



# Micro Focus Visual COBOL 7.0 for ISVs

Release Notes

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

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# Micro Focus Visual COBOL 7.0 for ISVs 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

The Micro Focus Visual COBOL for ISVs package comprises the following products which you can download from your Electronic Product Delivery Note:

- Visual COBOL for Visual Studio - delivers the richest development experience for COBOL programming available on Windows using Microsoft's Visual Studio 2017 or 2019. Visual COBOL supports the development and deployment of both managed .NET and native COBOL applications.
- Visual COBOL for Eclipse - provides an Eclipse-based integrated COBOL development environment for Windows or Linux. Provides COBOL JVM support and enhanced compatibility with ACUCOBOL. Can be used standalone for developing local applications or in conjunction with the Development Hub to develop remote projects in Linux and UNIX.
- Visual COBOL Development Hub - provides a rich desktop development environment based on the Eclipse IDE with high-performance server-based tools for managing builds, source code access and debugger engine. The Development Hub also provides a central administration site, simplifying the development tool distribution and maintenance process.

## 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.

If you are using Eclipse, Visual COBOL can automatically relink existing projects created with Visual COBOL earlier than 4.0 that have executable link artefacts. Eclipse displays a warning in the **Problems**

view that the project requires relinking. It then offers a Quick Fix action for you to execute that will link your project with the most recent version of the Run-Time System.

# What's New

Enhancements are available in the following areas:

- [Micro Focus COBOL Extension for Visual Studio Code](#) on page 6
- [.NET Core Support](#)
- [COBOL Language Enhancements](#)
- [Code Analysis](#)
- [Code Set Support](#)
- [Compiler Directives](#)
- [Containers Support](#)
- [Database Access - OpenESQL](#)
- [Data File Tools](#)
- [Eclipse Integration](#)
- [Enterprise Server](#)
- [Enterprise Server Common Web Administration](#)
- [Enterprise Server Security](#)
- [Library Routines](#)
- [Licensing Technologies](#)
- [Micro Focus Unit Testing Framework](#)
- [Visual Studio Integration](#)

## 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 Visual Studio IDE.

This functionality is available in the following products:

- Visual COBOL for Eclipse
- Visual COBOL for Visual Studio
- Visual COBOL Development Hub

## COBOL Language

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

- **.NET COBOL and JVM COBOL data type to hold strings of utf-8 characters** - support is now available in .NET COBOL and JVM 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. In Eclipse, you can access this from the context menu or from the Analysis Server Explorer.
- The Data Flow Analysis in Visual Studio 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.
- Import points of interest - the Code Analysis view in Eclipse now includes a new button,  (**Import points of interest**).

## 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 MF CODESET 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.
- EXEC SQL-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 Built 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.

## Eclipse Integration

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This release includes enhancements in the following areas:

- **Supported Eclipse versions** - this release supports Eclipse 4.16 (2020-06), which is shipped and installed with Visual COBOL.  
Versions of Eclipse prior to this one are not supported.
- **Micro Focus Search** - the search has been enhanced to filter results on the build action: in the **Limit To** section, select **Files configured for compilation** to only include files in the search results that have a build action set to **Compile**. The search results also include a new column, **Build Action**, that shows the current action for each file.
- **Formatting profiles** - the formatting and clean up preferences for your COBOL code are now stored in profiles. You can have many profiles per workspace, allowing you to easily switch between different sets of formatting for different projects. The profiles can also be shared between local workspaces and to other users, allowing developers to format code consistently throughout their team.
- The following new preferences have been added:
  - **Force native line endings when pasting with Ctrl + Shift + V**, available from **Micro Focus > COBOL > Editor**: this option produces line endings native to the local operating system.
  - **Show Compiler directive summary in editor**, available from **Micro Focus > COBOL > Editor > Compiler Directives summary**: this option shows a summary of the Compiler directives in effect, in the editor.

## 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.
- CBL\_CREATE\_STACKDUMP - generates a stackdump file.

## 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.
- In Eclipse, remote unit test projects for native COBOL can now be stored and run from Visual COBOL Development Hub.

## 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](#)
- [Compiler](#)
- [Data Tools](#)
- [Eclipse IDE](#)
- [Enterprise Server](#)
- [File Handling](#)
- [Header-to-COPY Utility](#)
- [Interface Mapping Toolkit](#)
- [Licensing requirements](#)
- [Reverse Debug and Live Recording](#)
- [Run-time System](#)
- [SQL: OpenESQL](#)

## 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)

## Eclipse IDE

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- In Server Explorer, the "associate with project" option is no longer available for remote servers. Remote servers are defined as any belonging to a remote directory server or remote ESCWA.

(57093)

- The Format Program option is no longer available for projectless files. Instead, select the Format option and the text you want to format.

(8743)

- Customers using Eclipse on Windows who connect to a Development Hub on UNIX can now create remote unit test projects. Remote unit test projects are available for native COBOL when you use a Samba or RSE connection to the DevHub.

3164533 (13318)

- Within a debug configuration for a remote project, you can now specify source files and debug symbol files that reside on remote hosts other than the one containing the remote project.

00363627 (12609)

- When starting a server from Server Explorer, if that server is unsecured, you are not prompted to add any credentials.

