctly honors MFJ_INPUTDS_ERROR=N on missing physical concatenated datasets.

  3153313 (1113826)
- MFJSORT OUTREC now applies the correct length for EDIT patterns.

  3145526 (1113484)

IDE

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- The ASP.NET code-behind files are now updated correctly when the web form is changed.

  3183873 (1116358)
- The Show Console Log menu item in Server Explorer now works correctly for servers in which the 'Configuration information' property is larger than 1024 characters.

  3182582 (1116297)
- An issue where a project build could fail due to a locked IDY file after debugging managed code that contains partial classes has been fixed.

  3180008 (1116114)
- The on-demand code analysis now works correctly with SQL programs.

  3179276 (1116015)
- 'Go To All' now correctly returns module names in programs which use a mainframe dialect.

  3178541 (1115978)
- The quick action "Extract the selected code to a new section" now creates a new section positioned before any comments that belong to the following section.

3178510 (1115955)

- Copybooks are now expanded correctly when debugging mainframe programs that are not part of a project.

3173323 (1115554)

- The resource editor now correctly generates resource entries for image files that contain spaces.

3171165 (1115424)

- There is a new Visual Studio setting in Tools > Options > Micro Focus > Projects, Restore error messages on project load. When enabled, it helps to restore the contents of the Error List and the icon overlays from the previous IDE session for that project.

3169606 (1115197)

- When selecting a copybook from the IntelliSense list, the format of the copybook name to insert in the code is determined by the COBOL dialect of the source file.

3169303 (1115196)

- The "Preview Changes - Determine Directives" dialog box no longer lists the "Set NOSQL" option when the option has not previously been set.

3168960 (1115481)

- Group items are now always colored red when referenced by name.

3166449 (1114920)

- A UNC path can now be specified as the output path for a COBOL project.

3166250 (1114929)

- Information in columns 1-6 of a copybook which is included in a program using COPY... REPLACING is now displayed when the copybook is expanded. When using the 'Find' command, the copybook must be expanded in order for the content to be found.

3163453 (1114687)

- A new Visual Studio setting enables you to specify whether the current file and its dependent copybooks are saved when compiling a standalone program. You configure this in Tools > Options > Micro Focus > Standalone Editing and on the General tab - check "Save dependent copybooks".

3162731 (1114627)

- Level 88 data items that have been referenced are now colored correctly in the editor.

3162191 (1114602)

- An issue causing Visual Studio 2017 to freeze when opening a solution has been resolved.

3161848 (1114537)

- It is now possible to use the COBOL Visualizer window to modify alphanumeric data items while debugging. The visualizer preserves null bytes which the standard visualizers do not support.

3156794 (1114109)

- The QuickInfo logic has been improved to search for the best matching item when the user is hovering over an ambiguous "redefines" item.

3154020 (1113951)

- The Net Express Project Import wizard in Visual Studio now successfully imports projects that contain control characters in the project's properties.

3151911 (1113692)

- Saving the settings in Visual Studio now updates the project's settings file.

3151311 (1113848)

- When debugging COBOL programs, you can now use a COBOL Visualizer in addition to the standard Visual Studio visualizers when querying data COBOL data.

3136410 (1112316)

- The progress dialog displayed when creating or starting a temporary server now includes a Cancel button.
- The Command Line tab in the properties of a COBOL file now displays the correct information when "Set explicitly no SQL" is enabled for the file.
- When debugging Enterprise Server applications loaded in Visual Studio in Open Folder mode, the IDE no longer prompts for a program path.
- Opening COBOL files that are not present in a project could crash Visual Studio (versions 15.8 and newer).
- IntelliSense in .xaml files is now supported for COBOL WPF applications.
- Any changes to the settings in Tools > Options > Micro Focus > Enterprise Server are now saved correctly.
- The ASP.Net Web Application project template is only supported with versions of the .NET Framework 4.0 and later. With versions of the .NET Framework 2.0 to 3.5 SP1, you can only use the Empty ASP.Net Web Application project template.
- In Visual Studio 2017, attempting to debug managed code with expanded copybook view disabled would cause the debugger to crash.
- Expanding a debugger data tip while debugging .NET COBOL code in Visual Studio 15.8 or newer could crash the IDE.
- Viewing the Micro Focus Code Analysis properties for a project no longer causes the project file contents to change.
- All elements in a group item can now be displayed in the Watch or Autos windows when debugging.

Interface Mapping Toolkit

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- For clients and services generated from WSDL, generated copybooks are no longer missing declarations for complex WSDL fields with duplicate names.

  3188506 (1116761)

- A problem that caused invalid xsd:date types in a CICS Web Service WSBIND file generated from a WSDL file has been fixed. xsd:date types are now generated as collapsed fields.

  3184571 (1116456)

Licensing

Back to the list

- cesadmintool.sh now searches for " version" string in the Java version and ignores any additional output that might appear.

  3185425 (1116559)
- In Docker environments, the license administration program, MFLicenseAdmin, now copes with longer-than-usual license strings. These occur with longer pieces of customer information embedded in the license.

  3174371 (1115634)
- There is no longer an entry in the Uninstall column for licenses installed on remote machines.

  3131570 (1112101)

Micro Focus Common Client

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- Applications which use the Micro Focus Common Client (MFCC), such as the Interface Mapping Toolkit (when deploying a COBOL web service or EJB to Enterprise Server), can now specify credentials when binding to the Micro Focus Directory Server. This provides additional security. If credentials are not

configured, MFCC will use an anonymous bind, as it did in earlier product versions. Credentials are specified using the mf-client.dat configuration file.

Micro Focus Directory Server

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- The Enterprise Server Administration Web UI will only display user session details if the logged in user is authorized.

  3190235 (1116886)
- Additional Enterprise Server Administration Web UI server-side checks were added to guard against non-editable field value changes for started Enterprise Server instances and active security configurations.

  3185626 (1116719)
- Establishing a connection to a TLS-enabled MFDS process if non-default (non-DemoCA) certificates were used now works as expected.

  3174276 (1115675)
- The MFDS journal data format has been enhanced to be platform and bitism independent.

  3169565 (1115249)
- Improved validation of data input to Enterprise Server Administration Web UI.

