Micro Focus Visual COBOL 7.0 for Visual Studio

Release Notes

Micro Focus
The Lawn
22-30 Old Bath Road
Newbury, Berkshire RG14 1QN
UK
http://www.microfocus.com

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Contents

Micro Focus Visual COBOL 7.0 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 Customer Support Documentation 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

Enhancements are available in the following areas:

Micro Focus COBOL Extension for Visual Studio Code

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The new Micro Focus COBOL extension for Visual Studio Code is available on the Microsoft Visual Studio Marketplace. This provides edit, compile and debug support for Visual COBOL and Enterprise Developer users in Visual Studio Code.

Note: The new Micro Focus COBOL extension is not included with the Visual COBOL installer.

.NET Core Support

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Support has been added for creating, building and running .NET Core projects using the `dotnet` command. This new support is in addition to the ability to work with .NET Core projects in the IDE.

This functionality is available in the following products:

- Visual COBOL for Visual Studio

COBOL Language

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The following enhancements have been made to the Micro Focus COBOL language:

- **.NET COBOL data type to hold strings of utf-8 characters** - support is now available in .NET COBOL for the PIC U data type. This was already available for native COBOL, to support its introduction by IBM in Enterprise COBOL version 6.3.
- The DYNAMIC LENGTH clause, which enables a data item to vary in length at run time, is supported. Again, this is in response to its introduction by IBM in Enterprise COBOL version 6.3.
- The following date-format-checking intrinsic functions have been added: TEST-DATE-YYYYMMDD and TEST-DAY-YYYYDDD.

Code Analysis

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This release includes the following enhancements:

- **Get Direct References** command - you can use this command to see if changing a file will affect the other files in your project as well as the files in the whole application. In Visual Studio, you can access this command from the context menu for COBOL files in Solution Explorer or from the **Analysis Server** window.
- The Data Flow Analysis is now available in both a tree and a graph view.
- The Code Analysis functionality is now available for the Procedural Multi-Output Project (.NET Framework) type.

Code Set Support

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The following enhancements have been made to the integrated code set translation support:

- Arabic support for Enterprise Server applications is available.

  If you are building Arabic support into Enterprise Server applications, your terminal emulator must support the Arabic EBCDIC 420 code page.

  Support is added by building your applications and configuring your enterprise server regions with the MFCODESET variable set to the supported country code (0420). Your product's in-built code set translation utility performs translations between the ASCII 1256 Arabic code page on your enterprise server region, and a terminal emulator that supports the Arabic EBCDIC 420 code page (for example, IBM's Personal Communications emulator).

  There are some considerations when working with a bi-directional language such as Arabic.

Compiler Directives

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The following Compiler directives are new in this release:

- PANVALET-INCLUDES-IN-COMMENTS - This directive controls whether ++INCLUDE statements in comments are actioned or not.
- EXECSQL-FLAG - This directive defines whether syntax reporting should emulate that of the DB2 preprocessor, the DB2 coprocessor, or to allow all syntax variations of both.
- RM-FILE-ERRORS - This directive generates run-time system errors for certain file conditions, even when a FILE STATUS clause is present; this is to emulate RM/COBOL behavior.

The following Compiler directive option has been deprecated:

- ILCLR(2) - this is as a result of deprecating support for versions 3.0 and 3.5 of the .NET Framework. Applications that have this option set will produce an E level message when compiled in this release of Visual COBOL.

Containers Support

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Support for containers in Visual Studio has the following enhancements:

- You can now add a Dockerfile to native Micro Focus Unit Testing projects in Visual Studio and run the tests in a container.
- Projects with Docker support now include an additional **Containers** property page. From it you can:
  - Specify any build, debug and run arguments for the image that will override the arguments specified in the project's dockerfile.
  - See all command-line arguments that will be applied when you build the image.
  - See the arguments that will apply when you run the container, or debug an application running in a container.
- The **Add COBOL Docker Support** dialog box now shows all available images, and supports images provided with a Patch Update release of this product suite.

  The versions of the **Runtime Image** and the **Built Tools Image** must match therefore the dialog box only shows the **Built Tools Image** that match the one for the runtime. For example, if you use a Patch Update 1 Build Tools image, the dialog box only shows the relevant Patch Update 1 Runtime image.

  The dialog box shows only the images that match the major release version (or a Patch Update of it) of your installed product. They must target the same platform (x64 or x86) as well. If you want to specify images from different major product versions, you need to edit the Dockerfile manually.

Database Access - OpenESQL

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This release provides the following enhancement:

- New OpenESQL TRACELEVEL=5 option - native OpenESQL applications can now trace ODBC calls to the database vendor’s ODBC driver, recording the start and stop times of each call’s execution. OpenESQL tracing can now provide more detail on where an SQL application is spending execution time, in the OpenESQL layer or the underlying ODBC driver layer.

Data File Tools

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This release includes the following enhancements in the Data File Editor:

- **New Data Explorer for working with data sets** - a new Data Explorer enables you to connect to either an ESCWA service or directly to an enterprise server region to access a catalog when working with data sets in the editor.
- **Multiple record selection**- you can select multiple records and, where appropriate, can perform certain actions on more than one record at once.
- **Cut, copy, and paste functionality** - traditional cut, copy, and paste functionality (including the standard Ctrl+X, Ctrl+C, and Ctrl+V shortcuts) is now available throughout the editor.

- **New filter creation** - a new process for creating filters has been introduced. A filter consists of one or more sets of conditions, and the resulting filter can include or exclude those records selected. The previous filter process is still available, but has been marked as deprecated.
- **Remote filtering** - functionality has gone into Fileshare Server which allows filtering to occur server side when opening data sets on remote enterprise server regions. The filter process results in only those filtered records being downloaded to the data file editor client.
- **Find/replace functionality** - you can search records in a data file to identify specific strings, and then if required, replace them.

Enterprise Server

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This release includes the following enhancements:

- Multiple Network Interface support - there is improved support for multiple network interfaces in some components, including better awareness of network interfaces and control over networking. This is a partial implementation and will be enhanced in future releases.
- Extended IPv6 support - support is available in Micro Focus Directory Server (MFDS) and in the Micro Focus Communications Server (MFCS) listener for multiple IPv6 addresses.

  In release 6.0, you could only configure MFDS and MFCS listeners to listen on a single IPv6 address. In release 7.0, by default, MFDS and MFCS now listen on all configured IPv4 and IPv6 addresses, and can also be configured to listen on a combination of specific addresses.
- HTTP improvements:
  - Additional security measures for HTTP, such as security-related headers.
  - Chunking support for large HTTP messages makes it possible to retrieve very large files from Enterprise Server regions.
- Application Diagnostic Reporting for Enterprise Server - Application diagnostic reporting collects and packages a number of reports, trace, and log files into a single report file.
- Enterprise Server now supports automatic reconnection to the standby Queue manager in an Multi-Instance Queue Manager.
- The casmgr process has been optimized to improve the use of initiators when dispatching jobs across a PAC. In addition, improvements have been made to the way it manages the queue of jobs waiting to be dispatched.
- Information has been added describing the best practice and the recommended approach you should adopt when performing a Patch Update to your PAC environment.
- (This feature has been added in 7.0 Patch Update 1) New operating modes , *upgrade* and *quiesce*, have been introduced for Performance and Availability Clusters (PACs). These operating modes can be used to facilitate the installation of product updates that introduce incompatibilities between PSOR data structures. You can check for incompatibilities using the new caspac utility option CheckCompat. An upgrade mode can be set when starting the first enterprise server region in a new PAC using the new casstart utility *start-type* option *u*. This upgrade mode will prevent participating enterprise server regions from processing batch workloads as part of its normal operation, and any EXEC CICS START requests will be rejected. See *casstart* and *caspac* in your product Help for more information.

  When enough enterprise server regions have been switched over to the new PAC, the old PAC can be set to operate in the quiesce mode. This prevents further batch workload and EXEC CICS START from being processed.

  The new PAC can now be switched to running mode so that batch workload and EXEC CICS START are enabled for processing again.

  

  Note: Before setting the new PAC mode to running, you must switch enough enterprise server regions to the new PAC to enable it to service the expected workload.

Enterprise Server Common Web Administration (ESCWA)

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This release offers the following improvements:

- MFDS User Interface functionality replacement - ESCWA now replaces the MFDS inside the IDE as the engine that provides access to and management of regions. ESCWA provides all the functionality that was previously available from MFDS. This release includes the following enhancements:
  - Delete all regions.
  - Session list.
  - Renew listening addresses.
- ESMAC User Interface functionality replacement - the following ESMAC features have been implemented in ESCWA:
  - Resource Filtering.
  - Millisecond support.
  - Control the scope for all changes to timeouts, trace flags, and memory strategy when applied to regions in a PAC.
  - Enable Application Diagnostic reporting.
  - Submission of local jobs from the JES Control page when CASRDO44_NEWSUB=OFF has been specified.
  - View and reply to pending ACCEPT FROM CONSOLE statements.
  - The messages after a JCL job has been submitted are now correctly JSON formatted. This page now works in ESCWA when MFJUXIT is enabled.
- Import, export, and copy regions - you can now use the UI to export and import regions in various formats, including use JSON. You can:
  - Copy regions between Directory Servers
  - Import and export regions in JSON, XML or in the `.dat` legacy format. The legacy format can be converted to a modern format.
- Mainframe Access (MFA) administration - ESCWA provides a modern Web UI and does not require you to use a separate terminal application. Features include:
  - Log in or off from MFA.
  - Change your MFA password.
  - View MFA server tasks.
  - Retrieve the XDBOUT log (Web UI).
  - Retrieve the JES spool files by DD Name (API).
  - Set the MFA and JES tracing level.
  - View the active MFA users.
  - Invalidate active user sessions.
  - View mainframe/MFA statistics.

  The MFA API library has been exposed to enable you to test and use the requests that are provided.
- Scale-Out and PAC administration - you can now:
  - Monitor Redis Sentinel and Cluster instances when used for Scale-Out Repositories.
  - Specify that all changes to timeouts, trace flags, and memory strategy can be applied to one of three options:

    Only the local region.
    All members of a PAC except the regions where local changes have been made.

All members of a PAC.

You can configure this in ESCWA with the **Apply Scope** field on the ES CONTROL page. Alternatively, you can use the casutl utility with the /w option.

- Multi-Network Interface Card support - ESCWA now enables you to configure Communications Servers and Listeners to listen on multiple IPv4 and IPv6 addresses. Previously, they were limited to listen on either all IPv4 addresses, or a single IPv4 or IPv6 address. Now a combination of any of the following can be used:
  - One or more specific IPv4 addresses.
  - One or more specific IPv6 addresses.
  - All IPv4 addresses.
  - All IPv6 addresses.
- A new filter field **resFilter** has been added to the following ESCWA and ESMAC resource listing modules:

  Every resource in By Type
  Every resource in By Start L
  Resource lists under Groups
  Every active resource type except Locks

  This parameter will filter the list of resources displayed by ESCWA and ESMAC. In addition, a new environment variable ES_RDO_MAX_RESOURCES has been added that enables you to specify a limit to the number of records displayed. For JSON requests, the list being truncated is indicated by the addition of the JSON property "truncated": true.

Enterprise Server Security

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This release includes the following enhancements:

- MLDAP ESM caching - the MLDAP ESM Module now implements LDAP search-result caching. This is controlled by the existing Security Manager cache settings, so that many installations will have this activated automatically. See the product Help for details.
- Vault Hashicorp support - support is available for using a Hashicorp KV2 vault server as a local or remote vault.

Library Routines

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The following library routines are new:

- CBL_GET_ERROR_INFO - enables error processing routines to establish the location of the error that occurred to cause the error processing routine to execute. This is available on a restricted range of platforms.

Licensing

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AutoPass licensing technology

In this release, Micro Focus brings in the power of the in-house Micro Focus AutoPass licensing technology alongside Sentinel RMS. AutoPass has the following additional benefits compared to Sentinel RMS:

- Usage logging which enables you to monitor the product usage. You need to install the AutoPass License Server in order to do this.
- Ongoing support for all platforms that this product is available for.

Features include:

- Installing this release installs both the AutoPass Daemon and the Sentinel RMS License Manager. Both of them are available in the Micro Focus License Administration tool.
- You can have both AutoPass and Sentinel RMS licenses installed on the same machine. Optionally, you can switch off the licensing technology you do not use.
- If you are an existing user of a Visual COBOL or an Enterprise Developer product, you only need an AutoPass license if you want to utilize usage logging or if you want to use your product on a platform on which Sentinel RMS is not supported.
- If you are a new user of the Micro Focus COBOL products, you will normally be issued an AutoPass license.
- Micro Focus will continue to provide Sentinel RMS in future releases of this product.
- AutoPass licenses should be installed into the existing Micro Focus License Administration tool, and not in the AutoPass License Server.