(62136)

## 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)

- We now take note of VALUE clauses for fields and properties defined in a JVM attribute (annotation), and output the default value to the class file. When using an attribute, any field that does NOT have a default value must now be specified explicitly.

(30021)

- MQ commands did not work because Windows installations of MQ are client, not server. This has been corrected.

(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)

## Licensing requirements

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- The following platforms - Solaris, Red Hat on IBM Z System, SUSE on IBM Z System, and Ubuntu - are now licensed using a new licensing model called AutoPass. These platforms and licenses are not available from the Software Licenses and Download portal ([sld.microfocus.com](http://sld.microfocus.com)) if you are using the

existing SafeNet license technology. To obtain AutoPass licenses for the aforementioned platforms, contact your account manager to discuss your actual requirements, and also raise a support incident to track the request.

## Reverse Debug and Live Recording

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- Reverse Debug and Live Recording functionality is licensed and installed separately from [undo.io](#). From this release forward, you can enable reverse debug functionality by downloading the extension from the [Micro Focus Marketplace](#).

## 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.
- Oracle does not support deployed .NET Core 3.x client applications on SUSE Enterprise Linux accessing Oracle databases.
- 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](#)
- [Code Analysis](#)
- [Common Communications Interface](#)
- [Compiler](#)
- [Data Tools](#)
- [Data Tools \(Classic\)](#)
- [Debugging](#)
- [Documentation](#)
- [Eclipse IDE](#)
- [Enterprise Server](#)
- [File Handling](#)
- [Interface Mapping Toolkit](#)
- [Java Artifacts](#)
- [Micro Focus Server Administrator \(GUI\)](#)
- [Run-time System](#)
- [Setup Issues \(UNIX\)](#)
- [Setup Issues \(Windows\)](#)
- [SQL: COBSQL](#)
- [SQL: DB2 ECM](#)
- [SQL: OpenESQL](#)
- [Visual Studio IDE](#)
- [XML Support](#)

## 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)
- Enterprise Server for UNIX and COBOL Server for UNIX now include the same Run-Time System and CCI C header files that are available in Enterprise Developer Unix Components and in Visual COBOL Development Hub.  
3230929 (13552)
- 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

### [Back to the list](#)

- 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)
- Within the Eclipse IDE, hovering over a data item which is part of an arithmetic expression, now shows the correct content of that item.  
00506208 (69314)
- 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)
- Within the Eclipse IDE, hovering over a data item which is part of an arithmetic expression, now shows the correct content of that item in the tooltip.  
00491644 (69551)
- 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 a large numeric data item (with more than 18 decimal digits) was used as a parameter to a method expecting a java.lang.Long object, bad code was generated, which resulted in a run-time error. This is now fixed.  
00370452 (28056)
- When multiple programs are compiled concurrently, it is possible that two compilation units attempt to create the same Ref type (generated as containers for reference parameters) at the same time, resulting in file locked errors. A fix has been made that means if such an implicit class already exists, an attempt to recreate it is not made, and the compilation proceeds normally.  
(60005)
- When compiling for JVM, if the parameter list for a procedural COBOL program includes a long numeric passed by value, followed by a group item passed by reference, and the program is compiled with the ILSMARTLINKAGE directive, incorrect code was generated for the extra typed method. This is now fixed.  
00371913 (27057)
- 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 mfsi.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 mfbisjcl was cancelled from a scheduler. This has been resolved by returning an abend S222 instead.

00366666 (12724)

- The mfbis.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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- An issue has been fixed where an RTS 114 error was thrown when attempting to run Animator (ANIM) on a large core-dump file (approx 4.5GB+) in 64bit mode.  
00454504 (57137)
- 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)
- On Ubuntu, in order for debugging to work within a Docker version 18.04 Container, you must update the kernel of the Docker host from version 5.0.0-27 to 5.0.0-31.  
(9295)

## 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)
- If a build is producing java.lang.OutOfMemoryError errors, you can try increasing the amount of memory available to the heap. Increase the maximum amount allowed by using the -Xmx parameter in the cobjvm.cfg file.  
00367351 (13272)
- 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)
- Documentation updated to highlight a difference in behavior when using CBL\_DIR\_SCAN\_READ for native COBOL, on a UNIX platform: the '.' and '..' directories are not returned if bit 1 of the search-attribute is set for CBL\_DIR\_SCAN\_START; whereas, for JVM COBOL, those entries are returned.  
(9557)
- 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 MF CODESET 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)
- The documentation for the dbfhdeploy command has been updated with a reminder to escape any semicolons with a backslash on UNIX platforms.  
(9565)
- 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 restriction documented for multi-preprocessor usage has been updated to state that it is supported for native COBOL, and for JVM COBOL that uses the 'dynamic calls' feature.  
3234218 (12614)