  3163386 (1114693)
- Adding or editing TCP listener-requested endpoint values using the Enterprise Server Administration web UI so that a port clash may occur now gives a warning rather than being disallowed and treated as a user input error.
- If the Enterprise Server Administration Web UI is hosted in a Docker container, the displayed hyperlinks to reach the Micro Focus Communications Process web pages can now be configured to use an address which is valid outside the container.
- URLs to SSL-enabled MFCS Control Channel addresses displayed in the Enterprise Server Administration HTML UI now use an https prefix.
- A new field, "Server CA Root Certificate", is available in the Communications Process Control Channel page (id: c400). The value specified here is used unless the MFDS_server_CAROOT environment variable was specified as it takes precedence. You must specify the server CA root certificate if the Communications Process Control Channel is SSL/TLS-enabled and if communications with the MFDS process are required such as to respond to keepalive and any other administration control requests.
- Enterprise Server Administration Web UI would sometimes display the successful logon splash screen instead of a logon error message.
- The MFDS process could terminate when copying the definition of an Enterprise Server instance if it contained a very long description text.
- Trying to view or edit the properties of a Security Manager that is not in the Directory Server Security Manager list now results in receiving an appropriate warning message instead of an HTTP 404 error.
- MFDS now saves any changes made to the Communications Process immediately instead of at shutdown.

Micro Focus Server Administrator

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- If Enterprise Server Administration was set to restricted access, some MQ listener configuration pages would not be displayed.

  3152874 (1113782)
- The Enterprise Server Administration HTML UI no longer displays the IP address but only the host name used by the Web administration server process.

  3140974 (1112912)

OpenSSL

Back to the list

- Visual COBOL, Enterprise Server, and Enterprise Developer now include an updated collection of public Certification Authority root and intermediate certificates (CARootCerts.pem) derived from the public collection maintained by Mozilla.org.

Run-Time System

Back to the list

- Under certain circumstances, if a file was opened multiple times and an error occurred, then any physical locks on the file could be lost.

  3177819 (1116043)
- In a threaded environment, when using critical-sections and simultaneously loading/unloading shared-objects, a race condition would sometimes create a deadlock. This no longer occurs.

  3177711 (1116154)
- The use of the P(COBSQL) Compiler directive in a Visual Studio or Eclipse project no longer causes the IDE to crash intermittently at termination.

  3133807 (1112077)
- The COBRT243 Class could not be loaded error message now contains the name of the class that could not be found.

  3104988 (1109420)
- Calls to CBL_MEM_VALIDATE might not have given the full memory corruption details if the corruption occurred in freed memory. This is now fixed.
- When using the Character Animator, you can enter Ctrl+C to interrupt the running process you are debugging. This would sometimes fail to stop the running process, but should now behave as expected.
- When setting the out-length parameter of the CBL_STRING_CONVERT API to zero in order to get the size of the buffer required for the conversion, the API no longer fails with a ArgumentNullException when running on the .NET environment. Under JVM COBOL, this API no longer corrupts the output buffer if the output length has been set to 0.

Setup Issues

Back to the list

- The Data File Tools AddPack can now be installed alongside Enterprise Server.

  3158290 (1114230)
- The installer error handling has been extended to cater for certain conditions.

  3152023 (1113706)

SQL: COBSQL

Back to the list

- COBSQL now handles "ELSE EXEC SQL" correctly when it is all on the same line in the source file.

  3176046 (1115778)
- The XAID option did not work properly for COBSQL when CHARSET(EBCDIC) was used.

  3174070 (1115697)
- A compilation error that was caused by the COBSQL preprocessor incorrectly handing sections declared inside of a copybook has been fixed.

  3164533 (1116863)

- An unreadable copybook caused COBSQL to loop when stacked with the CP preprocessor. This has been fixed.

  3156374 (1114103)
- An unreadable copybook caused COBSQL to loop when stacked with the CP preprocessor. This has been fixed.

  3156374 (637041)
- An issue that caused a compilation error when COBSQL encountered inline comments in an EXEC SQL statement has been fixed.

  3123025 (1111044)
- COBSQL messages have been updated to provide more information when failure is due to a missing list file, and when the list file is missing due to use of the LTYPE=NONE directive.

  2883514 (624749)
- To prevent exceeding the COBSQL directive buffer size, the maximum directive buffer size has been increased to a maximum of 8000 characters.

  2852872 (1104084)
- To prevent hanging or a compilation error, COBSQL has been updated to properly handle conditional statements in the same line as EXEC SQL statements.

  2804004 (1097225)
- An issue that sometimes caused SQL error text to display as truncated on the command line has been fixed by increasing the maximum error length to 250 characters, and updating the logic used to construct the message.
- An issue that caused an error when a space was present between an END-EXEC statement and a period has been fixed.
- The COBSQL precompiler interprets the SOURCETABSTOP COBOL compiler directive as SOURCETABSTOP(8) in all cases. This is due to Pro*COBOL honoring only SOURCETABSTOP(8), and is a permanent restriction for COBSQL.

SQL: DB2

Back to the list

- An optional 'FROM' keyword in SQL statements such as 'FETCH FROM <cursor-name>' used to cause compiler errors.

  3191635 (1116976)
- There is no longer an issue with negative line numbers being generated in the .bnd file when the COBOL source file has more than 32700 lines of code.

  3188178 (1116814)
- An issue with the DB2 preprocessor caused it to incorrectly classify PL/I variables greater than 4000 bytes as LONG VARCHAR when it should have classified PL/I variables less than 32767 bytes as VARCHAR as it does for COBOL variables. This has been fixed.

  3185976 (1116539)
- The DB2 pre-compiler incorrectly generated a compile error when hyphen was used in SQL command without a space between the hyphen and host variable name. This has now been fixed.

  3180089 (1116102)
- DB2 LUW now supports dashes in cursor names, so the DB2 pre-compiler no longer changes dashes to underscores in cursor names.

  3177271 (1115912)
- The DB2 pre-compiler incorrectly passed COBOL variable names to PL/I programs when generating code to handle EXEC SQL SET CURRENT PACKAGE PATH statements.

  3175885 (1115744)

- The DB2 and OpenESQL pre-compilers now qualify generated code that uses SQLSTATE to qualify SQLSTATE similar to this one: SQLCA.SQLSTATE.

  3173295 (1115512)
- An issue that caused the DB2 preprocessor to incorrectly reject FILLER as a valid host variable name in PL/I programs has been fixed.

  3164600 (1114767)
- An issue that occurred with user personalization on user names exactly eight characters long has been resolved.

  3156639 (1114163)
- When a DBCS database is used with CHARSET(EBCDIC), the data of a char field following a varchar field will no longer be corrupted.