Installing licenses at the command line

On Windows, Micro Focus License Administration is now also available as a command-line utility.

For more about AutoPass and usage logging, and about Micro Focus License Administration, see *Managing Licenses* in your product Help.

The Micro Focus Unit Testing Framework

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The following enhancements have been made to the Micro Focus Unit Testing Framework:

- The MFUPP preprocessor has been introduced to provide a seam between your program and a unit test. This seam lets you access the internals of a program under test, allowing you to create granular unit tests from paragraphs or sections. The MFUPP preprocessor also provides the ability to mock programs or stub programs out to create a unit test.

Visual Studio Integration

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This release includes enhancements in the following areas:

Editor:

- **Code cleanup** - Visual Studio now supports a variety of code cleanup options for COBOL which you can apply during formatting. These enable you to update any existing code, or enforce rules for new code for specific keywords or operators.
- **EditorConfig file support** - you can now create `.editorconfig` files with the code style settings in the IDE, and share the file within your organization to ensure consistency of the code.

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.

The numbers that follow each issue are the Support Case Number followed by the Defect number (in parentheses).

Common Communications Interface

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- The default TLS Security Level has been increased from 0 to 1. This change will not affect you if you have specified your own security options.If you rely upon the default TLS security options you might find that some old clients that are restricted to the use of weak ciphers will no longer be able to connect. See *Security Levels* and *Specifying a Server Protocol and Cipher Suite Preference* in your product Help for more information on the change to Security Level 1.

  (8453)

Compiler

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- Programs with file records greater than the documented limit of 62KB will now generate an error that they previously did not (COBCH0649) - although being an E level message, the program can still be executed and will work if it did so previously.

  3227892 (12447)
- Two of the available Ant parameters for compiling COBOL programs have been renamed as follows (functionality remains the same):

  - forceCompile becomes mf.forceCompile
  - threadCount becomes mf.buildThreadCount

  3230709 (12665)

Data Tools

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- The editor now automatically selects the first record in comparison when first loaded. The Editor will automatically select first record in comparison when first loaded

  3212848 (11362)
- Data File Tools now provides the Data Explorer, which is a catalog view that can connect to either ESMAC or ESCWA. When connecting to ESCWA, it enables you to open multiple data sets.

(70242)

- The scrolling speed for formatted records has been increased.

  00366018 (11378)

Enterprise Server

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- Previously, there was no security check performed when an ESMAC user tries to access the console, traces, or dumps. This is no longer the case. If you use LDAP-based security you can now add the new DIAGS resource under OPERCMDS class and provide access to ESMAC users accordingly.

  3231918 (12556)

- The "Requested Licenses" field has been removed from the ESCWA General Properties page as it is not used.

  (3956)

- Added the option to delete the associated package when the service has an associated package and that service is the only one with that associated package.

  00370971 (22264)

- When a new region is created in ESCWA, the Web listener's conversation type is now correctly set to "Web" instead of "SOAP and J2EE (legacy)".

  3244594 (21270)

- The Group can now be specified when starting or stopping a region using ESCWA.

  00371543 (12436)

- For Enterprise Developer 6.0 and later, the installer on Windows has automatically started the Enterprise Server Common Web Administration (ESCWA) service as part of the installation process. When using the Japanese system locale on the Windows operating system, the ESCWA service does not start automatically. During the installation process you might be required to press Retry to complete a successful product install. Even after a successful product install, ESCWA does not start until you have installed a valid license.

  00368527 (12747)

- In ESCWA, the Security Manager properties could be set too long, causing a crash. This has now been fixed.

  (61192)

- This fixes an issue with the change to the behavior introduced with the passtoken changes in previous patch updates. An issue might occur in a stacked environment with OS ESM and MLDAP_ESM. Job dispatch would issue a deny when `cassub` was used.

  3229601 (11524)

- An issue when using a secured MFDS, with an LDAP ESM as first in the stack, and a PAM ESM as second in the stack, and with federation enabled, has been resolved.Previously, if the security was reinitialized through any means (such as clicking the apply button, or reordering the ESMs and changing them back), the MLDAP ESM would not be able to correctly determine that the PAM ESM user user1 in group1 matched the LDAP resource rule which described group1 within the resource rule. This should have worked because the group information is shared when federation is enabled.With this fix, the resource rule in LDAP correctly identifies that the group1 rule applies to the PAM ESM user user1, on both initialization and reinitialization.Behaviour Change:When SAFMGR was reinitialized, PAM ESM was pointing to the old shared groups table, so MLDAP ESM and PAM ESM ended up pointing to different shared groups tables. It should have been the same table as federation was enabled.PAM ESM groups table is now cleared on initialization, so that the ESMs will now point to the same groups table.

  3221760 (11697)

- ESMAC now includes cross-site request forgery protection. A 403 Forbidden page is now returned whenever a user attempts to bypass the protection. If you want to access more than one region in ESMAC at the same time, it can no longer be done in the same browser session. You can access the regions in separate private browsing sessions.

  3216052 (13208)
- A new resource class, DCBINFO, enables you to control who can access the DCB information for cataloged datasets in ESMAC for a LDAP secured region. DCBINFO must be created for existing users to be able to access the DCB information in ESMAC.

  3231918 (13300)
- MQ commands did not work because Windows installations of MQ are client, not server. This has been ccorrected.

  (46022)
- MFDS now correctly uses the specified region user in the ESCWA Directory Server Scripts page or Directory Server user in the ESCWA Directory Server Configuration page. Otherwise, it defaults to the current user.

  (8727)
- If MFDS is set to "Restricted Access" and the MFDS "Anonymous access" option is off (the default), then valid authorized credentials will be required to access information stored in the Directory Server either via the legacy UI, ESCWA, or utilities such as mdump.

  (62100)
- When MFDS is TLS enabled and a client connects on the non-TLS port, it will now send a HTTP 302 Found response to the client to redirect it from the non-TLS port to the TLS-enabled port. This is seamless to the Web browser.

  (46024)

File Handling

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- Within MFDBFH, enhancements have been made to optimized I/O to further improve performance.Enterprise Developer 6.0 and Enterprise Developer 7.0 only: The dbfhconfig utility has been enhanced with the addition of the -optiokeyreads and -optioseqreads command-line options. These options are used to override the default number of records read ahead by MFDBFH when optimized I/O is enabled.

  00726932 (83019)
- The SFF (Signed Free Form numeric) input field is now supported in the TRAILER3 operand.

  3217597 (12477)
- A File Handler limit on the maximum record size (62KB) has resulted in the documented limits for data-driven unit tests to be revised. See *Restrictions in the Micro Focus Unit Testing Framework*.

  (25064)

Header-to-COPY Utility

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- When h2cpy is used to convert C header files to COBOL copy files, function prototypes with const *, which produce BY REFERENCE parameters in the ENTRY statement for the COBOL call prototype, will now include the CONSTANT reserved word. In this context, it means the variable is read-only in the callee, just like in C.

  (10214)

Interface Mapping Toolkit

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- Headers are no longer mapped in the output of WS2LS.

  3235120 (12606)
- Top-down CWS generation from WSDL now properly marks hexBinary fields in the generated WSBIND.

  3236069 (11690)
- WS2LS now assigns usage COMP-3 to items mapped from decimal and integer types in the WSDL.Behaviour Change:WS2LS will now assign usage COMP-3 to items mapped from decimal and integer types in the WSDL. This will affect the generated copybooks and WSBIND. Previously-generated files will still work, and users should be using the WSBIND and copybooks from a single execution of WS2LS in their environment anyway, since changing one results in (or reflects) changes to the other.

  3235120 (13494)
- In copybooks generated by WS2LS, several data types now have mappings that are closer to those generated by IBM's DFHWS2LS.Behaviour Change:In copybooks generated by ws2ls, several data types will now have mappings closer to those generated by IBM's DFHWS2LS.

  00365433 (11693)

Run-time System

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- When defining the file name for CBL_CREATE_STACKDUMP, %f now expands to basename of the program correctly when used cross-process.

  (60049)
- When CTF trace level is set to info (for post-offset values only) or debug (for pre-offset, offset and post-offset values) and component rts#process is set to true, the API will now dump the captured metrics to the output CTF file.

  (27040)

SQL: OpenESQL

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- An issue with compiling native programs that use SQL TYPE IS XML AS CLOB has been resolved.

  3240037 (12679)

Known Issues

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

In addition, note the following:

- The Server Core form of Windows Server 2019 is not supported.
- The Visual COBOL 7.0 for VS2017 or VS2019 installer crashes when you run it on machines where Visual Studio 2022 is or has been installed before.

  The following Knowledge Base article on the Micro Focus Support Portal provides a patch and instructions for fixing your system - *click here*.

  To patch your system before you can successfully run the Visual COBOL installer:

  1. Open an Administrative Command Prompt
  2. Backup or create a copy of the `Microsoft.VisualStudio.Setup.Configuration.Native.dll` file (v. 3.1.*n*) in the `C:\ProgramData\Microsoft\VisualStudio\Setup\x86\` folder.
  3. Unzip and copy the 2.7.*n* version of the `Microsoft.VisualStudio.Setup.Configuration.Native.dll` file supplied with the Knowledge Base article.
  4. Register the 2.7.*n* version of the `.dll` - execute the following at the command prompt:

     ```
     regsvr32
     C:\ProgramData\Microsoft\VisualStudio\Setup
     \x86\Microsoft.VisualStudio.Setup.Configuration.Native.dll
     ```

     The 7.0 installer should then run successfully.

- In Visual COBOL 4.0 and 5.0 in an extremely small and limited set of cases, an issue could occur with running .NET executables and .dll files, or JVM .class files, created with an earlier version of the product. 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, then executed in Visual COBOL 4.0 or 5.0.

  In these rare cases, the IS NUMERIC test could provide the wrong answer.

  In order to resolve this issue, in Visual COBOL 6.0 and later, the .NET COBOL and JVM COBOL run-times reject any program using IS NUMERIC on a NATIONAL item which was compiled with a version 5.0 or earlier of the product. You receive a "missing method" exception. To resolve the issue, you need to recompile any programs that use this construct in Visual COBOL 6.0.

  Program that do not use NATIONAL data, or those that have been recompiled in Visual COBOL 6.0 or later are not affected.

- Copying and pasting the contents of a license file into the **License file** field of Micro Focus License Administration results in the error "The path is not of a legal form. Please contact Micro Focus SupportLine".

Resolved Issues

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

CGI Support

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- The query string for CGI Applications using REQUEST_METHOD=GET no longer has a limit of 4096 bytes.

  3227061 (10285)

Code Analysis

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- A problem that caused the exclusion of the SQLCA copybook has been fixed.

  3219870 (11398)
- This release supports nested COBOL programs in a single source module.

  00366795 (12647)
- Verification errors for a specific structure-based slice have been fixed.

  3236246 (13377)

Common Communications Interface

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- A problem that caused the ccierr.log to contain multiple "connect_endpoint(), called in NET_CONNECT, return code 2" messages has been fixed.

(77040)

- When running an application that uses CCI in an aggressively multi-threaded environment, RTS 114 errors could be generated.

  00370924 (13510)
- Because of a previous optimization that was made it might result in getting stuck on a blocking receive. This has been fixed.

  00457870 (57287)
- An integer overflow in CCI time handling has been fixed.

  (9632)
- When running an application that uses CCI in an aggressively multi-threaded environment, RTS 114 errors could be generated.

  00370924 (12575)
- A rare crash in the Micro Focus Communications Server under heavy load has been resolved.

  3238018 (11727)

Compiler

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- A large amount of REPLACE text no longer causes unexpected syntax errors.

  00483050 (66002)
- The precision of intermediate results, and hence the result of arithmetic expressions, has been modified when ARITH(COMPAT) is specified to emulate the equivalent IBM option.

  00373696 (12616)
- CALL <data name>, where data name is defined as an ANY LENGTH item, now works as expected.

  00365007 (13541)
- A missing period on a File Description entry now compiles with only a warning message under OSVS emulation.

  3227505 (11445)
- A JSON GENERATE statement on a structure containing variable length groups now compiles and executes as expected.