- 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)
- The Server for COBOL 5.1 for UNIX product have been made available at [https://supportline.microfocus.com/Documentation/books/es51sx02/espubb.htm?\\_ga=2.88126877.763212273.1598017839-160368923.1595923556](https://supportline.microfocus.com/Documentation/books/es51sx02/espubb.htm?_ga=2.88126877.763212273.1598017839-160368923.1595923556)  
00370782 (13509)
- 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 software requirements have been updated to indicate that the 32-bit gcc libraries are not required for Red Hat 7 and Red Hat 8.  
3222619 (12400)
- The 'Using Breakpoints and Watchpoints' topic has been updated to include more detailed information on breakpoints.  
(8289)
- A JVM COBOL tutorial has been reintroduced to the documentation: 'Tutorial: Packaging JVM COBOL' covers how to package JVM COBOL applications as JAR files.  
(9247)
- The list of available samples, as noted in the documentation topic 'Demonstrations of COBOL', has been updated to include:- OESQL - Shared Connection COBOL to Java (JVM)- OESQL - Shared Connection Java to COBOL (JVM)  
(8803)
- The documentation for deploying JVM COBOL applications has been updated to include a number of files that are required depending on the content of your COBOL. You must include:
  - mfidmr.jar if the application uses JSON PARSE syntax
  - mfsq1jvm.jar if the application uses SQL syntax
  - mfle3790.jar if the application uses any LE Callable Services APIs
 00367560 (27058)
- 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)

- The EJB Service Interface tutorial has been updated to state the need to create a 32-bit project, in order for it to work with the 32-bit enterprise server region that is utilized later in the tutorial.  
(26287)
- If you are using Java 11 for any JVM COBOL tutorials, additional prompts may appear relating to Java modularization; these can be ignored for the purposes of the tutorials.  
(57507)
- The MFUnit tutorial in Eclipse (Tutorial: Running Unit Tests in the IDE) has been slightly updated with regards to screenshots matching the program names created in the instructions.  
(61245)

## Eclipse IDE

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- When dealing with standalone files, the .idy files available during debug are now also used when parsing the standalone files.  
00369039 (11715)
- An issue that prevented you from connecting with Server Explorer if credentials had been cleared has been fixed.  
(9467)
- The "COBCH0766S Failed to create class file" error is no longer reported when a project is built by using multiple concurrent compilations/links.  
(60007)
- The COBCH0766S Failed to create class file error is no longer reported when a project is built by using multiple concurrent compilations/links.  
(60006)
- A performance issue when using the cursor keys or Page up/down keys in the editor has been fixed.  
00373503 (13616)
- When the "Use dynamic calls" option is enabled, files that have a build action of "Ignore" are now correctly ignored during a build.  
00367558 (11730)
- JVM COBOL source that is part of a linked resource can now be compiled as a single file.  
3236418 (12723)
- When launching a server check via the 'Diagnose connection problems' option, additional information is now displayed if timeouts are exceeded.  
00373492 (11752)
- After the JSON GENERATE statement is executed, the Variables view is populated with the expected variables.  
00378392 (31044)
- During a connection diagnostics check, an issue with locating the xterm executable through an ssh connection when there is a MOTD (message of the day) on the remote machine has been fixed.  
00373492 (12657)
- Error checking in the Diagnose Remote Connections process has improved in respect of checking for write access errors.  
00373492 (13420)
- The Server Explorer view now contains a filter option (similar to the one in COBOL Explorer view) that enables you to filter the servers displayed in the view.  
00371167 (11483)

- An issue when updating a file and then saving the changes while comparing 2 COBOL files in Compare mode has been resolved.  
00457183 (58116)
- The Micro Focus search has been enhanced with a new 'Limit to files configured for compilation' option. Select this option to remove all files that have a Build Action set to Ignore from the search results. The Results pane has a new 'Build Action' column, which can be used to sort files based on their Build Action.  
00371168 (13301)
- An issue was identified when generating web service information and the CHARSET directive for a file was not set to the default for the specified COBOL dialect. This has been resolved.  
00725150 (73147)
- Edit/Browse dataset member menu items are now available on multi-line DSN statements.  
3229382 (13308)
- `mffilelist` elements inside COBOL build files can now be nested. See the *mffilelist* reference topic in the Micro Focus Ant User Manual for more information and examples.  
3232287 (13594)
- An issue with the connection diagnostic check for an installed xterm, where a motd ('message of the day') configured on the DevHub machine caused the check to fail, has been resolved.  
(5685)
- In the Micro Focus Build preferences pane, the "Each part of the package name corresponds to a subdirectory" option has been renamed to "Package to subdirectory matching". Its functionality remains unchanged.  
(6945)
- Japanese translations in various property pages within Eclipse have been corrected.  
(10518)
- An issue was identified in the generation of dependency information when projects were placed in paths of certain lengths. This has been resolved.  
3231446 (13440)
- Support for nested programs in the Program Flow view has now been implemented, and will now correctly display the graph for a nested program when invoked from the Outline views or the COBOL editor.  
00366795 (71348)
- An issue was identified when using code slicing features with Samba remote projects, in that the path to the analysis information was not being correctly calculated. This has now been fixed.  
3232148 (13311)
- On the Development Hub, an issue where code slicing could break if the code being analyzed contained non-utf8 characters has been fixed.  
3238283 (11612)
- When performing a column-based text search in the COBOL editor, the end column specified was not included in the search (so specifying a search between columns 1-6 would actually only look in columns 1-5). This has been fixed so that the specified end column is included in the search.  
00375087 (30042)
- In Eclipse, a new option has been added to the editor preferences, Force native line endings..., which when selected, causes any code pasted into a COBOL editor using the Ctrl+Shift+V key combination to be inserted using line endings appropriate to the local operating system.  
00375702 (57254)
- When traversing child variables of a parent, in order to find their memory addresses, operation did not always stop when a child was found; Instead, it was continuing through all children. Therefore, in some

cases, when an array and its DEPENDING ON variable happened to be in the same memory block, the result was an infinite loop of calls, and hence a stack overflow occurred. Now, the loop is stopped when the proper variable is found.