  3155499 (1114065)

SQL: OpenESQL

Back to the list

- JDBC now returns SQLCODE=+1 when the fetched value is NULL and NULL indicator is not used.

  3191192 (1116953)
- Decimal value is now inserted correctly into Oracle DB when DECDEL=COMMA is set.

  3189836 (1116947)
- An issue that caused performance degradation when using a STATIC cursor has been fixed.

  3185894 (1116518)
- The OpenESQL run-time now handles the compiler directive SQL(NOAUTOFETCH) correctly.

  3177780 (1115994)
- OpenESQL has been updated to provide cobrhcedsn64.so for 64-bit only platforms.

  3174065 (1116801)
- HCOSS now accepts FOR READ ONLY clauses in cursors before FETCH FIRST clauses. This is undocumented behavior for DB2 z/OS but HCOSS now supports it to ensure mainframe compatibility.

  3173586 (1115528)
- An issue where WITH HOLD cursors could remain open after an IMS transaction had terminated for SQL Server, ODBC and PostgreSQL XA resources has been fixed. SQL(NOCHECKDUPCURSOR) can now be used to override duplicate cursor checking when SQL(DIALECT=MAINFRAME) is used.

  3172382 (1115430)
- A new SQL directive [NO]ALLOWSERVERSELECT supports server-specific SELECT statements that are not recognized by OpenESQL as valid ESQL SELECT ... INTO statements. This behavior was the default in Net Express.

  3165092 (1114866)
- An issue that caused the OpenESQL runtime to incorrectly handle binary parameter markers for PIC X(n) VARYING host variables has been fixed.

  3163759 (1114719)
- The SQL Directives dialog box that appeared for .NET project types in the Visual Studio IDE erroneously omitted the SQL(HSFTRACE) option for DBMAN=ADO. This has been fixed.

  3162428 (1114593)
- Data type information that was incorrectly mapped by the OpenESQL Assistant caused it to display column information improperly when using an IBM DB2 ADO.NET provider connected to a DB2 z/OS data source. This has been corrected.

  3161285 (1114478)

- An issue that occurred when the SQL BEHAVIOR compiler directive option was set to UNOPTIMIZED caused the OpenESQL runtime to generate an RTS 114 error when the COBOL application exited. This has been fixed.

  3158065 (1114288)
- Problems with SQL Server and PostgreSQL that surfaced when working with large binary columns have been fixed.

  3156215 (1114335)
- An issue that caused the OpenESQL preprocessor to generate an incorrect error message when SQL(DBRMLIB) was not set prior to specifying SQL(VERSION) has been fixed; the OpenESQL preprocessor now generates the correct error message.

  3155275 (1114004)
- SQL FETCH ABSOLUTE CURSOR was not returning rows. A COMP position value is now supported in the SQL FETCH ABSOLUTE/RELATIVE statement and it behaves as expected.

  3153738 (1113903)
- An issue that prevented HCOSS from correctly handing IS [NOT] DISTINCT predicates has been fixed.

  3152630 (1113764)
- An issue that caused HCOSS to incorrectly apply QUALIFIERs to common table expression names has been fixed.

  3152008 (1113714)
- The DSNRLI function SWITCH TO is now supported for Enterprise Server Mainframe Subsystem applications using DB2, Microsoft SQL Server, and PostgreSQL.

  3151779 (1113680)
- An issue that caused HCOSS to incorrectly handle FETCH FIRST ROW ONLY when no literal row count was present has been fixed.

  3151398 (1113734)
- An issue that caused the OpenESQL runtime to execute a core dump on exit when the MEMORY_STRATEGY tunable was set has been fixed.

  3142107 (1113077)
- A program that contained zoned decimal host variables used in SQL statements and compiled using charset(EBCDIC) and dialect(MF) sometimes caused a run-time error. This has been corrected.

SQL Option for DB2

Back to the list

- The XDB pre-compiler incorrectly generated line and column number information used by the IDE to get COBOL information about field on EXEC SQL INSERT statements.

  3182574 (1116350)
- The XDB pre-compiler incorrectly tried to generate interface logic in nested COBOL routines without checking if a SQLCA copybook was defined. This resulted in an "Undefined ECM error" error message. This has been fixed.

  3168445 (1115099)
- An issue caused by an uninitialized stack variable that resulted in a server violation has been fixed.

  3168714 (1115237)
- A number of XDB components have been enhanced to better implement bulk INSERT/UPDATE/MERGE statements using both local XDB engines and XDB Link in dynamic and static mode to z/OS DB2.

  3175084 (1115695)

- XDB Link has been updated to support the invocation of stored procedures that return multiple result sets on z/OS DB2.

  3168036 (1115315)

- A memory leak in DRDA Continue Query Reply Message processing has been fixed.

  3160580 (1114426)

- An issue that prevented XDB Server configuration from allowing the full length of 16 characters in the Global Security Location text box has been fixed.

  3168821 (1115106)

- An issue with SQL step processing related to CASE expression evaluation that caused the SQL COALESCE scalar function to return the wrong result has been fixed.

  3160595 (1114413)

- Support has been added for the SOUNDEX() and DIFFERENCE() scalar functions.

  3155733 (1114043)

- An issue that caused a buffer overflow when processing a very large UPDATE WHERE CURRENT OF in the XDB Link has been resolved.

  3151725 (1113807)

- An problem with XUTLB (XDB emulation of DSNUTILB) erroneously reporting an invalid isolation level has been resolved.

  3134586 (1112183)

- An issue with join optimization using differing lengths of DECIMAL data has been resolved.

  3131870 (1111903)

- An issue with a scalar query using a DATETIME value returning an error indicating that the value was invalid has been resolved.

  3129637 (1111872)

- An issue with Query Descriptor mapping when performing XDB Server to Server connectivity has been fixed.

  3112564 (1110514)

- An issue with an uninitialized stack space causing a thread abend in XDB SQLDA code page processing has been fixed.

  2990360 (1108708)

Web Service Client

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- When a generated Web service client executes, an additional optional user-supplied exit program, exit-http-resp-headers, is now called to provide access to any and all HTTP headers present in the response message from the service.

  3172598 (1115452)

XML Schema to COBOL generation

Back to the list

- CBL2XML now handles the namespace of certain elements correctly.

  3175256 (1115745)

XML Support

Back to the list

- XML PARSE now handles "WITH ENCODING" clauses correctly.

  3175231 (1115707)
- Data within the CDATA tag is now processed by the managed XML syntax support run-time.