  00429712 (57257)
- When specifying a subscript, it is possible to use 'index-name +/- data-name' when under an MF dialect.

  00371309 (13582)
- EXEC INCLUDE syntax with a period following the include name (and before the END-EXEC) is now supported for better compatibility with the Oracle Pro*COBOL precompiler.

  00370456 (12738)
- Very long source lines now debug as expected.

  00481396 (65050)
- A new directive RM-FILE-ERRORS is provided to control emulation of RM/COBOL file errors. See the documentation for full details.

  00368536 (12711)
- READ and WRITE statements under DIALECT"RM" now only process the exception clause appropriate for the format of that statement.

  00368537 (12729)
- DISPLAY literal AT now works with the DISPLAY-AT directive.

  3201040 (12639)

- A bug has been fixed so EA now indicates if a nested program is "COMMON".

  00366795 (70003)
- There is no longer an issue in printing the value of the EXITPROGRAM directive when SETTING is on.

  00369139 (12490)
- FUNCTION DISPLAY-OF(nat-var, 1208), which is a national data item to UTF-8, no longer truncates the UTF-8 results.

  (8864)
- Compiling a program containing nested date intrinsic functions with the compiler option INTDATE(LILIAN) now produces valid object code as expected.

  3227569 (12457)
- The CONSTANT qualifier can now be applied to data items > PIC 9(18).

  (8678)
- A DISPLAY of sub-screen-section items that are under a group LINE identifier clause now position correctly.

  00368541 (13573)
- A new Compiler directive, DPC-IN-DATA, enables you to control whether the DECIMAL-POINT IS COMMA clause (if specified) is applied to the output from the XML GENERATE and JSON GENERATE statements.

  3225204 (12393)
- The record area of a print file is no longer cleared after a WRITE statement for a program compiled with a mainframe dialect.

  00383677 (47029)
- The NOBOUND directive specified after the SSRANGE option is now correctly respected. Also, when both NOBOUND and SSRANGE are specified, the behaviors of the intermediate and generated code are now consistent.

  3226804 (12430)
- ISO2002 behavior for PROCEDURE DIVISION/CALL RETURNING is now under ISO2002(2) to allow compatibility with Server Express/Net Express. The previous behavior can be selected with ISO2002(1).

  00363117 (12604)
- The startup time of the run-time system has been reduced, which has resulted in improved compilation performance for some programs.

  00384452 (50019)
- The $REGION syntax can now be used in comments if the DIRECTIVES-IN-COMMENTS directive is specified.

  3232251 (12464)
- The SCREEN SECTION clause FROM ZERO no longer produces an internal error.

  00380019 (31075)
- Index names within a COBOL program no longer cause validation issues when compiling for use with EA.

  00370455 (28197)
- The Compiler directive option ILCLR(2) has been deprecated. Applications that have this set will produce an E level message when compiled in this release of Enterprise Developer or Visual COBOL.

  (10381)
- An invalid program no longer results if a .NET class contains an ASYNC method, and that class also defines a COBOL file (using SELECT syntax).

  00379383 (31065)

- In a static class, a spurious error was produced for the record following an FD.

  3233665 (12706)
- An assignment requiring an implicit conversion could cause bad generation of the rvgen/treegen output, or cause the compiler to crash.

  00373024 (13380)
- When debugging generated code, if the first statement following PROCEDURE DIVISION or an ENTRY statement is a GO TO statement, stepping into that program could fail and the debugger would zoom. This has now been fixed.

  00455393 (69101)
- For native generated code, a bug when referencing a field in a linkage section parameter when PROTECT-LINKAGE has been specified has been fixed.

  00479164 (71154)
- For Intel x86 32-bit generated code only, a bug in generating code with OPT"4" set, which caused the Compiler to hang, has been fixed.

  00619916 (71454)
- A run-time system error (COBRT114), which occurred at generate time when a call literal contained an unmatched quote symbol (that is, ""), has been fixed.

  3242461 (13524)
- Support is now available for the Control-M function %%$WEEKDAY. Control-M week day variables now correctly respect the start week day specified in mfbsi.cfg (StartOfWeek=Sunday|Monday).

  (10495)
- In Control-M emulation, a problem that prevented the $WCALC function from accepting a variable for the calendar name has been fixed.

  00487802 (69090)
- The Control-M XML Calendar has been updated to enable the defining of 366 days, even for years other than leap years.

  00488291 (71104)
- The Control-M SUBSTR function now correctly handles the Start and Length variables defined using environment variables.

  3226645 (11688)
- In a non PAC environment, MFBSI now validates that the .sem files created in $MFBSI_DIR use STRIPSPACE=ON.

  3224140 (11417)
- An abend 0C4 sometimes occurred when mfbsijcl was cancelled from a scheduler. This has been resolved by returning an abend S222 instead.

  00366666 (12724)
- The mfbsi.cfg file now supports a new parameter, STDNUM, which is set to ON by default. If STDNUM=OFF, aLL JCL records in columns 73-80 are ignored even if there are JCL statements or any in-stream data records in these columns. The previous MFBSI logic based on the contents of the first record of JCL and whether it contains any data in columns 73-80 is maintained. This parameter is mainly useful when your JCL members contain a mix of STD NUM ON and OFF. for existing customers

  3230289 (12654)

Data Tools

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- A 'large file' alert is no longer displayed when opening files > 128 MB and the 'Use temporary file for editing' option is not selected.

(69199)

- The Column indicator in the status bar now shows the correct value when selecting a field in the right-hand pane (structured view).

  00491656 (70177)
- An issue which could cause the Data File Editor to hang the region has been fixed.

  00426198 (58053)
- The Data File Editor now provides navigation to the last page when showing fixed-block, variable-block, and indexed files, and also for filtered results. If Go To <record-number> is also larger than the number of records available, the last page of records is displayed, instead of a "no record found" error returned. For sequential fixed-block files, the available number of records is also shown.

  (88030)
- The ruler will now stay at the top of the displayed record list, even when you scroll down the page.

  00485504 (71308)
- The performance of the Data File Tools catalog has been enhanced when using a database-hosted catalog file, and when specifying a data set name filter with a leading wildcard character.

  00377995 (31059)

Data Tools (Classic)

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- The Data File Editor now support temporary changes to sequential, line-sequential, and relative data files. Users can choose to save those changes to the data file, or revert the changes, leaving the data file in its original state. See 'Editing Data Files' in the documentation for more details.

  3239290 (12680)

Debugging

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- Watchpoint values now update correctly when they change when using the x64 configuration.

  3235325 (13441)

Dockerfiles

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- The HEALTHCHECK in the Dockerfile for the CICS container demonstration on Windows sometimes failed to run.

  (8146)

Documentation

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- The Comments section of the ListWidth directive documentation now clarifies behavior that only happens under SOURCEFORMAT"FIXED".

  00382245 (30116)
- The documentation has been updated to reference the ACUCOMMENT directive correctly (previously referenced with a hyphen - ACU-COMMENT).

  (58226)
- The documented IDE equivalents for the run-time tunables have been updated to reflect the current IDE options.

(7279)

- The Configuring Your Application... tutorial, for converting RM/COBOL applications in the IDE, has been updated, as some RM/COBOL-specific configuration files are no longer shipped with the product.

00365052 (7877)

- The syntax rules have been updated in the documentation in regards to the order in which the OCCURS and VALUE clauses can be specified for a data item; see syntax rule #2 of the 'Data Description Entry Skeleton' topic.

(8710)

- The documentation has been updated to correctly state that up to 1024 conditional expressions are possible within the INCLUDE and OMIT program control statements of a SORT operation.

3232114 (12450)

- A definition for the environment variable MFRU_NOINHERIT has been added to the documentation (Windows-based only).

3145619 (13073)

- The documentation has been updated with details of how to use CSSID translation tables in deployed applications; see *Codeset Translation* for more information.

(8567)

- The product Help has been modified to indicate that you can only use analyzer programs if they have been compiled with ASCII or EBCDIC specified as the character set. See "Analyzer Programs" in your product Help for more information.

3231967 (12460)

- The documentation has clarified the values acceptable for the SORTCOMPRESS environment variable: to enable SORTCOMPRESS, specify any positive integer.

3228239 (13280)

- The documentation has been updated to include a known restriction where the cobcall function does not locate statically-linked COBOL programs on Windows platforms.

(8304)

- The documentation for the dbfhdeploy command has been updated to list all possible file types that can be added using this command.

(9566)

- The documentation has now clarified the use of the MFCODESET values AUTO and DEFAULT, particularly for Japanese Windows, and UNIX platforms.

3229004 (13290)

- The Message Files section of the National Locale Support documentation has been corrected to use the `.msg` extension for user-created message files.

(8387)

- A recommendation has been added to the documentation for the tunables DATEWARP_DYNAMIC and TIMEWARP_DYNAMIC. It is recommended that these are not used in an Enterprise Server environment.

3235487 (13455)

- If the ILSMARTLINKAGE directive is used, and a linkage record contains a data item that cannot be uniquely qualified, then no property is generated for that item and a warning (COBCH1969) is produced.

00371909 (11629)

- The documentation for CBL_SPLIT_FILENAME has been updated to ensure that the syntax diagram and the definitions are consistent.

(10599)

- The documentation has been corrected to state that the SORT environment variable for determining where the run-time system stores paging files is called TMPDIR (not TEMPDIR).

  (9534)
- The documentation for the CBL_ALLOC_* and CBL_FREE_* library routines now state the limitation of using those routines in sub-programs that have the AMODE directive in effect.

  (10712)
- You can now configure and optimize database connections using options in your MFDBFH configuration file (`mfdbfh.cfg`). See *Optimizing Database Connections* in your product Help for more information.

  00367278 (12752)
- The directive lists automatically set for certain language-related directives have been updated to remove obsolete directives.

  3223241 (12411)
- The PC_PRINTER_LOAD_BMP documentation has been updated with the list of supported formats that may be used with this routine.

  3111670 (8680)
- The Unit Testing Framework documentation now updated to advise against manually editing test fixture files. Instruction on how they are to be managed is given in the topic 'Test Fixture Files'.

  (10585)
- The 'Using Breakpoints and Watchpoints' topic has been updated to include more detailed information on breakpoints.

  (8289)
- See "Additional Software Requirements for PACs" in your product Help for more information on software support and compatibility for Performance and Availability Clusters (PACs).

  00367289 (13588)
- One of the parameters in the example given in 'Create Microsoft SQL Server Datastores Using Script Files' has been corrected. It now reads -password:<pass>, and not -password=<pass>

  (71177)
- The documentation now states that the iFileshare functionality has been deprecated. It also recommends the alternative solution for anyone that was relying on iFileshare.

  00367322 (22266)

Enterprise Server

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- HTTP 403 restrictions no longer erroneously prevent access to ESCWA and ESMAC after interacting with the MONITOR > Monitor page in ESCWA and ESMAC.

  (57283)
- Configuring a region to have 47 Service Execution Processes resulted in the console daemon failing to start on DBCS platforms. This has been fixed.

  00371935 (13365)
- An EJB-wrapped COBOL service involving multiple invocations would not always commit database changes until the dispose event was driven. This resulted in updates not being accessible while the service was in-flight. This has been fixed.

  00367387 (13507)
- An issue with the FAULTCODESTR parameter on the SOAPFAULT CREATE API has now been resolved.

  3232615 (11548)

- The output from caslock is no longer truncated at 64k.

  00368510 00477856 (11573)
- A message is now displayed in the `console.log` file when Enterprise Server fails to create a process when starting a region.

  3222161 (11434)
- Fixed parameter processing when the `-x` option is specified with `casstop`. Information about the `-x` option has been added to the command line help for `casstop` and `casstart`. See *casstop* and *casstart* in your product Help for more information.

  (26323)
- HTTP Headers processing now supports HTTP Headers that do not have any spaces between ':' and the value.

  3232451 (12434)
- A truncation of custom messages occurring in HSF has been fixed.

  00382022 (39011)
- On WEB RECEIVE and WEB SEND, if you omit all of the code page conversion options (SERVERCONV, CLNTCODEPAGE, CHARACTERSET, HOSTCODEPAGE), no code page conversion will take place.

  3232480 (11632)
- When a CWI analyzer program was not returning a converter or a server program, an "EIBRESP 27 pgm not found" message was returned. Enterprise Server now correctly returns the static response received from the analyzer.

  00367285 (28199)
- The `dfhcbtct.cpy` copybook is now provided with the product.

  (25040)
- A change to an internal synchronization procedure resulted an increase in the time taken for a DELAY to respond to a CANCEL from 20ms to 100ms. This has been fixed.