3236284 (13446)

- A new preference has been added to allow all Micro Focus source file editors in Eclipse to be opened in overwrite mode instead of the (default) insert mode. Select Window > Preferences > Micro Focus > General > Editor > open Micro Focus editors...

00371258 (13454)

- An issue with file-level settings when the source file was included via a linked folder located within a subfolder of the project has been fixed; however, you may be required to delete the `.cobolBuild` file from the project, to force it to be regenerated.

00371255 (13503)

- ILSMARTNEST is now working properly - the data hierarchy in a COBOL program can now be represented correctly as an inner static class, or classes.

00367559 (26067)

- The Eclipse preprocessor sample readme now correctly displays within the Samples Browser.

00373585 (11558)

## 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)

- Using the AMODE option to request a reload of a data table using the CPMT transaction sometimes resulted in a FUNC abend. This has been fixed.

00726248 (77027)

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

3232615 (11548)

- The Enterprise Server utility program `casclsec` did not work correctly on non-Windows platforms. This has been fixed.

00365438 00375691 (12562)

- 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)

- Ensure that for protected starts the recoverable flag is set on the TST entry that is cached on the TCA TST chain.

00367517 (53093)

- 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)

- On UNIX platforms, under certain circumstances the request to start a process was incorrectly reported as having failed. This has been fixed.

00696684 (82001)

- 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 binary repository exports (non-XML exports) in Visual COBOL and Enterprise Developer 6.0 could contain listener data that was not cross compatible if imported on certain UNIX platforms that did not create the exports.  
(61176)
- 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 MFICODESET 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 MFICODESET\_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)
- Changing the status of a listener through ESCWA no longer times out on UNIX.  
(71113)
- 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 from 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

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- 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 `dbfhadm` 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 `dbfhadm` 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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- Generated clients that use InvokeService04 will now compile and run correctly on UNIX.  
3233543 (13384)
- 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 `ws21s`, unions are now mapped with their default whitespace behavior as collapsed.  
3237304 (13437)
- For `ws21s`, 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 IBM HWTJxxxx APIs for processing JSON messages are now available on UNIX.

3238012 (12540)

- 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)
- Reading from STDIN, via the `CBL_READ_FILE` API, has been enhanced when stdin is being redirected from a pipeline on UNIX. Previously, a 9/18 status would be returned if a large record was requested but only some of the data had been written in the pipeline. Now, multiple OS device reads will be used, if required. The subsequent OS device reads will block if there is no data available yet.  
00371948 (11519)
- `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)
- During compilation, `libjvm.so` is now correctly located when using AdoptOpenJDK.  
(52067)
- `.NET COBOL` and `JVM COBOL` programs compiled with `REENTRANT"2"` now produce instance methods, whereas previously, compilation of these programs produced static methods. If your non-COBOL code relies on these methods being static, you will have to refactor your code to handle this; or for `.NET COBOL` only, recompile the code with the `ILSTATIC` directive.  
(26049)

### Setup Issues (UNIX)

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- If MFDS is started and attempts to use a zero sized XML options file, instead of terminating with an error it will write out the default options and continue to operate.  
(53015)

### Setup Issues (Windows)

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- 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 validation 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

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- 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 OPTIMIZE 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.

# Installation

## 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.

### System Requirements

#### System Requirements for Visual COBOL for Visual Studio

##### 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 `cb1ms` 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.

## System Requirements for Visual COBOL for Eclipse (Windows)

### Hardware Requirements

Visual COBOL has the following requirements in addition to the requirements of Eclipse. See the Eclipse documentation for details of its requirements.

The disk space requirements are, approximately:

<b>Visual COBOL</b>
2.6GB



**Note:** The disk space requirements include the size of the Eclipse IDE and the version of Java and the .NET Framework provided with the Visual COBOL setup file. This includes the space needed to cache information locally so that you can modify the installation without the original source media.

### Operating Systems Supported

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

Also note the following:

- A 64-bit Windows is required. Visual COBOL installs fully only on 64-bit Windows platforms. On 32-bit Windows, the setup file does not install some of the components. See *Issues with the Installation in Known Issues and Restrictions*.

You can produce both 64-bit and 32-bit applications with Visual COBOL on 64-bit operating systems.

- 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.
- The Server Core form of Windows Server 2019 is not supported.