  3166588 (1114954)
- XML PARSE did not handle lengthy CONTENT-CHARACTERS correctly which caused the event to be returned twice.

  3162231 (1114582)
- Literals positioned beyond column 72 in the editor are now being handled correctly and compile without any issues.

  3152550 (1114087)

Other Issues Resolved in This Release

The numbers listed are the Support Incident Numbers followed by the Reported Problem Incident (RPI) number (in parentheses).

- 3177187 (1115851)
- 3181887 (1116201)
- 3177661 (1116118)
- 3134735 (1112201)
- 3170148 (1115245)
- 3171080 (1115373)
- 3161109 (1114775)
- 3160774 (1114530)
- 3187599 (1116668)
- 3176925 (1115833)
- 2802311 (1097060)
- 3140337 (1112673)
- 3175137 (1115685)
- 3170946 (1115402)
- 3128586 (1111526)
- 3105876 (1109394)
- 2990180 (1108737)
- 2854004 (1103682)
- 2851622 (1103230)
- 2844942 (1102368)
- 2841043 (1102369)
- 2590883 (1085717)
- 3181941 (1116211)
- 3103315 (1109252)
- 2990950 (1108778)
- 2865338 (1105207)
- 2597474 (1088223)
- 3164898 (1114811)
- 3150507 (1113583)
- 3122080 (1110968)
- 3122020 (1110949)
- 3114654 (1110269)
- 2887726 (1108356)
- 2885799 (1108108)
- 2873642 (1106416)
- 2835954 (1101265)
- 2795293 (1096771)
- 2652488 (1090826)
- 2587952 (1086146)
- 3123593 (1111108)
- 2642528 (1090004)
- 2594601 (1086032)
- 3181445 (1116188)
- 3168020 (1115032)
- 3164533 (1115215)
- 3162064 (1114546)
- 3158311 (1114231)
- 3158072 (1114399)
- 3141381 (1112770)
- 3164533 (1115570)
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- 3158936 (1114346)
- 3156405 (1114097)
- 3152246 (1113749)
- 3157702 (1114217)
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- 3150188 (1113906)

- 3161964 (1114569)
- 3172126 (1115445)
- 3103315 (1109252)
- 3187219 (1116640)

Unsupported Functionality

This section includes information about features or functionality that are no longer supported.

- The HOSTSIGNS Compiler directive is no longer supported. Micro Focus recommends that you use the following Compiler directives instead: SIGN-FIXUP, HOST-NUMMOVE, and HOST-NUMCOMPARE. This is a change since version 3.0 of this product.

Installation

Before Installing

Downloading the Product

You can download Visual COBOL from the *Product Updates* section of the *Micro Focus SupportLine* Web site.

On Windows

System Requirements

Hardware Requirements

Visual COBOL has the following requirements in addition to the requirements of Microsoft Visual Studio. See the Visual Studio documentation for details of the Microsoft requirements.

The maximum disk space requirements are, approximately:

Visual COBOL	Sentinel RMS License Manager
1.2Gb	75MB

- This includes the space needed to cache information locally so that you can modify the installation without the original source media.
- The disk space requirements include the versions of JRE and .NET Framework supplied with the setup file.

Operating Systems Supported

For a list of the supported operating systems, check the *Product Availability* section on the Micro Focus SupportLine Web site: *http://supportline.microfocus.com/prodavail.aspx*.

Note:

- You can produce both 32-bit and 64-bit applications with Visual COBOL installed on a 64-bit operating system.
- Support for development on Windows 8 and Windows Server 2012 has been discontinued. These platforms are still supported for deployment. Windows 8.1 and Windows Server 2012 R2 are supported.
- Visual COBOL for Visual Studio is not supported on versions of Windows earlier than Windows 7.

Software Requirements

The setup file will check your machine for whether the prerequisite software is installed and will install any missing prerequisites and the product components. A supported version of Microsoft's Visual Studio must be installed in advance.

Note:

- Besides the software listed below, the setup file also installs the 64-bit AdoptOpenJDK's OpenJDK 8 (u202) with Hotspot.
- This product includes OpenSSL version 1.1.1b.

Visual Studio IDE

You must have Microsoft's Visual Studio 2017 version 15.9.4 or a newer one or 2019 version 16.1 or a newer one installed in advance. (Visual Studio 2019 16.0 is supported but you need to use the search field in the **Create a new project** dialog box in order to find the COBOL project templates).

You need one of the advanced versions of Visual Studio listed below:

Professional, Enterprise or Community Edition (for Visual Studio 2017) - see the next section for the Visual Studio components you must install.

Professional, Enterprise or Community Edition (for Visual Studio 2019) - see the next section for the Visual Studio components you must install.

Microsoft's Visual Studio Express Edition is not supported.

Important:

- When installing Visual Studio, ensure you select the Help Viewer component for installing if you want to view the Visual COBOL product help inside Visual Studio. When you select components to install in the Visual Studio installer, click **Individual components** and check **Help Viewer** in the **Code tools** section.

The following software is also required:

- Microsoft .NET Framework 4.7.2. This is included with Visual Studio.

Selecting the Visual Studio components to install

The Visual Studio installer enables you to customize and only install the workloads and components that are most suitable for your area of development. For example, you can select the components that are required for .NET desktop development, ASP.NET Web or C++ development.

If not already installed, the Visual COBOL setup file will install the following components:

- .NET Framework version 4.7.2.
- Debugger
- Data services

A number of workloads and components are optional and only required by specific types of applications or tasks:

- Azure, WCF, Web, WPF or SQL CLR application development.

If you require any of these, you can select them when you start the Visual Studio installer or, enable them after completing the installation - see the next section.

Installing Visual Studio features that are not currently installed

If a feature of Visual Studio was not installed during the Visual Studio installation, the respective functionality or the project templates for it are not available. You can install a missing feature in one of the following ways:

Rerun the Visual Studio installer:

1. Start the Visual Studio installer and choose to modify an existing Visual Studio instance.
2. Select the workloads and the components that are missing (for example, **ASP.NET and web development** or **Help Viewer**).

3. Start the Visual Studio installation.

Use the **Quick Launch** control in Visual Studio:

1. Start Visual Studio.
2. Type the name of the feature in the **Quick Launch** control - for example, type `ASP.NET` or `Help Viewer`.

   A drop-down list with any features matching your search string appears. If the feature is not already installed, one of the search results will be an option to install it.