  3236122 (12619)
- An issue with multiple header processing programs in the pipeline has been fixed.

  3225239 (11464)
- HSF records had a response time of 0 when the application executed EXEC SQL statements and there were no trace flags switched on. This has been fixed.

  00367263 00383874 (23073)
- If ES_ESM_XUSER=NO, Enterprise Server still performs a check for the surrogate user to be defined in the system but does not check for the surrogate authority.

  3231824 (13335)
- In the case of the SEP monitor thread performing a soft kill, CAS will now defer freeing shared memory blocks (ICE and ACPE) associated with task DCA until end-of-task processing in the main thread.

  (29002)
- Enterprise Server now enables automatic reconnection to the standby Queue manager in an Multi-Instance Queue Manager. See "Reconnecting to an MQ Server in a Multi-instance Queue Manager" in your product Help for more information.

  00367275 (13387)
- An issue where the Syncpoint option of MQ PUT and GET APIs was set to "NO_SYNCPOINT" has been fixed.

  3241185 (11747)
- When using MQBACK in JCL the messages were not rolled back if the user had not specified mqpmo-syncpoint when the message was stored using MQPUT or MQPUT1. This has now been fixed.

00725720 (69586)

- Intermittent I/O errors (typically reported with a 9/13 file status) occurred during file creation when using DB2 datastores.

(9767)

- An RTS 114 no longer occurs in CASSTORE during concurrent SET-FILE / RELEASE PROGRAM statements.

3240785 (12742)

- An issue existed with importing and/or exporting a (long) SIT fileshare username and password with `casrdtup` or `casrdtex`. Lower-case characters are no longer converted to upper case, and the fileshare username and password are now correctly displayed in both ESMAC and ESCWA.

00371939 (23050)

- A new filter field "resFilter" has been added to the following ESMAC resource listing modules:
  - Every resource in by Type
  - Every resource in by Start L
  - Resource lists under groups
  - Every active resource type except Locks

  This parameter will filter the list of resources returned and displayed by ESCWA and/or ESMAC. This will avoid excessive response buffers being sent over the network which might degrade browser performance. In addition, a new environment variable ES_RDO_MAX_RESOURCES has been added. This enables you to specify a limit to the number of records ESCWA and/or ESMAC will attempt to display. For JSON requests the list being truncated will be indicated by the addition of the JSON property "truncated": true.

00367293 (13581)

- The stack size of `cassi.exe` has been increased from the default 1Mb to 2Mb.

3232744 (13324)

- CICS-MQ Bridge functionality is now available as a Technical Preview. It supports CICS target DPL applications that interact either with a COMMAREA or CONTAINER interface.

00363634 (11447)

- A trace that was not controlled is now emitted when the trace API flag is enabled.

3231371 (11628)

- Default users were not added to HSF. This has now been fixed.

00376906 (31028)

- Enabling ESLOGGING for the Oracle Switch resulted in an error. This has been fixed.

(46056)

- XA switch now handles CAS xa-flow correctly to resolve in-doubt transaction issues on connection loss.

00368472 (48018)

- XA switch now handles CAS xa-flow correctly to resolve in-doubt transaction issues on connection loss.

00368472 (48018)

- The XA Switch module now tries to reuse an existing connection in order to prevent multiple connections being opened for the same XA resource within the same process.

3239642 (13477)

- The DB2 XA switch module now works with DB2 applications that are compiled with the NOPRE directive option.

3237650 (11691)

- The ES_XA_%xaname%_OPTIONS environment variable can attempt to reconnect up to a maximum of 9999 times.

00455239 (59135)

- A new exit for ESXACUSTOMORA has been added to the Oracle switch module. The build scripts have also been updated with some new options to enable this logic.

  00367295 (20268)
- The XA Switch module now handles the Duplicated Connection error correctly.

  3211450 (11427)
- The Vault module is no longer unloaded after the first transaction.

  3243323 (12584)
- The SQL cursor is now kept opened when CICS SYNCPOINT is executed if the cursor type is WITH-HOLD or the SQL compiler directive option CLOSE_ON_COMMIT=NO is specified.

  00364548 (11684)
- The DB2 XA Switch module now sets the Package Path correctly.

  00362931 (12718)
- The Micro Focus Directory Server security configuration custom text could not be set or modified from the Enterprise Server Common Web Administration (ESCWA) HTML GUI interface or API.

  (9646)
- ESCWA can now set region listener endpoint values that contain a valid hostname as well as an IP address value.

  (10258)
- When creating a new Communications Server for a region the "autostart" value was incorrectly set. This has been fixed.

  (71033)
- MFDS now supports the HTTP Strict-Transport-Security (HSTS) response header in responses from its TLS-secured endpoint.

  00368444 (11617)
- Changing the configuration of a running region no longer causes the region to change to 'Not Responding' status.

  00620712 (70308)
- You can now establish new MFDS sessions even if the maximum number of concurrent sessions is reached. A minimum number of UI administration sessions will always be retained.

  3240043 (13428)
- An issues with the MFDS service not starting if the MFCESD licensing daemon was not started has been resolved.

  3228431 (12644)
- The Micro Focus Directory Server HTML GUI now includes an additional XSS protection.

  3243314 (13537)
- Previously, a low-privileged user (without read permissions to a region) could manipulate URLs to get read access to that region's Server properties, listeners, services, packages and handlers. This information leakage has now been fixed, and in these case the user will now see a 403.

  00368584 (11392)
- Region import will no longer fail if the mfServerNonDefaultSecurityConfiguration node is missing.

  00696539 (69402)
- Exporting the MFDS Journal when using a 64bit MFDS process could cause a crash. This has now been fixed.

  (9735)
- MFDS no longer errors when eight Security Managers are configured to be stacked for use by the MFDS process. Eight stacked Security Managers is the maximum permitted.

  3232694 (12528)

- When a malformed request was sent to MFDS it could become unresponsive. This has been fixed.

  00445311 (58026)
- Fixed a regression causing incorrect files to be output from an MFDS Web UI export.

  (86058)
- When using MFDS via a web browser or connecting to it via mldap (with MDUMP for instance) it was possible that MFDS would not respond immediately. This has now been fixed.

  (57189)
- If a user or user group has a "Read" allow but no "Update" allow ACE for the "Enterprise Server Administration" class "Options" resource, then they will be able to view but not update the MFDS options values. Previously only the "Update" rule allowed a user to view MFDS options.

  3217327 (12380)
- MFDS now sends the "Secure" cookie attribute if MFDS has been configured to use TLS.

  3228919 (11606)
- If the MFDS process has been restarted or you have clicked its "Renew" option, client applications such as Server Explorer inside the IDE and ESCWA will now automatically reestablish a connection.

  (10516)
- When using startup and shutdown scripts in MFDS, when run for a second time it would result in a permission error when writing the script out to a file. This has now been fixed by keeping a backup of the existing script and by writing the new one out again.

  00377287 (30073)
- A potential double free caused by a race condition involving the exit handler has been fixed.

  3242625 (11709)
- MFDS became unresponsive when performing multiple simultaneous service deployments. This has been fixed.

  00739041 (87099)
- When you perform an XML export or import of regions with multiple communication processes, the communication process autostart option value is now correctly preserved.

  3236278 (11644)
- When using the region name option (/f) with `casclsec`, the option was not passed to the utilities invoked. This has now been fixed.

  00696227 (73045)
- MFFTP creates an end-of-line (eol) file when the file transferred from Enterprise Server is a Variable Block (VB) file. A new environment variable (MFFTP_DISABLE_EOL=Y) enables the VB file to be transferred from the Enterprise Server environment as it is. The default value is 'N'.

  00477620 (57488)
- An issue with a SEP been killed and stuck in termination has been fixed.

  00675262 (69370)
- When the External Security Facility in Enterprise Server has the auditing option enabled, with the syslog auditing option, some processes could accumulate multiple connections to the syslog server.

  00374548 (12564)
- Enterprise Server can optionally cache the results of user signon (ESF Verify) requests in order to improve the performance of signon operations. Caching these requests from any mainframe-emulation environments now works properly when enabled in the security configuration.

  3232724 (11516)
- In some cases, portions of the configuration text of an Enterprise Server External Security Facility configuration were not processed correctly. This has been fixed.

  (58016)

- The Enterprise Server ESF Admin LISTUSER command has a new optional parameter which disables locking the group list while computing a user's group membership. See the documentation for LISTUSER in your product Help for more information.

  3235237 (11586)
- Enterprise Server ESF Update requests no longer report an error if a Security Manager does not recognize a user or group being updated.

  00383391 (32087)
- When Enterprise Server Externals security is used with both PAM and LDAP external security managers, and all-groups, federation, and PAM groups are enabled, the PAM groups are correctly added to the user's group membership when the PAM ESM is not the first ESM in the list.

  3221760 (11538)
- When Enterprise Server External Security is configured with both a PAM security manager (pam_esm) and an LDAP security manager (mldap_esm), and all-groups mode and group federation are enabled, and the PAM security manager is configured for PAM group processing, the various ESF Update operations (update user, update group, update all) will now correctly update the user group membership information from both security managers.

  (8088)
- The Enterprise Server External Security Facility's Update feature could sometimes cause a SEP to abend with a COBOL RTS 114 error. This has been fixed.

  00384962 (47011)
- The Update All button was not refreshing the group permissions for a name mapped user in an LDAP ESM. This has been fixed.

  00364056 (11765)
- Arabic support for Enterprise Server applications is available as part of the in-built code set support. If you are building Arabic support into Enterprise Server applications, your terminal emulator must support the Arabic EBCDIC 420 code page. Support is added by building your applications and configuring your enterprise server regions with the MFCODESET variable set to the supported country code (0420). Your product's in-built code set translation utility performs translations between the ASCII 1256 Arabic code page on your enterprise server region, and a terminal emulator that supports the Arabic EBCDIC 420 code page (for example, IBM's Personal Communications emulator).

  00374780 (11480)
- If a deployed application does not require a full Enterprise Server product to be available, but also relies on the inbuilt DBCS translation support, those applications must be deployed with the appropriate code set mapping files, and then you must use the MFCODESET_DBCSDIR environment variable to locate those files at run time. See 'Codeset Translation' in the product documentation for more details.

  (10286)
- Access to the ESMAC pages are now verified and validated server side when applicable. A disabled button client side could be re-enabled and used to access an unauthorized page. This has been fixed.

  00368464 (12713)
- Enterprise Server will now issue a physical cancel to ESMAC modules even if CAS_SRV_CANCEL is set to a non-default value.

  3245515 (27055)
- Redundant comments in the source code have been removed.

  3239529 (12691)
- Cookie validation has been improved to prevent any unauthorized tampering with the casCookie.

  00368456 (11740)
- Creating an Active MQ Listener failed. This is now fixed.

  (69437)

- Enterprise Server External Security passtokens and the DCAS (Digital Certificate Authentication Service) feature now work properly when using a security configuration with two or more Security Managers of different types.

  3231876 (11549)
- The Enterprise Server DCAS feature has been enhanced to work with IBM HATS.

  00431373 (57050)
- Handling sessions for the Micro Focus Binary Protocol has been enhanced in the Micro Focus Communications Server. This resolves a number of long-standing issues where sessions could be leaked or misused by misbehaving clients. It affects J2EE services hosted by Enterprise Server and possibly some other uses of the MFBINP protocol.

  00367384 (12716)
- Language specific decimal separators are now dealt with by the MFCS and by extension ESCWA components when outputting JSON.

  00502140 (69256)
- Enterprise Server's `esfupdate` utility now supports updating servers where the Communications Process control listener is configured for TLS (SSL).

  3236811 (11615)
- In Enterprise Server, performance and capacity have been improved when retrieving large files, such as server log files and spool output, over the Internet.

  00370973 (12381)
- The following headers on the responses for the multiprotocol listener (often named "Web Services and J2EE") have been added:- X-Frame-Options- X-XSS-Protection- X-Content-Type-Options- Content-Security-Policy This includes ESMAC responses.Header values:“X-Frame-Options": "SAMEORIGIN""X-XSS-Protection": "1; mode=block"“X-Content-Type-Options": "nosniff"Content-Security-Policy": "default-src http: https:; img-src 'self'; script-src 'unsafe-inline' 'self'; style-src 'unsafe-inline' 'self'; worker-src 'none'; object-src 'none'"

  00367046 (13389)
- MfsecretsAPI no longer masks exit codes from COBOL applications.