### Software requirements



**Note:** This product includes OpenSSL version 1.1.1k-mf6 (modified).

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

### Requirements for the setup file

- A 64-bit Windows is required. Visual COBOL installs fully only on 64-bit Windows platforms. On 32-bit Windows, the setup file does not install some of the components. See *Issues with the Installation in Known Issues and Restrictions*.
- The setup file installs Visual COBOL and the 64-bit version of Eclipse 4.16 (2020-06).
- The installation requires Java v11 or later such as AdoptOpenJDK 11. If not found on the machine, the setup file will install AdoptOpenJDK 11 (LTS).
- Visual COBOL only supports the 64-bit version of Eclipse. You can use the 64-bit Eclipse to create both 32-bit and 64-bit applications.
- The setup file also installs Microsoft's Visual C++ 2012, 2013 and 2017 Redistributables.

## Requirements for running the product

- Java 11 (64-bit) is required to run the Eclipse IDE. The minimum recommended version is AdoptOpenJDK's OpenJDK 11 (LTS) with HotSpot, which the Windows product installs automatically. You can download AdoptOpenJDK's OpenJDK 11 (LTS) with HotSpot from [AdoptOpenJDK's Web site](#) and unpack the archive anywhere on your machine.
- Visual COBOL requires a 64-bit Java installation to run a 64-bit Eclipse.
- Microsoft Windows SDK and Microsoft Build Tools: 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 `cb1ms` command line utility post-installation to manage this; see *Managing the Microsoft Build Tools and Windows SDK Packages* for more information.

See *Java Support Restrictions* in the product help for any considerations when using Eclipse and Java.

## 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.

## System Requirements for Visual COBOL for Eclipse (UNIX)

### Hardware Requirements for Visual COBOL for Eclipse

Visual COBOL has the following requirements in addition to the requirements of Eclipse. See the Eclipse documentation for details of its requirements.

The disk space requirements are approximately:

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
x86-64 running Red Hat Linux	Micro Focus	1.11 GB	4.42 GB	2.21 GB	50 MB

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
x64 running SUSE SLES	Micro Focus	924 MB	3.70 GB	1.85 GB	50 MB

## Operating Systems Supported

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

On SUSE 12 and 15 you can only install and use the 64-bit version of this product. You can still produce both 64-bit and 32-bit applications on 64-bit operating systems.

## Software Requirements

The setup file requires that the following software and libraries are installed before you start the installation, and that certain environment variables are set.

- [Software required by the setup file](#)
- [Libraries required by the setup file](#)
- [Required environment variables](#)
- [Software installed by the setup file](#)
- [Requirements for running the product](#)
- [License Manager requirements](#)

## Software required by the setup file

The following software must be installed in advance:

- Java v11 or later such as AdoptOpenJDK 11 (LTS) with HotSpot or later.
- The unzip utility.
- The "awk", "ed", "ps", "sed", "tar", "sed", and "which" utilities must be installed and added to the PATH.
- The pax archiving utility. Pax is distributed with most UNIX and Linux systems but, if it is missing, you must install it separately. To verify pax is installed, run `pax --help` or `pax --version` at the command line.

On Red Hat 8.1, pax is no longer installed by default. You must install the spax version found in the OS ISO. Use the `yum install spax` command.

- If SELinux is installed and you plan to use anything other than core COBOL functionality, or plan to use Enterprise Server within an environment with ASLR enabled, the "SELINUX" configuration must be disabled. To do this, set `SELINUX=disabled` in `/etc/selinux/config`.

## Libraries required by the setup file

The 32-bit libraries listed below are required on both 32-bit and on 64-bit Operating Systems for this product to install and work correctly.

If installing on a 64-bit OS, the 32-bit libraries are not installed by default and must be installed before you start the installation.



Library	Bitism		Platform					
	32-bit	64-bit	SUSE 12 <sup>1</sup>	SUSE 15 <sup>1</sup>	Red Hat 7	Red Hat 8	CentOS 8.2	Ubuntu 20.4
glibc <sup>2</sup>	X	X			X	X		
libgcc	X	X			X	X		
libgc1c2		X						X
libstdc++	X	X			X	X		
glibc-locale <sup>3</sup>	X	X	X	X				
libXtst6		X	X	X				X
libXtst		X			X	X	X	
glibc-devel	X	X			X		X	
gtk3		X			X <sup>7</sup>	X <sup>7</sup>	X	
PackageKit-gtk3		X			X <sup>7</sup>	X <sup>7</sup>	X	
libcanberra-gtk3		X			X <sup>7</sup>	X <sup>7</sup>	X	
webkitgtk3		X			X <sup>7</sup>			
webkit2gtk3		X				X <sup>7</sup>	X	
xterm	Any version	Any version	X	X	X		X	
unzip	Any version	Any version	X	X	X		X	
libgnome		X			X			
libgtk-3-0		X	X <sup>7</sup>	X <sup>7</sup>				X
gtk3-tools		X	X <sup>7</sup>	X <sup>7</sup>				
gcc <sup>45</sup>	X	X	X	X	X	X		
cpp <sup>4</sup>		X			X	X		
libnotify-tools <sup>6</sup>		X	X	X				X
libnotify		X						X
libjasper1		X	X					X
libjasper4		X		X				



**Note:**

- Libraries marked with an 'X' are not included in the platform and need to be installed separately.
- <sup>1</sup>On SUSE 12 or 15, you can only install the 64-bit version of Visual COBOL. The glibc-locale-32bit library is still required by the SafeNet licensing components.
- \* Additional libraries required to use the core\_on\_error runtime variable. The gdb packages (for the GNU Project Debugger) can be installed from the install media for your OS.