Use the `Install Missing Feature(s)` command in Visual Studio:

1. Start Visual Studio.
2. Click **Help > Micro Focus Product Help > Install Missing Feature(s) > *Feature Name***.

   Follow the instructions in the installer to install the missing feature.
3. Alternatively, if a Micro Focus project template requires a Visual Studio feature which is not currently installed, the IDE displays an information bar with instructions to install the feature.

Other Requirements

Important: For local servers, you do not need to install the Micro Focus License Administration tool separately, as the setup file installs a new Visual COBOL client and a new licensing server on the same machine.

If you have a network server, you must update the license server before installing the product as the client is not able to communicate with license servers of versions older than 10000.2.660. On Windows, you can check the version of your license server by clicking **Help > About** in the Micro Focus License Administration tool.

If Micro Focus License Manager version 10000.2.02070 or older is installed, it must be uninstalled before the product installation or upgrade can continue.

You can download the new version of the license server software from the Micro Focus SupportLine Web site: *http://supportline.microfocus.com*.

Supported Third Party Software

The table below lists some of the software requirements and Third Party Software this product is tested with.

For full details on the supported software, see *Software Requirements* and *Additional Software Requirements* in this product's install notes.

Software	Requirements
Integrated Development Environment	Visual Studio 2017 (the earliest supported version is 15.9.4).
	Visual Studio 2019 (the earliest supported version is 16.1).
.NET framework, .NET Core	All .NET framework versions supported
	.NET Core 2.1
Java application servers	Tomcat 9.0
	JBoss EAP 7.1
	Oracle WebLogic 12c R2
	IBM WebSphere 9.0
Relational databases	Oracle 12c R2 and 18c

Software	Requirements
	Microsoft SQL Server 2012, 2014, 2016 , 2017
	IBM DB2 10.5, 11.1
	Postgres 10.5
	MySQL 5.7
Middleware	Oracle Tuxedo and Tuxedo ART 12.1.3c
	IBM TXSeries for Multiplatforms 9.1
	IBM's MQ series 8.0
Platform support	See *http://supportline.microfocus.com/prodavail.aspx*.

Additional Software Requirements

To ensure full functionality for some Visual COBOL features, you might be required to obtain and install additional third-party software in addition to the prerequisite software installed automatically by the Visual COBOL setup file.

See this information on the Product Documentation pages on Micro Focus SupportLine, in the product help for Visual COBOL for Visual Studio 2017 (*click here*) or Visual COBOL for Visual Studio 2019 (*click here*).

Product Co-Existence

- 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.

Installation Restrictions and Requirements

Before starting the installation you should consider the following:

- Visual COBOL and Enterprise Developer cannot coexist on the same machine.
- If, when you install Visual COBOL, the machine does not have Microsoft Visual C++ 2017 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.

Basic Installation

The instructions in this section apply when you are performing a basic installation of this product for the first time. If you are an administrator, you can perform a basic installation on a local machine before performing a more advanced installation when rolling out the product to developers within your organization.

For considerations when installing this product as an upgrade, for additional installation options or non-default installations, see *Advanced Installation Tasks* in your product Help.

Installing

Note:

- This version of the product is a full install.
- See *Before Installing* first for important information. Also, see *Installing as an Upgrade*, if you have an earlier version of Visual COBOL installed on your machine.

To install this product:

1. Run the `vcvs2017_50.exe` file (or `vcvs2019_50.exe`) and follow the wizard instructions to install the prerequisite software and the product.

Note:

- If you are installing onto a machine that has an existing Micro Focus product that uses an older Sentinel RMS License Manager, you might be prompted to remove it and install the Micro Focus License Administration. By doing this you maintain the existing Sentinel RMS license files while adding the Micro Focus License Administration. If you are unsure about existing licenses on your computer or removing the Sentinel RMS License Manager, consult your System Administrator. If you want to proceed, remove Sentinel RMS License Manager by using **Program and Features** (Windows Vista or later), and rerun the installation file.
- If do not choose to install Rumba+ at this time, but decide you want it later, you must then uninstall Visual COBOL, and then rerun the installer with the Rumba+ option checked. As an alternative, you can use a different emulator, but be aware that instructions in this documentation often assume that you are using the embedded Rumba+ Desktop emulator.
- Trial licenses cannot be used with remote desktop services. If you want to use your product in this way, please contact Micro Focus SupportLine to obtain a relevant license.
- We recommend that you install any updates for Visual Studio and the .NET Framework that are available at the *Microsoft Download* site.
- If you install JDK you might be prompted to install the latest update. The latest update is not required for use with Visual COBOL but you can install it if you wish.

Advanced Installation Tasks

This section includes instructions about how to perform a non-default installation, install this product as an upgrade, or about how to install the additional components.

The advanced installation tasks include:

- *Installing as an Upgrade* - included in these Release Notes
- *Command line installation options* - included in these Release Notes
- *Installing on Microsoft Terminal Server and Citrix* - available in the product Help and on the Product Documentation pages on Micro Focus SupportLine

See this information on the Product Documentation pages on Micro Focus SupportLine, in the product help for Visual COBOL for Visual Studio 2017 (*click here*), and Visual COBOL for Visual Studio 2019 (*click here*).

On Windows

Installing as an Upgrade

Installing this release as an upgrade will automatically uninstall any Patch Updates of the older version of the product you have installed on your machine.

- Before installing this release as an upgrade, ensure you create a back-up of your Enterprise Server configuration. To do this, on the Enterprise Server Administration home page, click **Export** and then select **Export Enterprise Server configuration and Security Manager definitions**. This creates a backup folder in the `c:\programdata\micro focus\Enterprise Developer\MFDS`. You can restore the Enterprise Server configuration after installing this release - click Import on the Enterprise Server Administration home page.
- This release can be installed as an upgrade to Visual COBOL 4.0 or 3.0 for Visual Studio 2017.
- Visual Studio versions 2013 and 2015 are no longer supported. It is not possible to upgrade to release 5.0 from Visual COBOL for Visual Studio 2013 or 2015 4.0 or earlier.

Visual COBOL Installation Options

To install Visual COBOL you run `vcvs2017_50.exe` which contains a number of product `.msi` files (Windows Installer packages). When run, `vcvs2017_50.exe` performs some initial system checks then sequentially installs the `.msi` files.

Note: The following applies to `vcvs2019_50.exe` when installing the product for Visual Studio 2019.