  (10521)
- Support for the Hashicorp vault is now available in the Secrets API.

  00370908 (11321)
- The migrate command of Mfsecretsadmin now works when two separate configurations files are specified.

  00365440 (11662)
- When ESMAC CSRF handling was active, and the first request to ESMAC was a POST request, the request failed because it had no CSRF token. To correct this, the ESCWA server now obtains a CSRF token by making a GET /native/v1/regions/{host}/{port}/{region}/esproperties request before the POST.

  (10570)
- A notification was incorrectly displayed when opening or closing a DCT. This has now been fixed.

  00364218 (12601)
- The number of items than can be displayed in the ESCWA tree has been increased to 512.

  (8765)
- An issue where it was not possible to set the Codeset on Catalog Entry DCBs in ESCWA has been resolved.

  (9706)
- Added a DOWNLOAD option to the ESCWA Journal page. See *Journal* in your product Help for more information.

  (57228)

- The STOP POLLING button has been added to the ESCWA Control page. This enables you to stop polling for the region's status while starting and stopping a region.

  Note: Clicking STOP POLLING will not stop the region form starting or stopping.

  (6983)
- An issue with regions created in ESCWA not showing in the Web Service - Deployment Server list in Eclipse has been resolved.

  3234600 (13345)
- The ESCWA security page did not clearly identify that it was only for configuring ESCWA's security and did not affect Directory Servers. The page now has the new title "ESCWA Security Facility Configuration" as well as a new information alert to make this clear to users.

  (9711)
- A problem translating names displayed on table filters to match their corresponding columns has been fixed.

  (53076)
- ESCWA now creates the `commonwebadmin.json` file if it has been deleted rather than refusing to start. You can use this to reset ESCWA back to a default state.

  00367573 (13511)
- In ESCWA, you can now disable the logon screen animation. To do this, at the top right of the menu bar click the user icon and then switch off Animate Logon.

  00366659 (11795)
- ESMAC sent response and latency percent information to ESCWA which did not total 100%. In this case, ESCWA was displaying the wrong information in its HSF detail charts. This has now been fixed.

  00372430 (27158)
- The API documentation for ESCWA ESM requests has been updated.

  (26197)
- ESCWA lost connection information for Directory Servers when the ESCWA session timed out. This has been fixed.

  (7891)
- Underlying issue causing the SSL authorize page to appear when navigating between listeners has been fixed; the SSL authorize page now only appears when you click Authorize.

  (8638)
- When using the ESCWA or MFDS Web APIs, a new session cookie is now attached to a failed API response.

  (9661)
- ESCWA now handles regions that are started correctly but it cannot contact if it has its listeners set to connect on loopback only.

  (51008)
- ESCWA now validates ports for /config APIs.

  (8730)
- MFCC will now correctly parse IPv6 addresses when connecting.

  (8498)
- Fixed segfault on the exit of the ESCWA shutdown command line option.

  (69484)
- The new ESCWA copy region functionality enables you to copy or discard the port as required.

  2795268 (11098)

- ESCWA will now generate an error and prevent changes being made to a Communications Process if the region would no longer have a Communications Process set to auto start.

  (62177)
- Control characters present in the `console.log` resulted in invalid JSON. The ESCWA server now replaces these control characters with spaces.

  (61254)
- The size of tables in ESCWA are now adjusted based on the number and height of the rows.

  (10385)
- MFDS Logoff method has been implemented in the ESCWA API and Web UI.

  (51041)
- Widgets on the ESCWA dashboard now display the name of the directory server as well as the region. This enables you to differentiate where regions have the same name.

  3225866 (13408)
- The Enterprise Server MLDAP ESM module no longer leaks sockets when there are transient connection or bind failures with the LDAP server.

  00378150 (30089)

File Handling

Back to the list

- MFDBFH now correctly handles schema names that are specified more than once when updating the CURRENT PACKAGE PATH. Previously, this was treated as an error causing the associated database operation to fail.

  00374750 (24079)
- Improvements have been made to MFDBFH to reconnect where possible when database connections are lost.

  3225946 (12378)
- The `dbfhadmin` command-line tool has been enhanced to allow PostgreSQL databases to be created on a remote server, or a server using the non-default port 5432. A remote PostgreSQL server can now be specified using the -host option, and an alternative port number can be specified using the -port option. Previously the only way to use dbfhadmin to create remote PostgreSQL databases was by setting the PGHOST and/or PGPORT environment variables prior to use. Alternatively, the PostgreSQL psql command could have been used to directly execute the generated SQL script.

  (71250)
- Configuration options have been introduced to restrict the lifetime of database connections. These options are primarily for use with PostgreSQL to enable integration with connection poolers such as pgbouncer and pgpool-II.

  00367281 (24080)
- Newly-created ESDS files now support the full 32-bit ESDS key space. Existing ESDS files will remain limited to 31 bits/half the space.

  00367110 (12692)
- The Enterprise Server transaction performance has been improved.

  3232506 (12506)
- An I/O error occurred during a file open operation when a Db2 SQL application was sharing the user database with an MFDBFH datastore and had issued a "SET CURRENT PACKAGE PATH" command. MFDBFH now automatically appends any schemas it needs to the current package path when required.

  3214792 (12453)
- An RTS 114 error sometimes occurred if the CAS spool view was repeatedly refreshed while switching between Active, Completed, etc.

(8805)

- A 9/21 error (file is directory) is now returned if an attempt is made to open a filename which has been specified as a folder URL.

(9444)

- When returning a record read from a line-sequential file, MFDBFH did not pad the record with spaces. This was incompatible with the EXTFH behavior for a disk file.

(10361)

- MFDBFH did not reconnect to PostgreSQL databases after losing connections.

(10205)

- An ESDS STARTBR specifying prev (or prev equals) with a RID of X"FFFFFFFF" was not correctly starting the browse from the last record in the dataset.

00367110 (12555)

- MFDBFH enhancements have been made to improve performance when components need to check for the existence of database-hosted files.

00468750 00488011 (61239)

- MFDBFH no longer causes excessive CBL_THREAD_SLEEP API entry/exit events being output to CTF trace files when RTS tracing is enabled.

3226855 (13319)

- MFDBFH has been enhanced to improve the recovery from a lost database connection, and other transient errors, when creating a file.

(69520)

- MFDBFH now supports Oracle databases (version 19c and later).

00367287 (13426)

- MFDBFH no longer uses the default stack size associated with the main thread of the process when creating its worker threads. This helps avoid receiving any RTS 114/115 errors at run-time due to memory exhaustion if the user has specified a very large stack size to be associated with the main thread.

00373754 (12548)

- Performance enhancements have been made for MFDBFH's handling of COBOL READ statements. Part of these changes now installs an additional database index for each alternate key associated with a file when the key is created. For files that have been created prior to this change, the "dbfhdeploy upgrade" command has been enhanced to install all missing indexes for a given file.

00488011 (70352)

- The performance of the ESMAC Catalog View has been enhanced when using a database hosted catalog file and when specifying a dataset name filter with a leading wildcard character.

3242217 (11705)

- An error message is now output when attempting to use `dbfhadmin` to generate a script file to a non-existent folder, or to one without write permissions. Previously the operation either silently failed, or resulted in an run-time system error 115.

(62236)

- The "dbfhadmin -region -list" command failed to list regions which were not associated with a database of the same name. This problem could occur when a single physical database was used to host regions and datastores. The problem is now fixed.

(30001)

- When an Enterprise Server instance has been configured to use database-hosted resource locks, the ESMAC Locks view no longer remains in a busy state if the connection to the region and/or cross-region database has been lost.

(51129)

- MFDBFH is automatically upgrading existing datastores to resolve some existing restrictions on the maximum number of files that can be supported, and to prepare for future enhancements. Datastores periodically need to be upgraded and should not impact the user in any way. However, in previous versions of MFDBFH, if an upgrade did fail, it would do so silently and could only be detected by trace files and/or unexpected application behavior. If an upgrade does fail, it is normally due to the client connection having insufficient database privileges to perform the operation. This change now also reports an upgrade failure to the user and give the user the opportunity to manually perform the upgrade using the new "dbfhadmin -upgrade -datastore *datatore-url*" command. This command generates an SQL command script, which should then be executed by a database user with sysadmin privileges.

  

  Note: For Enterprise Server scale-out systems using PostgreSQL datastores, you may want to consider temporarily shutting down the system, applying the patch update on each of the scale-out machines, and then restarting the system. This will avoid potential batch job failures that could occur on active scale-out machines that had not had the patch update applied due to them still using cached older versions of procedures that have been replaced by the upgrade.

  (58126)
- When using Microsoft SQL Server, WRITE operations no longer fail with a 3/0 status (I/O error) for files using AUTOMATIC|MANUAL SINGLE record locking when a record lock is not held.

  (58041)
- A temporary file that was being used by the rebuild utility had its file size restricted, which caused the recovery of large files to fail; this has now been fixed.

  00375739 (30033)
- A performance issue has been addressed that was affecting parallel compilation.

  3230709 (12666)
- A stability issue has been resolved that was being caused by using SHARE-OUTDD in a batch setting.

  00369363 (13336)
- A new Fileshare Server option is available to control the regularity in which the disk file checks are carried out when the Flush on Commit (/fc) option is in effect. By default, the check occurs on every flash, but by setting /fds <value> you can limit the number of times the check will be performed. Permissible values are 1-65536. Any values < 1 is treated as 1, and any value > 65536 is treated as 65536.

  00370974 (13238)
- FSMGR was not logging out all clients when instructed to.

  3237032 (12656)
- Any temporary file created through Fileshare by Data File Tools will be deleted if Data File Tools crashes or is disconnected.

  (69512)

Interface Mapping Toolkit

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- A problem that prevented JSON-REST Web services from using an application RETURN-CODE to set the response HTTP status code has been fixed.

  00369975 (11324)
- A problem that prevented JSON-REST Web services from using an application RETURN-CODE to set the response HTTP status code has been fixed.

  00370461 (11716)
- New service interfaces added to Enterprise Server Application projects are now in the correct format.

  (10415)

- For `ws2ls`, unions are now mapped with their default whitespace behavior as collapsed.

  3237304 (13437)
- For `ws2ls`, boolean data types in the WSDL are now defined as BOOLEAN in the generated WSBIND file.

  3237798 (12511)
- Web-service clients generated from JSON schemas no longer include an extraneous root JSON field.

  00366626 (12633)
- When returning the LDO array of all operations in a JSON service, any operation in the JSON response with an empty "path" attribute is now returned with a "href" value of "/<operationName>".

  (10411)
- When data containing a null character is returned to a Java string, the null character is no longer used as a delimiter and will instead be included in the Java string

  00367385 (11622)
- A service created from an earlier non-versioned service definition now gives correct behavior on a POST or PUT REST operation.

  00372694 (13565)
- In a program that has two or more tables that are empty, the SEP would abend after deploying and running the service in Enterprise Server. This problem has been resolved.

  3229853 (11498)

Micro Focus Server Administrator (GUI)

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- A potential MFDS abend in scenarios where a "Renew" is repeatedly issued and TLS is enabled has been resolved.

  00368581 (13379)
- A Content-Security-Policy has been added to all MF Directory Server HTTP response headers. Additional restrictions on how MFDS process shutdown requests are handled.

  00379021 (30103)
- Secured REDIS servers now automatically connect in secure mode.

  3229330 (11499)

Run-time System

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- A .NET Core COBOL application deployed on Linux, which performs file handling operations, no longer prevents the correct processing of a NullReferenceException in the managed code.

  (8770)
- In .NET environments, ACCEPT FROM DAY-OF-WEEK now returns the correct value on a Sunday.

  00368357 (13597)
- When using the .NET Runtime, a new tunable, command_line_arguments_unquoted, is now available which when set to true will provide command line argument handling that is compatible with that of the 2.3.2 product and earlier releases - in that command line arguments containing quoted spaces are returned to the application.

  00417766 (52004)
- You can potentially reduce print close time of a .NET deployed COBOL application that prints long documents by enabling the optimization for network printers via the Switch.System.Drawing.Printing.OptimizePrintPreview configuration switch.

This optimization is described in the "PrintPreviewDialog performance" section in "PrintPreviewDialog control overview (Windows Forms)", direct link *https://docs.microsoft.com/en-us/dotnet/desktop/winforms/controls/printpreviewdialog-control-overview-windows-forms?view=netframeworkdesktop-4.8*, in the Microsoft's .NET Framework documentation (under Docs->.NET Desktop Guide->.NET Framework->Windows Forms->Controls->Controls to Use on Windows Forms->PrintPreviewDialog Control->PrintPreviewDialog Control Overview).