- <sup>2</sup>The glibc-locale-32bit library is only required if you want to install the SafeNet licensing components. If this is present, the installer installs and configures both SafeNet and AutoPass licensing. If glibc-locale-32bit is not installed, the installer only installs AutoPass licensing.
- <sup>3</sup>On 64-bit Red Hat 7, you only need to install glibc-2.17\*.x86\_64 and glibc-2.17\*.i686.
- <sup>4</sup>On Red Hat, these libraries are required to enable COBOL to compile.
- <sup>5</sup>On Red Hat, only the 64-bit gcc libraries are required.
- <sup>6</sup>For SUSE 12 and later, you might need to install the Notifications Library tools (libnotify-tools). This is to enable notifications to be displayed by the notify-send tool when starting Visual COBOL for Eclipse from a desktop icon. Execute the following command to install the libnotify-tools library:  

```
zypper install libnotify-tools
```
- <sup>7</sup>The minimum GTK support required is 3.20. Certain platforms meet this requirement without the need of installing the libraries manually; for example Red Hat 7.4 and SUSE 12 SP3.

## Required environment variables

Before you start the installation, you need to set the environment as follows:

- Set the JAVA\_HOME environment variable. When installing the product, set this variable to a 64-bit Java installation or the installation terminates. For example, execute the following:

```
export JAVA_HOME=java_install_dir
```

where *java\_install\_dir* is the path to the JAVA installation directory such as */usr/java/javan.n*

- Add \$JAVA\_HOME/bin to your system PATH variable. To do this, execute:

```
export PATH=$JAVA_HOME/bin:$PATH
```

- You need to set the LANG environment variable to pick up localized messages. If you do not set it as specified here, the installation will run but you might experience unexpected behavior from the installer.

The LANG settings are English and Japanese only so set it to one of the following 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
```

You can set LANG before running the setup file as follows:

```
export LANG=C
```

Alternatively, add it to the start of the setup command line:

```
LANG=C ./setupfilename
```

See *Using the LANG Environment Variable* for details.

## Software installed by the setup file

- The setup file installs Visual COBOL and the 64-bit version of Eclipse 4.16 (2020-06). After the installation, you can install Visual COBOL as a plug-in into other Eclipse 4.16 (2020-06) instances available on the same machine - see *Installing Visual COBOL into other instances of Eclipse*.



**Note:** On SUSE platforms, you can only use the 64-bit version of Eclipse to produce 64-bit applications; on other 64-bit platforms, you can use Eclipse to produce both 32-bit and 64-bit applications.

- Xterm, the terminal emulator for the X Window System, is part of your UNIX/Linux distribution but is not installed by default. Use your UNIX/Linux installation media to install it.

## Requirements for running the product

- Java 11 (64-bit) is required to run the Eclipse IDE. The minimum recommended version is AdoptOpenJDK's OpenJDK 11 (LTS) with HotSpot, which the Windows product installs automatically.

You can download AdoptOpenJDK's OpenJDK 11 (LTS) with HotSpot from [AdoptOpenJDK's Web site](#) and unpack the archive anywhere on your machine.

### License Manager requirements

- 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.

## System Requirements for Visual COBOL Development Hub

### Hardware Requirements

The disk space requirements are approximately:

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
POWER running AIX	Micro Focus	530 MB	2.12 GB	1.06 GB	41 MB
HP IA	Micro Focus	911 MB	3.65 GB	1.83 GB	79 MB
System Z running Red Hat Linux	Micro Focus	437 MB	1.75 GB	875 MB	39 MB
x86-64 running Red Hat Linux	Micro Focus	615 MB	2.47 GB	1.23 GB	50 MB
SPARC running Solaris	Micro Focus	498 MB	2.00 GB	996 MB	42 MB
x86-64 running Solaris	Micro Focus	469 MB	1.88 GB	938 MB	33 MB
System Z running SUSE SLES	Micro Focus	319 MB	1.28 GB	638 MB	39 MB
x64 running SUSE SLES	Micro Focus	435 MB	1.75 GB	870 MB	50 MB
x64 running Ubuntu	Micro Focus	440 MB	1.77 GB	880 MB	50 MB

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
x86-64 running CentOS	Micro Focus	615 MB	2.46 GB	1.23 GB	50 MB

## Operating Systems Supported

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

On SUSE 12 and 15, and on Ubuntu, you can only install and use the 64-bit version of this product.

## Software Requirements

 **Note:** This product includes OpenSSL version 1.1.1k-mf6 (modified).

The following topic lists the software requirements for Visual COBOL Development Hub.

- [Software required by the setup file](#)
- [Libraries required by the setup file](#)
- [Required environment variables](#)
- [License Manager requirements](#)

### Software required by the setup file

- The "awk", "ed", "ps", "sed", "tar", "sed" and "which" "tar" utilities must be installed and added to the PATH.
- `pax` - the `pax` archiving utility is required by the setup file. `Pax` is distributed with most UNIX/Linux systems but, if it is missing, you must install it separately. To verify `pax` is installed, run `pax --help` or `pax --version` at the command line.

On Red Hat 8.1, `pax` is no longer installed by default. You must install the `spax` version found in the OS ISO. Use the `yum install spax` command.

- If SELinux is installed and you plan to use anything other than core COBOL functionality, or plan to use Enterprise Server within an environment with ASLR enabled, the "SELINUX" configuration must be disabled. To do this, set `SELINUX=disabled` in `/etc/selinux/config`.
- Xterm, the terminal emulator for the X Window System, is part of your UNIX/Linux distribution but is not installed by default. Use your UNIX/Linux installation media to install it.

### Libraries required by the setup file

The following table lists the required libraries for Red Hat and SUSE Linux platforms. The setup file checks that both the 32-bit and 64-bit libraries listed below are installed on both 32-bit and on 64-bit Operating Systems for this product to install and work correctly.

If installing on a 64-bit OS, the 32-bit libraries are not installed by default and must be installed before you start the installation.

The following table shows which of the required libraries are not installed by default on the specified platforms - X indicates the libraries are missing.

Library	Platform								
	32-bit	64-bit	s390	SUSE 12 <sup>1</sup>	SUSE 15	Red Hat 7	Red Hat 8	CentOS 7 and 8	Ubuntu 18 and 20
glibc <sup>2</sup>	X	X	X			X	X	X	
libgcc	X	X	X			X	X	X	
libstdc++	X	X	X			X	X	X	
glibc-devel	X	X	X			X	X		
gcc <sup>3, 4</sup>	X	X	X	X	X	X	X	X	
cpp <sup>3</sup>		X				X	X	X	
libgc1c2		X							X

- Libraries marked with an 'X' are not included in the platform and need to be installed separately.
- <sup>1</sup>On SuSe 12 or 15, you can only install the 64-bit version of this product. The glibc-locale-32bit library is still required by the SafeNet Sentinel licensed components.
- <sup>2</sup>On 64-bit Red Hat 7, you only need to install glibc-2.17\*.x86\_64 and glibc-2.17\*.i686.
- <sup>3</sup>On Red Hat, these libraries are required to enable COBOL to compile.
- <sup>4</sup>On Red Hat, only the 64-bit gcc libraries are required.

Visit the [Red Hat Web site](#) for more information.

### Required environment variables

- Set the JAVA\_HOME environment variable. When installing the product, set this variable to a 64-bit Java installation or the installation terminates. For example, execute the following:

```
export JAVA_HOME=java_install_dir
```

where *java\_install\_dir* is the path to the JAVA installation directory such as `/usr/java/javan.n`

- Add \$JAVA\_HOME/bin to your system PATH variable. To do this, execute:

```
export PATH=$JAVA_HOME/bin:$PATH
```

- You need to set the LANG environment variable to pick up localized messages. If you do not set it as specified here, the installation will run but you might experience unexpected behavior from the installer.

The LANG settings are English and Japanese only so set it to one of the following 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
```

You can set LANG before running the setup file as follows:

```
export LANG=C
```

Alternatively, add it to the start of the setup command line:

```
LANG=C ./setupfilename
```

See *Using the LANG Environment Variable* for details.

### License Manager requirements

- 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.

## Issues with the Installation on UNIX and Linux

- If you reinstall Visual COBOL for Eclipse on a UNIX machine, it is possible that Eclipse will start without loading the Micro Focus features. To solve this, you must delete the `.eclipse` folder in your home directory and restart Visual COBOL.

### Installing on Linux

On Linux, the RPM installer for Visual COBOL for Eclipse installs a 64-bit version of Java. When you start the installation, if the 32-bit version of Java is already installed on your Linux machine, you might not be able to install Visual COBOL. This is a *known issue* with the Oracle Java installers for Linux which prevents you from installing both the 32-bit and the 64-bit versions of Java on the same machine. To work around this problem:

- Download the 64-bit Java distribution in a compressed `.tar` format from the Oracle Web site.
- Untar the distribution into a location different from the one used for the 32-bit Java version. For example, untar in `/usr/local/java64` and not in `/usr/local/java`.
- Set `JAVA_HOME` and `LD_LIBRARY_PATH` to the 64-bit version of Java so that it is used to install and run Visual COBOL.

### Installing on Red Hat 8.x s390

On Red Hat 8.x s390, the RPM non-root install method is not supported due to errors given by `cpio`. You receive the following messages:

```
error: unpacking of archive failed on file /usr/lib/.build-id/lb/af99f26c6b4c00ca499a3199a574b73aeb3854;6092b79c: cpio: symlink failed - No such file or directory
error: Micro_Focus_cobol_server-7.0.0.0-100700.s390x: install failed
```

As a result, the installation in this scenario is incomplete.

### Installing while using AFS/Kerberos authentication

If you are using AFS/Kerberos authentication to log onto your Linux system then you need to ensure you have a local user ID which SOA and Visual COBOL components of the product can use. This user ID must be set up prior to running the installer. When running the installer you need to specify `ESadminID=[User ID]` on the command line so it is used by the installer.

### License Server

You need to configure the computer hostname to ensure the license server will start properly.