`vcvs2017_50.exe` can take a number of parameters, enabling you to specify a number of different types of installation:

- Standard Installation

  Format:
  `vcvs2017_50.exe`
  Summary:
  Full installation including License Manager and Visual COBOL. During installation you can specify options including the location to which the components are installed.
- Non-interactive Installation

  Format:
  `vcvs2017_50.exe /passive`
  Summary:
  Full installation, but the components are installed non-interactively using default options and directories.
- Silent Installation

  Format:
  `start /wait vcvs2017_50.exe /q`
  Summary:
  Full installation, but the components are installed non-interactively with no user interface, using default options and directories.
- Modified Silent Installation

  Format:
  `start /wait vcvs2017_50.exe /q InstallFolder=d:\otherdirectory`
  Summary:
  Full installation, but the components are installed non-interactively with no user interface, and Visual COBOL is installed to `d:\otherdirectory`.

To see what parameters you can use, execute the following from the command line: `vcvs2017_50.exe /?`.

Note:

- Log files that are created during installation are saved in the folder specified by the TEMP environment variable. To change the location or name of the files, use the `/log` parameter on your setup command line and specify the path and file name, for example: `filename /log d:\temp\log.txt`. This creates a log file, named `log.txt`, in the `d:\temp` directory.

Installing Visual COBOL into Visual Studio

Visual Studio is offered in different editions, Professional, Enterprise or Community Edition, that can all co-exist on the same machine. When you install Visual COBOL, its setup file installs it into any edition of Visual Studio installed on the machine, including Preview versions.

If, after Visual COBOL is installed, you install a different edition of Visual Studio, you can use the **MFVSIXINSTALL** utility (available in the Visual COBOL installation directory) to plug Visual COBOL into that edition.

MFVSIXINSTALL

To install Visual COBOL in all editions of the Visual Studio version that you target (either 2017 or 2019):

1. Locate `MFVSIXInstall.exe` in `%ProgramFiles(x86)%\Micro Focus\Visual COBOL\vsix`, and in in either the `VS15.0` (for Visual Studio 2017) or `VS16.0` (for Visual Studio 2019) subfolder.
2. Run `MFVSIXInstall.exe`.

   This starts the VSIX Installer utility that will install all the required components into the existing editions of the Visual Studio version that you target.
3. Click **Modify** in the **VSIX Installer** dialog box to start the installation.
4. Click **Close** when the installation is completed.

You can execute `MFVSIXInstall.exe` from the command line with different parameters. For example, to uninstall Visual COBOL from all editions of Visual Studio, execute `MFVSIXInstall -u`.

For a list of all parameters execute `MFVSIXInstall -?`.

Troubleshooting Visual COBOL installations

You can use the MFVSIXInstall utility to troubleshoot and fix any issues with plugging Visual COBOL into Visual Studio.

If after installing Visual COBOL there appears to be no Visual COBOL support in Visual Studio, run the MFVSIXInstall utility as described earlier. The utility provides information about any issues that were found and will, in most cases, fix the Visual COBOL integration.

In some cases, an issue with the Visual COBOL installation might be caused by an issue with Visual Studio setup itself. You need to run the Visual Studio installer that will report any potential problems and enable you to either repair, modify or uninstall the IDE. If the installer reports any issues, check the following for more details:

After Installing

- See *Changes in Behavior or Usage* in your product documentation and in the Release Notes for important information about changes in this release that might affect existing applications.
- Check the *Product Documentation* section of the *Micro Focus SupportLine Web site* for any updates to the documentation which might have been uploaded.

On Windows

Starting the Product

You are now ready to run Visual COBOL:

Windows 7 and Earlier	• From your Windows desktop, click **Start > Visual Studio 2017**.
Windows 8.1	• From your Windows desktop, click the **Visual Studio 2017** tile.
Windows 10 and Later	• From your Windows desktop, click **Start > Visual Studio 2017**.

Viewing the Product Help

Visual COBOL is configured to display the product help available online on the Micro Focus SupportLine Web site: *https://www.microfocus.com/support-and-services/documentation/*.

You can view the product help in one of the following ways:

Online help (default)

Note: Your Visual Studio must be configured to show online help by default. Make sure **Help > Set Help Preferences** in Visual Studio points to **Launch in Browser**.

You can access the Help in one of the following ways:

- Click **Help > Micro Focus Product Help > Product Documentation**.
- Alternatively, press **F1** inside the editor or from a UI part.

  This opens the Visual COBOL help or Microsoft's MSDN depending on which keyword in the editor or part of the UI you are querying.

Local help

Note: If you've had an earlier version of Visual COBOL installed on your machine, you need to uninstall any older version of the documentation as follows:

1. Click **Help > Add and Remove Content** inside Visual Studio.

   This starts the Microsoft Help Viewer.
2. Click the **Manage Content** tab and click **Disk**.
3. Click **Remove** next to the line for the Visual COBOL documentation.
4. Click **Update**.

The local help is not shipped with the installer. If you prefer to view the help locally on your machine, you need to download and install it manually as described below.

1. Download the local help files:
   a. Find the download link for local help in your Electronic Product Download email or in the **Product Updates** section on the Micro Focus SupportLine Web site and save the files on your machine.
   b. Expand the archive on your machine. Ensure that the `.msha` and the `.cab` files are in the same folder.
2. Ensure that the Visual Studio Help Viewer is installed:
   a. Click **Help** inside Visual Studio.

      If no **View Help** command is available, you need to install the Help Viewer manually. See *Installing missing components of Visual Studio* in *Software Requirements* for instructions on how to install it.
3. Install the help in the Help Viewer:
   a. Click **Help > Add and Remove Content** inside Visual Studio.

This starts the Microsoft Help Viewer.

b. Click the **Manage Content** tab and click **Disk**.
c. Click the browse button next to **Disk** and navigate to the folder in which you extracted the local help files.
d. Select `helpcontentsetup.msha` and click **Open**.

   This loads the Visual COBOL documentation.
e. Click **Add** and then **Update**.

   After the installation is complete, the Visual COBOL product Help appears in the Help Viewer.

4. Configure Visual Studio to use local help:

   a. Start Visual Studio.
   b. Ensure that the Visual Studio Help Library is pointing to local help - from the Visual Studio menu click **Help > Set Help Preferences > Launch in Help Viewer**.
   c. Click **Help > View Help**.

      This opens the product help in Microsoft's Help Viewer.

      For full details of the Visual Studio Help system, see the MSDN.