For example, for apps running on the .NET Framework 4.6 version or later, you can add the following switch to the <AppContextSwitchOverrides> element in the <runtime> section of your app config file:

```
<runtime>
   <AppContextSwitchOverrides value =
"Switch.System.Drawing.Printing.OptimizePrintPreview=true" />
</runtime>
```

00501669 (71260)

- In .NET COBOL and JVM COBOL, when using the Compiler directive numproc(acos), a space character, 0x20, in the sign byte of a sign included display item, was being interpreted as negative instead of as positive.

3228161 (13329)

- Printer close in a program that uses printer redirection and pc_printer_set_font many times no longer takes a very long time.

00445383 (59200)

- The 64-bit version of 'name.dll' is now built and delivered into the product.

00368438 (28156)

- If a recoverable run-time error occurs in an Enterprise Server container when the core_on_error tunable is set, then a core file is now created.

(53181)

- CBL_GET_OS_INFO now returns the correct major and minor operating system versions.

3226654 (13376)

- FUNCTION NATIONAL-OF, when used with a reference-modified identifier and the 2nd parameter is a ccsid number, now returns the correct length of data.

3243083 (9863)

- It is now possible to add an application launch configuration file to applications where the main program is not written in COBOL. To enable this, you need to calling the new coblaunchconfig() API.

3232953 (12513)

- Defaults for the memory_strategy tunable in some of the product documentation versions have been updated.

(73061)

- The profile_behavior tunable can now be configured to enable the Profiler to record time spent in called programs in CPU time or in real time.

3126255 (12491)

- FUNCTION DISPLAY-OF(XML-NTEXT) no longer produces a 'COBRT105 - Memory allocation error' error.

00364697 (26053)

- When the core_on_error tunable is used, a core dump is produced when a signal or error occurs. However, there was a situation where a SIGSEGV signal could be repeatedly generated, which would cause a very large core dump to be produced; this has now been resolved.

00373622 (27254)

- A run-time system error when loading 32-bit .gnt files, on an Intel x86 platform, has been fixed.

3235746 (13506)

Setup Issues (Windows)

Back to the list

- The `cblms` tool no longer detects Windows SDK installations that do not include the required lib subfolder and so are not valid to use.

  (8454)
- Spacey input paths are now handled correctly.

  3236578 (11603)
- The topic "Installing Visual COBOL in an Offline Environment" in the product Help of Visual COBOL for Visual Studio and Enterprise Developer for Visual Studio available from the Micro Focus SupportLine now includes instructions about how to add CRL information into the certificate store. This is a required step for offline installations that enables the validatation of the signature on the Visual Studio extensions without any errors.

  00378086 (51001)
- The Software Requirements topic in the product Help for installing on UNIX machines now includes more detailed instructions about how to set up the LANG environment variable. This must be set before you start the installation.

  LANG must be set to one of the following English or Japanese locales: C, default, en_GB, en_GB.UTF-8, en_US, en_US.UTF-8 ja_JP, ja_JP.SJIS, ja_JP.UTF-8, ja_JP.eucJP, ja_JP.eucjp, ja_JP.sjis, ja_JP.ujis, ja_JP.utf8, japanese

  Set LANG either before running the setup file - for example: export LANG=C Alternatively, add it at the start of the command for running the setup file:LANG=C ./setup_...

  00371216 (11458)
- The deployment SDK zip file names now include the Patch Update number and the build package number. For example, for Patch Update 4, the name of the deployment SDK file for Visual COBOL is now generated as:cs_60_pu04_268826_deployment_sdk.zip

  3240181 (13554)
- Previously, there was an issue when uninstalling release 6.0 of Visual COBOL or Enterprise Developer if IBM DB/2 was also installed. This is resolved in release 7.0.

  00368460 (11643)

SQL: COBSQL

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- Support in COBSQL for a large number of REDEFINE data items has been increased to up to 8000.

  3244127 (13591)
- COBSQL did not correctly handle the byte conversion of FETCH statements with 10 COMP items and one Non-COMP item. It now correctly handles this scenario, as well as the same one in INSERT statements and EBCDIC conversion.

  00365970 (22267)
- COBSQL now supports EBCDIC conversion in the case in which the operator token is right next to a host variable inside a DECLARE SELECT statement.

  3232492 (13562)
- COBSQL now handles correctly a long list of host variables when the KEEPCOMP Compiler directive is used.

  00365968 (13415)
- COBSQL now displays an error (in Visual Studio, Eclipse and on the command line) when the procobol command is not found.

  (10332)

- EBCDIC conversion when DECLARE TABLE statements are present is now handled correctly.

  3236281 (12536)
- COBSQL now supports the EBCDIC conversion in the case in which the host variable used in a FETCH statement was previously initialized, and the FETCH statement returns no rows.

  3232429 (13368)
- A problem that caused COBSQL to abend with memory errors when the KEEPCOMP variable was used along with certain array values in a "FOR :HOSTVAR ALLOCATE" statement has been corrected. COBSQL now skips unnecessary byte conversions for "FOR :HOSTVAR ALLOCATE" statements.

  00365886 (13607)
- COBSQL has been updated to handle redefined variable declarations broken into multiple lines.

  00430595 00506991 (59202)
- COBSQL now supports EBCDIC conversion of saved declare cursor variables with '=: variable syntax'.

  3240853 (13447)
- COBSQL has been updated to override or reset previously set directives with those specified by inline $SET statements as needed.

  00422020 (53080)
- COBSQL now supports host variables used in FOR :HOSTVAR statements when the KEEPCOMP directive is used.

  00373979 (11794)
- COBSQL is no longer unnecessarily setting a "bad pointer" to check if the EBCDIC modules are present.

  3242687 (12748)
- COBSQL now supports EBCDIC conversion of redefined host variables.

  3241688 (12700)

SQL: DB2 ECM

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- DB2 ECM now correctly handles data item names with the character 'f' or 'F'. It also handles arrays of COMP values correctly when the FOR n ROWS clause is used.

  3229912 (13341)
- When DB2(RELEASE=COMMIT) was specified and the targeted database was not DB2 z/OS, the compiler generated a warning indicating that the directive would be ignored. This has been corrected.

  00371184 (11372)
- Using a group host variable with FILLER could cause a Visual Studio background parse crash of Visual Studio. Compiling from the command line would result in a subscript out-of-range error. This issue has been resolved.

  00371048 (27157)
- A problem compiling a COBOL program using dialect ENTCOBOL on a program using ROWSET in a SQL statement has been fixed.

  00424387 (57057)
- An issue with the HCO for DB2 LUW tooling in DDL generation where creating a table with a "FOR EACH" or "FOR BIT" clause on a column was generated incorrectly has been resolved.

  00373396 (11400)
- DB2 ECM now handles COMP data items correctly when the NULL indicator array is involved and COMP data item is used in the SQL Statement as both input and output host variable.

  3236080 (12661)

- The HCO for DB2 DDL tool erroneously inserted a space when an input line filled the maximum column with a non-space literal value, and continued on the following line at position 1. This has been fixed.

  3205352 (8474)
- The limit on the NULL indicator array size has been extended from 255 to 1012.

  00368494 (12545)
- A problem that caused a failure in the CheckSwitchUserStatus section when running a job that uses DB2 User impersonation has been fixed.

  00375618 (32025)

SQL: OpenESQL

Back to the list

- When compiling with the ILTARGET directive without specifying x86 or x64 bitness, an unknown type 'type OdbcWrapper.Class1' compiler error was returned erroneously. This has been corrected.

  (52174)
- An error that occurred when a DB2 stored procedure was called from the ADO runtime has been resolved.

  00425931 (58056)
- Opened cursors are now kept open after a ROLLBACK if SQL directive option CLOSE_ON_ROLLBACK=NO or BEHAVIOR=UNOPTIMIZED is specified.

  3238292 (11710)
- OpenESQL application now retrieves DBCS strings correctly from PostgreSQL database.

  00369140 (28051)
- An issue that caused truncation of a dynamic SQL statement and that resulted in a runtime error, even when the maximum length of an allowed statement had not been exceeded, has been corrected.

  00454855 (58163)
- The OpenESQL directive option CLOSE_ON_COMMIT is now available to select from the project's properties inside Visual Studio and Eclipse.

  00364548 (11631)
- The OpenESQL run-time now handles Oracle passwords correctly.

  3230203 (13545)
- A problem that prevented the OpenESQL preprocessor from recognizing the SQL Server OPTIMZE FOR syntax has been fixed.

  00465904 (57173)
- OpenESQL did not handle syntax checking for PostgreSQL when using VARBINARY type variables.

  3239363 (13433)
- The new PICXBINARY SQL compiler directive option,enables COBOL and PL/I programs to use PIC X(n) host variables to receive data from BINARY, VARBINARY, LONGVARBINARY columns in binary format without changing source to use SQL TYPE BINARY host variables.

  3242422 (12745)
- .NET COBOL applications with dynamic SQL statements using SQLDA now work correctly via the ODBC driver.

  00370895 (11701)

Visual Studio IDE

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- Attempting to scroll to a copybook within a program displayed in the Visual Studio preview tab no longer causes the IDE to display an error alert.

  00452493 (58245)
- The debugger tool-tip no longer flickers when you use the keyboard shortcut for the "Quick Info" command while debugging.

  (7804)
- When using Visual Studio 2019 16.8 or later, COBOL .NET Core projects require that you install Visual COBOL or Enterprise Developer 6.0 Patch Update 4 (or later).

  (9828)
- Visual Studio now offers suggestions for both paths and executables' file names in the Executable field on the Debug page in the project's properties.

  00376339 (27354)
- Under some conditions, importing a Net Express project into Visual Studio could result in a large amount of invalid information being added to the Visual Studio projects. This led to unexpected results when the projects were built. For previously-imported projects where this issue has arisen, after installing this Patch Update you need to either manually remove the erroneous information or re-import the projects.

  00371252 10602 (28061)
- When stepping into an external source file during a debug session, the source code now parses correctly without errors.

  00466126 (57255)
- The speed of building of very large projects has been improved.

  00364436 (13539)
- An issue that resulted in a warning shown when you paste code into the virtual space in the editor has been resolved.

  00364591 (11658)
- It is now possible to enforce upper case for text you add in the COBOL editor. You can enable upper case from Edit > Advanced > Force Uppercase menu item, or from Tools > Options > Text Editor, select the desired language, and go to the Margins and Text Casing options page. This option applies to all code inserted into the source file, whether typed, pasted or automatically inserted.

  3230875 (11531)
- Some properties of RESTful web services (.svi) were not included when using the "Package services as COBOL archive (.car) files" option of Enterprise Server Application projects in Visual Studio.

  (10452)
- When creating new files using any of the COBOL refactoring commands, the new files use the same file encoding as the one of the original program file.

  3231350 (11495)
- An issue that was causing an intermittent exception during multi-processor compilation has been resolved.

  00364604 (25072)
- Changes made to any of the values in a project’s Debug property page are now saved when the project is saved or closed.

  (10529)
- core_on_error and debug_on_error tunable options now show a list of valid values.

  00365051 (7187)
- Properties are now generated with the getter and setter syntax.

  00365050 (4880)

- The Program Flow graph now supports nested COBOL programs.

  00366795 (69362)
- When using Visual Studio 2019 versions 16.6 or later, documents that were previously open when a project was closed will now be reopened automatically when reopening the project.

  3236715 (11540)
- An issue related to breakpoints resulted in memory leaks. This has been resolved.

  00367085 (11651)
- The Standalone Editing Debug Options dialog box will now appear each time you start debugging unless the 'Don't show this dialog again' check box is checked.

  (5748)
- The Build Settings page now correctly shows the values of the -debug, -dc and -isuffix directives used when building a PL/I project.

  (3977)
- The TO keyword alignment formatting preference is no longer ignored.

  00364587 (12533)
- When debugging, if a module is loaded that does not have valid date or time information, an ArgumentOutOfRangeException popup is no longer displayed.

  (10298)
- By default, when debugging .int or.gnt code in Visual Studio, RUNW.EXE is used as trigger. However, you can now use RUN.EXE by selecting the 'Debug as a console application for INT/GNT or Library projects' option in Tools > Options > Debugging > Micro Focus COBOL.

  00365053 (8239)
- The COBOL debug setting "Show load information for system programs" (see Debug > Debug Options > Micro Focus COBOL) has been renamed as "Show load and stack frame information for system programs". When unchecked, the Call Stack debug window does not show any system stack frames.