      Note: On some Windows versions such as Windows 8 or Windows Server 2012 or later, an issue with Microsoft Help Viewer and Internet Explorer's security being turned on can cause the Help content to be displayed as raw HTML code. To resolve the issue, you need to turn off the Internet Explorer Enhanced Security Configuration (IE ESC) for both administrators and users. Check the Microsoft Windows help for more information on how to do this.

Repairing

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**.

Uninstalling

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 Micro Focus Visual COBOL and Micro Focus License Administration. Uninstalling only Visual COBOL does not automatically uninstall the Micro Focus License Administration or any of the prerequisite software.

To completely remove the product you must uninstall the Micro Focus License Administration 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:

- The `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.

To silently uninstall the product, you need the setup file and you need to execute the following at the command line:

```
start /wait install-file.exe /quiet /uninstall
```

In addition, the following registry entries are not removed. These are created the first time that an Enterprise Server that has been enabled for performance monitoring starts up:

- Micro Focus Server\Performance\Active Servers
- Micro Focus Server\Performance\PerfIniFile

Licensing Information

Note:

- Personal Edition licensing is only available with Visual COBOL for Visual Studio 2019
- When you activate Visual COBOL Personal Edition, you can use it for a limited period of 365 days. After this period, you can either register a new Personal Edition license for 365 days or acquire a valid license either for a 30-day trial or full license of Visual COBOL in order to continue using the product.
- If you have purchased licenses for a previous release of this product, those licenses will also enable you to use this release.
- The latest version of the SafeNet licensing software is required. See the *Software Requirements* section in this document for more details.
- If you are unsure of what your license entitlement is or if you wish to purchase additional licenses, contact your sales representative or *Micro Focus SupportLine*.

To activate Visual COBOL Personal Edition

To activate Personal Edition:

1. Start Visual COBOL.

   If you have not installed a license for Visual COBOL, starting the IDE and trying to create a COBOL project opens the **Micro Focus Visual COBOL Product Licensing** dialog box. If you cancel this dialog box, you can invoke it again from **Help** > **Micro Focus Product Help** > **Product Licensing**.
2. Click **I want to activate the free product**.
3. Ensure that the email address used to register the product is in the **Email address** text entry field. If you haven't registered your email address yet, click **registration page** and follow the instructions on that page.
4. Select one of the following options:

   Automatic Use this if you have Internet access.

   1. Click **Activate License** to activate your copy of Visual COBOL Personal Edition.

   Manual Use this if you are not connected to the Internet.

   1. Click **Send email**.

      This opens your default email client and creates a new email filled in with the details to send to Micro Focus about activating your copy of the free Personal Edition of the product.

      Note: If there is no mail client installed on your machine, click next to **Send email**, and click **Display fields**. You will be presented with a template that includes the email address, the subject and the contents of an email to send to Micro Focus using a mail client of your choice. Do not modify the details.

      You will receive a response email with details about your authorization request.
   2. Paste the contents of the response email in the designated field in the **Micro Focus Visual COBOL Product Licensing** dialog box.
   3. Click **Activate License**.

This displays a message confirming your request for authorization has been successful.

4. Click **Close**.

To request and activate a 30-day trial license for Visual COBOL

1. In the IDE, click **Help** > **Micro Focus Product Help** > **Product Licensing**.

   This opens the **Micro Focus Visual COBOL Product Licensing** dialog box.
2. Type your email address in the **Email address** text entry field.

   You need to use the same email address you used for the registration.
3. Select one of the following options:

Automatic Use this if you have Internet access.

1. Click **Activate License** to activate the trial license for Visual COBOL.

Important: After clicking **Finish**, if you click the **Cancel** button in the progress dialog box to stop the activation process, the trial license might have registered on Micro Focus servers but not yet be registered on your machine. If you request a trial again then you can get a message saying that a trial license has already been used. If this happens, you should contact a Micro Focus Sales representative to obtain a new license.

You can do this by sending an email to VCBuyNow@microfocus.com, or selecting **Help > Micro Focus > Buy Now** and using the contact options in the dialog box.

Manual Use this if you are not connected to the Internet.

1. Click **Send email**.

   This opens your default email client and creates a new email filled in with the details to send to Micro Focus about activating the trial license for Visual COBOL.

Note: If there is no mail client installed on your machine, click next to **Send email**, and click **Display fields**. You will be presented with a template that includes the email address, the subject and the contents of an email to send to Micro Focus using a mail client of your choice. Do not modify the details.

2. Send the email.

   You will receive a response email with details about your authorization request.
3. Paste the contents of the response email in the designated field in the **Micro Focus Enterprise Developer Product Licensing** dialog box.
4. Click **Activate License**.

   This displays a message confirming your request for authorization has been successful.
5. Click **Close**.

After activation, you can see how many days your trial license has remaining by selecting **Help > Micro Focus > Product Licensing**, or by using Micro Focus License Administration.

To buy and activate a full unlimited license

To buy a license for Visual COBOL, contact your sales representative or Micro Focus SupportLine.

For instructions on using the Micro Focus Licensing Administration Tool, see *Licensing* in the Visual COBOL help.

To start Micro Focus License Administration

Windows 7 and Earlier	• From your Windows desktop, click **Start > All Programs > Micro Focus License Manager > License Administration**
Windows 8.1	• From the Windows **Start** screen, click the **License Administration** tile
Windows 10 and Later	• From your Windows desktop, click **Start > Micro Focus License Manager > License Administration**

Installing licenses

You need either a license file (with a `.mflic` extension) or an authorisation code which consists of a string of 16 alphanumeric characters.

If you have a license file

1. Start Micro Focus License Administration.
2. Click the **Install** tab.
3. Do one of the following:
   - Click **Browse** next to the **License file** field and select the license file (which has an extension of `.mflic`).
   - Drag and drop the license file from Windows Explorer to the **License file** field.
   - Open the license file in a text editor, such as Notepad, then copy and paste the contents of the file into the box below the **License file** field.
4. Click **Install Licenses**.

Alternatively, you can install the license file from within the IDE as follows:

1. Start Visual COBOL.
2. Click **Help > Micro Focus Product Help > Product Licensing** to open the **Product Licensing** dialog box.
3. Ensure **I have a full Visual COBOL license** is checked.
4. Click **Browse** next to the **License file** field.
5. Select the license file (which has an extension of `.mflic`), and then click **Open**.
6. Click **Authorize** to install the license.

   You should see a dialog box with a confirmation that the licenses have been installed successfully.

If you have an authorization code

Authorizing your product when you have an Internet connection

Note:

- It is not possible to install licenses remotely. You must be logged into the machine on which you are installing the licenses.

The following procedure describes how to authorize your product using a local or network license server. The license server is set up automatically when you first install the product.

1. Start Micro Focus License Administration.
2. Click the **Install** tab.
3. Type the authorization code in the **Enter authorization code** field.
4. Click **Authorize**.

If you change the name of the machine running your license server after it has granted licenses, the licenses stop working.

Authorizing your product when you don't have an Internet connection

This method of authorization is required if the machine you want to license does not have an Internet connection or if normal (automatic) authorization fails.

1. Start Micro Focus License Administration.
2. Click **Manual Authorization** on the Install page.
3. Make a note of the contents of the **Machine ID** field. You will need this later.
4. Do one of the following:

   - If your machine has an Internet connection, click the SupportLine Web link in the Manual Authorization Information window.
   - If your machine does not have an Internet connection, make a note of the Web address and type it into a Web browser on a machine that has an Internet connection.

   The Micro Focus SupportLine Manual product authorization Web page is displayed.
5. Type the authorization code in the **Authorization Code** field. The authorization code is a 16-character alphanumeric string supplied when you purchased your product.
6. Type the Machine ID in the **Machine ID** field.
7. Type your email address in the **Email Address** field.
8. Click **Generate**.
9. Copy the generated license string (or copy it from the email) and paste it into the box under the **License file** field on the Install page.
10. Click **Install Licenses**.

To obtain more licenses

If you are unsure of what your license entitlement is or if you wish to purchase additional licenses for Visual COBOL, contact your sales representative or Micro Focus SupportLine.

Updates and SupportLine

Our Web site gives up-to-date details of contact numbers and addresses.

Further Information and Product Support

Additional technical information or advice is available from several sources.

The product support pages contain a considerable amount of additional information, such as:

- The *Product Updates* section of the Micro Focus SupportLine Web site, where you can download fixes and documentation updates. Go to *https://supportline.microfocus.com/websync/productupdatessearch.aspx*
- The *Examples and Utilities* section of the Micro Focus SupportLine Web site, including demos and additional product documentation. Go to *https://supportline.microfocus.com/examplesandutilities/index.aspx*.
- The *Support Resources* section of the Micro Focus SupportLine Web site, that includes troubleshooting guides and information about how to raise an incident. Go to *https://supportline.microfocus.com/supportresources.aspx*

To connect, enter *https://www.microfocus.com* in your browser to go to the Micro Focus home page, then click **Support & Services** > **Support** > **Support Resources** > **All Support Resources by Product**. In the **Browse by Product** field, click the product you require, and then click **Log into SupportLine**.

Note: Some information may be available only to customers who have maintenance agreements.

If you obtained this product directly from Micro Focus, contact us as described on the Micro Focus Web site, *https://www.microfocus.com/support-and-services/contact-support/*. If you obtained the product from another source, such as an authorized distributor, contact them for help first. If they are unable to help, contact us.

Also, visit:

- The Micro Focus Community Web site, where you can browse the Knowledge Base, read articles and blogs, find demonstration programs and examples, and discuss this product with other users and Micro Focus specialists. See *https://community.microfocus.com*.
- The Micro Focus YouTube channel for videos related to your product - see *https://www.youtube.com/user/MicroFocusIntl*.

Information We Need

However you contact us, please try to include the information below, if you have it. The more information you can give, the better Micro Focus SupportLine can help you. But if you don't know all the answers, or you think some are irrelevant to your problem, please give whatever information you have.

- The name and version number of all products that you think might be causing a problem.
- Your computer make and model.
- Your operating system version number and details of any networking software you are using.
- The amount of memory in your computer.
- The relevant page reference or section in the documentation.
- Your serial number. To find out these numbers, look in the subject line and body of your Electronic Product Delivery Notice email that you received from Micro Focus.

On Windows, if you are reporting a protection violation you might be asked to provide a dump (`.dmp`) file. To produce a dump file you use the **Unexpected Error** dialog box that is displayed when a protection violation occurs. Unless requested by Micro Focus SupportLine, leave the dump setting as `Normal` (recommended), click **Dump**, then specify a location and name for the dump file. Once the dump file has been written you can email it to Micro Focus SupportLine.

Alternatively, you might be asked to provide a log file created by the Consolidated Tracing Facility (CTF) - a tracing infrastructure that enables you to quickly and easily produce diagnostic information detailing the operation of a number of Micro Focus software components.

On Windows, you can use the Micro Focus SupportLine Support Scan Utility, MFSupportInfo, to create either:

- a `.log` file that contains the details about your environment, Micro Focus SupportLine products, and settings.
- a `.zip` archive that includes the same information as the `.log` file plus some product configuration files from **c:\ProgramData** and the product installation log files.

`MFSupportInfo.exe` is stored in `<`*`install-dir`*`>\bin`.

To run MFSupportInfo:

1. Start a 32-bit Enterprise Developer command prompt.
2. Enter `MFSupportinfo` at the command prompt to start the utility.
3. Create a `.log` file or a `.zip` archive as follows:

   a. To create a `.log` file, click **File > Save**.

      This prompts to save the `.log` file, `MFSupportInfo_Log_`*`MachineName_YYYY-MM-DD_HH-MM-SS`*`.log`, in the `%temp%` directory.

   b. To create a `.zip` archive, click **Tools > Create Zip Package**.

      This creates a `.zip` archive, `MFSupportInfo_Log_`*`MachineName_YYYY-MM-DD_HH-MM-SS`*`.zip`, in the `%temp%` directory.
4. Send the diagnostic information to your Micro Focus SupportLine representative:

   The following requires an Internet connection and an Email client:

   a. Click **Tools > Email Log to SupportLine** to open the **Email Log** dialog box.
   b. Fill in the required fields and click **Send**.

   If the machine is not connected to the Internet or if there are no Email clients installed, copy either the `.log` file or the `.zip` archive to a machine that is connected to the Internet. Use your Email client to email the files to Micro Focus SupportLine at *supportline@microfocus.com* together with the Support Incident (SI) number, if available, and any additional details that might be useful to diagnose the issues that you are experiencing.

Creating Debug Files

If you encounter an error when compiling a program that requires you to contact Micro Focus SupportLine, your support representative might request that you provide additional debug files (as well as source and data files) to help us determine the cause of the problem. If so, they will advise you how to create them.

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