  (9712)
- Visual Studio catalog filters now support regular expressions.

  00370817 (13531)

XML Support

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- The XMLIO run-time system now correctly handles namespace prefixes specified in the IDENTIFIED BY clause.

  00371218 (11634)
- The XML PARSE run-time system can now handle large elements content.

  3222846 (13461)

Other Issues Resolved in This Release

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

- 00367244 (12615)

Unsupported or Deprecated Functionality

This section includes information about features or functionality that are not supported.

- The SafeNet Sentinel licensing system has been deprecated and will be not available in this product starting with the next major release after release 9.0. The SafeNet Sentinel licenses will not be supported after release 9.0 and you need to use AutoPass licenses if you use these releases.

  You can replace your SafeNet Sentinel licenses with AutoPass licenses starting with release 8.0. Contact Micro Focus Customer Care for further information.

- 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.

Additional Software Requirements

To ensure full functionality for some Visual COBOL features, you might be required to obtain and install additional third-party software.

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

Installation

Supported Operating Systems and Third-party Software

Lists operating systems supported and tested with Micro Focus software products, and third-party software supported by major features within Micro Focus products.

Attention: This provides a summary of operating systems and third-party software supported across the Micro Focus Visual COBOL / Enterprise Developer suite of products. Not all software and/or software versions listed here are supported by every product in the suite.

Windows Operating Systems

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All supported Windows operating system versions have been tested with all listed Micro Focus product releases. Each listed Windows operating system version and its subsequent updates are supported.

	Micro Focus Product Release		
Operating System	**5.0**	**6.0**	**7.0**
Windows 7	X		
Windows 8.1	X	X	X
Windows 10	X	X	X
Windows Server 2008 R2 SP1	X		
Windows Server 2012 R2	X	X	X
Windows Server 2016	X	X	X
Windows Server 2019	X	X	X

Linux/UNIX Operating Systems

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Micro Focus has tested the operating system base versions with corresponding Micro Focus product releases. Any Micro Focus release that supports a given operating system base release also supports any subsequent minor releases provided by the vendor.

		Micro Focus Product Release		
Operating System Base	**Processor**	**5.0**	**6.0**	**7.0**
AIX 7.1.x (where x >=4)[1]	IBM Power System[2]	X	X	X
AIX 7.2 [1]	IBM Power System[2]	X	X	X
CentOS 7 [1]	Intel x86-64		X	X
CentOS 8[3]	Intel x86-64		X [1]	X
HP - UX 11.31 [1]	Itanium	X	X	X
Oracle Linux - Red Hat Compatible Kernel 6 [1]	Intel x86-64	X	X	
Oracle Linux - Red Hat Compatible Kernel 7 [1]	Intel x86-64	X	X	X
Oracle Linux - Red Hat Compatible Kernel 8 [1]	Intel x86-64	X	X	X
Oracle Linux - Unbreakable Enterprise Kernel 6 [1]	Intel x86-64	X	X	
Oracle Linux - Unbreakable Enterprise Kernel 7 [1]	Intel x86-64	X	X	X
Oracle Linux - Unbreakable Enterprise Kernel 8 [1]	Intel x86-64	X	X	X
Red Hat Enterprise Linux 6	Intel x86-64 [1]	X	X	
Red Hat Enterprise Linux 6	IBM Z System[1]	X	X	
Red Hat Enterprise Linux 7	IBM Power System [1,2]	X		
Red Hat Enterprise Linux 7	Intel x86-64	X	X	X
Red Hat Enterprise Linux 7	IBM Z System[1]	X	X	
Red Hat Enterprise Linux 8	Intel x86-64		X	X
Red Hat Enterprise Linux 8.2 and later	IBM Z System[1,2]		X	X
Oracle Solaris 11 [1]	Intel x86-64	X	X	X
Oracle Solaris 11 [1]	SPARC	X	X	X

		Micro Focus Product Release		
Operating System Base	**Processor**	**5.0**	**6.0**	**7.0**
SUSE Linux Enterprise Server 12	IBM Power System [1]	X		
SUSE Linux Enterprise Server 15	IBM Power System [1]	X		
SUSE Linux Enterprise Server 12	Intel x64	X	X	X
SUSE Linux Enterprise Server 15	Intel x64	X	X	X
SUSE Linux Enterprise Server 12	IBM Z System [1]	X	X	X
SUSE Linux Enterprise Server 15	IBM Z System [1]	X	X	X
SUSE Linux Enterprise Desktop 15	Intel x64			X
Ubuntu 18.04 [1]	Intel x64		X	X
Ubuntu 20.04	Intel x64			X

[1] Not supported by Eclipse.

[2] 64-bit-only

[3] The end-of-life date for this platform is 31 December 2021. We recommend that you check CentOS 8 end-of-life notices before using this platform.

IBM Mainframe Operating Systems

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	Micro Focus Product Release		
Operating System	**5.0**	**6.0**	**7.0**
z/OS 2.3	X	X	X
z/OS 2.4	X	X	X

Integrated Development Environments (IDEs)

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	Micro Focus Product Release		
IDE	**5.0**	**6.0**	**7.0**
Microsoft Visual Studio 2017	X	X	X
Microsoft Visual Studio 2019	X	X	X
Eclipse v4.16 [1]			X
Eclipse v4.7	X	X	

	Micro Focus Product Release		
IDE	**5.0**	**6.0**	**7.0**
Eclipse v4.8	X	X	
Microsoft VS Code v1.x	X	X	X
[1] Installed automatically with Eclipse-based products.			

.NET Core

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	Micro Focus Product Release		
.NET Core	**5.0**	**6.0**	**7.0**
.NET Core 2.1	X		
.NET Core 3.1	X	X	X

Java JDK

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	Micro Focus Product Release		
Java	**5.0**	**6.0**	**7.0**
IBM JDK 1.7	X	X	
IBM JDK 1.8	X	X	X
Oracle JDK 1.7 / 7	X	X	
Oracle JDK 1.8 / 8	X	X	X
AdoptOpenJDK 8	X	X	X
AdoptOpenJDK 11 [1,2]		X	X
AdoptOpenJDK 11 OpenJ9			X
[1] Installed with Micro Focus products for Windows platforms. [2] Not supported on AIX platforms. See the *AdoptOpenJDK Web site* for more information about OpenJ9.			

Java Application Servers

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	Micro Focus Product Release		
Java Application Servers	**5.0**	**6.0**	**7.0**
Apache Tomcat 9.0	X	X	X
IBM WebSphere 8.5.5	X	X	X
IBM WebSphere 9.0	X	X	X
IBM WebSphere Liberty 19.0.0.0[1]	X	X	X
IBM WebSphere Liberty 20.0.0.0[1]			X

	Micro Focus Product Release		
Java Application Servers	**5.0**	**6.0**	**7.0**
JBoss EAP 7.1	X	X	X
JBoss EAP 7.2		X	X
JBoss EAP 7.3			X
Oracle WebLogic 12.2.1	X	X	X

[1] Websphere Liberty is made available as a single stream continuous delivery software lifecycle. Micro Focus does not test all updates to Liberty but does periodically test the latest release of WebSphere Liberty against the latest available Micro Focus product release.

Micro Focus will make reasonable efforts to resolve product issues against supported releases of Liberty and in accordance with the Micro Focus product lifecycle policy. Micro Focus might require you to update to a newer release of Liberty to remedy a Support case.

Relational Database Management Systems (RDBMSs)

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All RDBMS testing is done on both 32- and 64-bit platforms based on RDBMS client software availability.

	Micro Focus Product Release		
RDBMS	**5.0**	**6.0**	**7.0**
Oracle 12.2, 12.2.0.1	X		
Oracle 18c (12.2.0.2)	X	X	
Oracle 19c (12.2.0.3)		X	X
Microsoft SQL Server 2012	X		
Microsoft SQL Server 2014	X	X	X
Microsoft SQL Server 2016	X	X	X
Microsoft SQL Server 2017	X	X	X
Microsoft SQL Server 2019		X	X
Microsoft Azure SQL Database			X
Microsoft Azure SQL Managed Instance			X
IBM DB2 LUW 10.5	X	X	X
IBM DB2 LUW 11.1	X	X	X
IBM DB2 LUW 11.5		X	X
IBM POWERLinux LE using DB2 LUW 10.5		X	
EDB PostgreSQL 10.x	X	X	X
EDB PostgreSQL 11.x		X	X
EDB PostgreSQL 12.x			X
GDG PostgreSQL 10.x	X	X	X
GDG PostgreSQL 11.x		X	X

	Micro Focus Product Release		
RDBMS	**5.0**	**6.0**	**7.0**
GDG PostgreSQL 12.x			X
Amazon Aurora for PostgreSQL 2.x (10.x)			X
Amazon Aurora for PostgreSQL 3.x (11.x)			X
MySQL 5.7	X	X	X

Database Client Software

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Client	Release	Micro Focus Component(s)
.NET Core database providers	Consult the RDBMS documentation specific to your installed RDBMS to determine which version(s) of .NET Core are compatible.	OpenESQL
ADO.NET	Consult the RDBMS documentation specific to your installed RDBMS to determine which version(s) of ADO.NET are compatible.	OpenESQL HCOSS
IBM Data Server Runtime Client, which includes Database Connectors, CLI, Database Connectors, and ADO.NET	Consult the IBM documentation specific to your installed RDBMS to determine which version(s) of IBM Data Server Runtime Client are compatible.	OpenESQL DB2 DB2 for HCO
IBM Data Server Client	Consult the IBM documentation specific to your installed RDBMS to determine which version(s) of IBM Data Server Client are compatible.	OpenESQL DB2 ECM
Oracle Client and Oracle Instant Client with Pro*COBOL	Consult the Oracle documentation specific to your installed RDBMS to determine which version(s) of Oracle Client or Oracle Instant Client are compatible.	OpenESQL COBSQL
IBM Informix ESQL/COBOL [1]	7.3 or later	
Database Connectors Drivers	Consult the RDBMS documentation specific to your installed RDBMS to determine which version(s) of Database Connectors Drivers are compatible.	OpenESQL
Microsoft OLE DB Provider for DB2	Consult the SQL Server documentation specific to your installed RDBMS to determine which version(s) of Database	HCOSS

Client	Release	Micro Focus Component(s)
	Connectors Drivers are compatible.	
Microsoft OLE DB Provider for SQL Server	Consult the SQL Server documentation specific to your installed RDBMS to determine which version(s) of Database Connectors Drivers are compatible.	HCOSS
Database Connectors Drivers	ODatabase Connectors 3.0-compliant drivers	
Sybase Open Client Embedded SQL/COBOL [1]	11.1 or later	
[1] Not tested.		

Middleware

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	Micro Focus Product Release		
Middleware	**5.0**	**6.0**	**7.0**
IBM WebSphere MQ 9.0	X	X	X
IBM TXSeries for Multiplatforms [1]	X	X	X
Oracle Tuxedo and Tuxedo ART [2]	X	X	X
[1] See the *IBM Web site* for a list of supported versions.			
[2] See the *Oracle Web site* for a list of supported versions.			

Before Installing

Downloading the Product

1. Log into the Software Licenses and Downloads (SLD) site at *https://sld.microfocus.com/mysoftware/download/downloadCenter*.
2. Select your account and click **Entitlements**.
3. Search for the product by using any of the available search parameters.
4. Click **Show all entitlements**.
5. Click **Get Software** in the Action column for the product you want to download or update.

   In the **File Type** column, you see entries for "Software" for any GA products, and "Patch" for any patch updates.
6. Click **Download** on the relevant row.

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 supported operating systems, see *Supported Operating Systems and Third-party Software* in your product documentation.

Note:

- A 64-bit Windows is required. You can produce both 32-bit and 64-bit applications with Visual COBOL installed on a 64-bit operating system.
- Support for development and deployment on Windows 7 has been discontinued.
- 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 Build Tools for Windows x64 is only supported on Windows 10 or Windows Server 2019 operating systems.

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.

- Besides the software listed below, the setup file also installs the 64-bit AdoptOpenJDK 11.0.8 (LTS) with Hotspot.
- This product includes OpenSSL version 1.1.1k-mf6 (modified).

Visual Studio IDE

You must have Microsoft's Visual Studio 2017 version 15.9.4 or a newer one or 2019 version 16.9 or a newer one installed in advance.

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

Various actions and operations within your COBOL development environment depend on certain files that Microsoft distributes in the following packages: the Windows SDK package and the Microsoft Build Tools

package. See *Microsoft Package Dependencies* for a full list of actions and operations that require one or both of these packages.

By default, the product installation installs the latest versions of the Microsoft Windows 10 SDK, and the Microsoft Build Tools for Visual Studio 2017, to their default locations.

If you need to use any other version of these packages, or use them installed to a non-default location, use the `cblms` command line utility post-installation to manage this; see *Managing the Microsoft Build Tools and Windows SDK Packages* for more information.

License Manager requirements

- The Micro Focus License Administration tool requires Java to run. It supports Java 1.7 or later.
- 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 any network license servers, you must update them before you update the client machines.
- If you are upgrading from Visual COBOL release 2.2 or earlier, uninstall the license manager before installing the product.

You can download the new version of the license server software by following these steps:

1. Log into the Software Licenses and Downloads (SLD) site at *https://sld.microfocus.com/mysoftware/download/downloadCenter*.
2. Select your account and click **Downloads**.
3. Select a product and a product version from your orders.
4. In the list of software downloads, locate the **License Manager**.
5. Click **Download** to download an archive with the installers.
6. Run the installer suitable for your Operating System to install License Manager on your machine.

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.
- Various actions and operations within your COBOL development environment depend on certain Microsoft files distributed in the following packages: the Windows SDK package and the Microsoft Build Tools package. By default, a standard product installation downloads and installs these. Refer to *Microsoft Package Dependencies* to see if these packages are required. If you do not plan to use your development tool in a way that will depend on any of these packages, you can run a non-standard installation, which will skip their download and installation, thus saving disk space and time taken for installation. Refer to *Advanced Installation Tasks* for details on the available installation options.

- If you already have Microsoft Build Tools for Visual Studio 2017 installed, you must ensure that it contains the Visual C++ build tools workload (or at least the individual components contained in that workload) before you run this installation.

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_70.exe` file (or `vcvs2019_70.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**, and rerun the installation file.
- Depending on how you plan to use the product, there could be dependencies on the Microsoft Windows SDK and Microsoft Build Tools packages. The installer will install the latest versions of the Microsoft Windows 10 SDK, and the Microsoft Build Tools for Visual Studio 2017, to their default locations. Refer to *Microsoft Package Dependencies* to see if you will require these packages, and if not, you can configure the installer to skip download and installation (see *Advanced Installation Tasks* for more information).
- Trial licenses cannot be used with remote desktop services. If you want to use your product in this way, please contact Micro Focus Customer Care 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 Customer Care

See this information on the Product Documentation pages on Micro Focus Customer Care, 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 6.0.

Visual COBOL Installation Options

To install Visual COBOL you run `vcvs2017_70.exe` which contains a number of product `.msi` files (Windows Installer packages). When run, `vcvs2017_70.exe` performs some initial system checks then sequentially installs the `.msi` files.

Note: The following applies to `vcvs2019_70.exe` when installing the product for Visual Studio 2019.

`vcvs2017_70.exe` can take a number of parameters, enabling you to specify a number of different types of installation:

- Standard Installation

  Format:
  `vcvs2017_70.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-standard Installation

  Format:
  `vcvs2017_70.exe skipmstools=1`
  Summary:
  Full installation, minus the Microsoft package dependencies. A standard installation downloads and installs the latest Microsoft Build Tools (for Visual Studio 2017) and Windows SDK packages. Refer to *Microsoft Package Dependencies* to see if you will depend on these packages, and if not, use the option above to skip installation of the packages, thus reducing the footprint and duration of the installation process.
- Non-interactive Installation

  Format:
  `vcvs2017_70.exe /passive`

Summary:
Full installation, but the components are installed non-interactively using default options and directories.

- Silent Installation

  Format:
  ```
  start /wait vcvs2017_70.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_70.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_70.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.

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 Customer Support Documentation 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 8.1, and Windows Server 2012 R2	• From your Windows desktop, click the **Visual Studio 2017** tile.
Windows 10 and Later	• From your Windows desktop, click **Start > Visual Studio 2017**.

Managing the Microsoft Build Tools and Windows SDK Packages

There are a number of COBOL development features that depend on the Microsoft Build Tools and Windows SDK packages. By default, the product installer downloads and installs these packages to their default locations. The installer then sets your COBOL environment to depend on those downloaded versions.

You can use the Microsoft Build Tools and Windows SDK Packages configuration utility - `cblms` - to view which versions are in use, and also configure your COBOL environment if you require something other than the standard usage.

For example, some project types (for example, .NET Core) require a different version of the Microsoft Build Tools (the Visual Studio 2019 version) than the one installed (the Visual Studio 2017 version). If you have already installed the correct version for .NET Core, run `cblms` after product installation, to update your environment to use the correct package.

There is an option within the product installer to skip the installation of the default packages (`skipmstools=1`); however, this does skip both packages, so make sure that you do already have the package(s) that you require before setting this - see *Microsoft Package Dependencies* for details on the package(s) you may require.

The Microsoft Build Tools and Windows SDK Configuration Utility

Use the `cblms` command line utility to view and set the package versions in effect for your COBOL environment.

Important: If you are updating or clearing package versions, you must run this utility from a command prompt with administrative privileges.

Syntax:

```
cblms <option>
```

Parameters:

Note: <*option*> settings are case insensitive.

<*option*> can be one of:

-U

Updates the COBOL environment to use the latest versions of the Microsoft Build Tools and SDK packages that are located in the default folders. Any open IDE instance or command prompt must be restarted before these changes take effect.

-U<*ms-pkg*>

Updates the COBOL environment to use the latest version of the particular package type that is located in the default folder. Any open IDE instance or command prompt must be restarted before these changes take effect.

-U<*ms-pkg*>:<*version*>

Updates the COBOL environment to use a specific version of the particular package type that is located in the default folder.Any open IDE instance or command prompt must be restarted before these changes take effect.

-U<*ms-pkg*>:<*path*>

Updates the COBOL environment to use the latest version of the particular package type that is located in the (non-default) folder specified. Any open IDE instance or command prompt must be restarted before these changes take effect.

-U<*ms-pkg*>:<*path*>?<*version*>

Updates the COBOL environment to use a specific version of the particular package type that is located in the (non-default) folder specified. Any open IDE instance or command prompt must be restarted before these changes take effect.

-L

Lists all versions of the Microsoft Build Tools and SDK packages that are located in the default folders.

-L<*ms-pkg*>

Lists all versions of a particular package type that are located in the default folder.

-L<*ms-pkg*>:<*path*>

Lists all versions of a particular package type that are located in the (non-default) folder specified.

-Q

Displays the versions currently in use by the COBOL environment.

-Q<*ms-pkg*>

Displays the version of the selected package type that is currently in use by the COBOL environment.

-R

Clears all version information. (Only use this option when instructed to by Customer Care.)

-H

Displays the available command line options.

Legend:

<ms-pkg>	<*ms-pkg*> can be one of **S** or **SDK** for the Microsoft SDK, or **B** or **BT** for the Microsoft Build Tools.
<path>	<*path*> is the path in which to locate packages that are not installed to the default location for their package type.
<version>	<*version*> is the package version with which to update when the latest version is not the one required. When specifying *version*, it must be in the form: • *n.n.n.n* for a Windows SDK • *n.n.n* for Build Tools • *n* for list ID - the list ID is displayed using `cblms -L`.

The following example updates the COBOL environment to use version 10.0.17134.0 of the Windows 10 SDK, installed in `C:\WinSDK\10`.

```
cblms -USDK:C:\WinSDK\10\10.0.17134.0
```

Viewing the Product Help

Visual COBOL is configured to display the product help available online on the Micro Focus Customer Care website: *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**.
- Ensure that you have an up-to-date version of your 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 Customer Care website 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, 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:

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.

During the uninstall process, only those files added during the installation (to the installation and Samples directories) are removed. If the installation installed the Microsoft Windows 10 SDK or Microsoft Build Tools packages, these are left in place, although the Micro Focus-related registry entries for these packages are removed.

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 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 Customer Care*.

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. Copy the authorization code which you were sent after registering for Personal Edition, and paste it into the **Authorization code** field.
3. Click **Finish**.

   You should receive a message that the activation has been successful.

To buy and activate a full unlimited license

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

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

To start Micro Focus License Administration

To start the GUI Micro Focus License Administration

Windows 8.1, and Windows Server 2012 R2	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**.

To start the command-line Micro Focus License Administration tool

1. At a command prompt, navigate to:

   ```
   C:\Program Files (x86)\Micro Focus\Licensing
   ```

2. Type `cesadmintool.bat`, and press **Enter**.

Installing licenses

You need either a license file (with a `.mflic` extension for Sentinel RMS licenses or an `.xml` extension for AutoPass licenses) or an authorization code which consists of a string of 16 alphanumeric characters (Sentinel RMS licenses only). You need to install AutoPass licenses into the existing Micro Focus License Administration tool, and not in the AutoPass License Server.

If you have a license file

To use the GUI Micro Focus License Administration

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` or `.xml`).
   - Drag and drop the license file from Windows Explorer to 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 either `.mflic` or `.xml`), 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.

To use the command-line Micro Focus License Administration tool

1. Start the command-line Micro Focus License Administration tool.
2. Select the **Manual License Installation** option by entering `4`.
3. Enter the name and location of the license file.

If you have an authorization code

Note: Authorization codes are only available with Sentinel RMS licensing.

Authorizing your product when you have an Internet connection

Note:

- This topic only applies if you have an authorization code. Authorization codes are only available with Sentinel RMS licensing.
- 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.

To use the GUI Micro Focus License Administration

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.

To use the command-line Micro Focus License Administration tool

1. Start the command-line Micro Focus License Administration tool.
2. Select the **Online Authorization** option by entering `1` and pressing **Enter**.
3. Enter your authorization code at the **Authorization Code** prompt and then press **Enter**.

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

Note: This topic only applies if you have an authorization code. Authorization codes are only available with Sentinel RMS licensing.

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.

To use the GUI Micro Focus License Administration

1. Start Micro Focus License Administration.
2. On the **Install** tab, click **Manual Authorization**.
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 Customer Care 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 Customer Care 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 use the command-line Micro Focus License Administration tool

In order to authorize your product from the command-line Micro Focus License Administration tool you must have the following:

- Access to a computer which is connected to the Internet.
- Your authorization code (a 16-character alphanumeric string).
- The machine ID. To get this, start the Micro Focus License Administration tool and select the **Get Machine Id** option by entering 6. Make a note of the "Old machine ID".

If you have previously received the licenses and put them in a text file, skip to step 6.

1. Open the Micro Focus license activation web page *http://supportline.microfocus.com/activation* in a browser.
2. Enter your authorization code and old machine ID and, optionally, your email address in the **Email Address** field.
3. Click **Generate**.
4. Copy the licenses strings from the web page or the email you receive into a file.
5. Put the license file onto your target machine.
6. Start the Micro Focus License Administration tool and select the **Manual License Installation** option by entering 4.
7. Enter the name and location of the license file.

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 Customer Care.

Updates and Customer Care

Our Web site provides up-to-date information 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:

- Product Updates on *Software Licenses and Downloads*, where you can download fixes and documentation updates.

  1. Log into the Software Licenses and Downloads (SLD) site at *https://sld.microfocus.com/mysoftware/download/downloadCenter* .
  2. Select your account and click **Entitlements**.
  3. Search for the product by using any of the available search parameters.
  4. Click **Show all entitlements**.
  5. Click **Get Software** in the Action column for the product you want to download or update.

     In the **File Type** column, you see entries for "Software" for any GA products, and "Patch" for any patch updates.
  6. Click **Download** on the relevant row.
- The *Examples and Utilities* section of the Micro Focus Customer Care 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 Customer Care 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/en-us/home/* in your browser to go to the Micro Focus home page, then click **Support & Services** > **Support**. Type or select the product you require from the product selection dropdown, and then click **Support Login**.

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 *Micro Focus Channel on YouTube*.

https://www.microfocus.com/en-us/resource-center/webinar

Information We Need

If your purpose in contacting Micro Focus is to raise a support issue with Customer Care, you should collect some basic information before you contact us, and be ready to share it when you do.

See the *Preparing to Raise a Support Case* topic on the Product Documentation pages on Micro Focus Customer Care, in the product help for Visual COBOL for Visual Studio 2017 (*click here*) or Visual COBOL for Visual Studio 2019 (*click here*).

Creating Debug Files

If you encounter an error when compiling a program that requires you to contact Micro Focus Customer Care, 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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