To avoid performance issues, "localhost" and the computer hostname must not both be mapped to IP address 127.0.0.1. You should only map "localhost" to IP address 127.0.0.1.

The following is an example of how to specify these entries correctly in the `/etc/hosts` file:

```
127.0.0.1 localhost.localdomain localhost
IP machinelonghostname machineshorthostname
```

where *IP* is the unique IP address of the computer in `xx.xx.xx.xx` format.

# Product Co-Existence

 **Note:** The following applies to Windows only.

- 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.

## 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 Visual COBOL for Visual Studio

To install this product:

1. Run the `vcvsnnnn_80.exe` file (where *nnnn* is the version of Visual Studio you're installing for) 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.

## Installing Visual COBOL for Eclipse (Windows)

 **Note:**

- This version of the product is a full install.
- If you have an earlier version of Visual COBOL installed on your machine, check *Installing as an Upgrade* before you start the installation - see *Advanced Installation Tasks*.

These are the steps to install Visual COBOL:

1. Run the `vce_70.exe` file and follow the wizard instructions to complete the installation.

By default, this installs Visual COBOL in the `%ProgramFiles(x86)%\Micro Focus\Visual COBOL` folder and installs a full version of Eclipse 4.16 (2020-06) 64-bit, with the Micro Focus plugins already installed, in the `C:\Users\Public\Micro Focus\Product Name\eclipse` directory.

The setup file installs any missing prerequisite software as listed in the topic *Software Requirements*.



**Note:** See *Advanced Installation Tasks* for information about non-default installation tasks.

## Installing Visual COBOL for Eclipse (UNIX)

These are the steps to install this product using the Micro Focus installer:

1. Give execute permissions to the setup file:

```
chmod +x setup_visualcobol_deveclipse_7.0_platform
```

2. Run the setup file with superuser permissions:

```
./setup_visualcobol_deveclipse_7.0_platform
```

If you don't run this as superuser, you are prompted to enter the superuser password during the install.

The COBOL environment is installed by default into `/opt/microfocus/VisualCOBOL`, (`COBDIR`). A full version of Eclipse, with the Micro Focus plugins already installed, is present in the `COBDIR/eclipse` directory.

To install in a different location use the `-installlocation="Location"` parameter to specify an alternative directory location. For example:

```
./setup_visualcobol_deveclipse_7.0_platform -installlocation="full path of new location"
```



**Note:** You can use variables when specifying an absolute path for `-installlocation`. For example, the following examples are equivalent:

```
-installlocation="/home/myid/installdir"
```

```
-installlocation="$HOME/installdir"
```

You can see details about which additional parameters can be passed to the install script if you enter the `-help` option.

## Installing Visual COBOL Development Hub

Micro Focus offers two types of installers on UNIX and Linux - a proprietary Micro Focus installer for installing on UNIX and Linux and a standard RPM (RPM Package Manager) installer for installing on Linux. See your product Help for instructions on how to use the RPM installer.

Before starting the installation, see *Software Requirements*.

These are the steps to install this product using the Micro Focus installer:

1. Give execute permissions to the setup file:


```
chmod +x setup_visualcobol_devhub_7.0_platform
```

2. Run the installer with superuser permissions:

```
./setup_visualcobol_devhub_7.0_platform
```

If you don't run this as superuser you will be prompted to enter the superuser password during the installation.



 **Note:** On Ubuntu, the prompt for superuser password is not available. On this platform you must either log in as root or use the `sudo` command to get root permissions before you run the installer.

The COBOL environment is installed by default into `/opt/microfocus/VisualCOBOL`, (COBDIR).

### Enterprise Server System Administrator Process

During the installation process, the installer configures the product's Enterprise Server System Administrator Process User ID. The Process User ID will be the owner of all Enterprise Server processes except the one for the Micro Focus Directory Server (MFDS). The Directory Server process (Enterprise Server Administration) runs as root as this allows it to access the system files and ports.

All Enterprise Server processes you start from Enterprise Server Administration run under the Process User ID which can affect the file access and creation.

You must supply the user ID at the command line - specify `-EsadminID=[ ID ]` as part of your command.

By default, the installer uses the login id of the user that runs the installer for the Process User ID. To change the user id after you complete the installation, execute `$(COBDIR)/bin/casperm.sh` and follow the onscreen instructions.

### SafeNet Sentinel considerations

- The installation of this product could affect the SafeNet Sentinel licensed components running on your machine. During installation licensing is shutdown to allow files to be updated. To ensure the processes running on your machine are not affected, you need to use the `-skipsafenet` option, which skips the installation of SafeNet:

```
./setup_visualcobol_devhub_7.0_platform -skipsafenet
```

- To protect the SafeNet Sentinel installation from accidental updating you can create an empty file named `SKIP_SAFENET_INSTALL` in `/var/microfocuslicensing/` as follows:

```
touch /var/microfocuslicensing/SKIP_SAFENET_INSTALL
```

While the file is present, the SafeNet installer does not make changes to the installation or shutdown the running license daemons. If licensing needs to be updated later, you can rerun the `MFLicenseServerInstall.sh` from within the `$(COBDIR)/safenet` folder with the force command line option:

```
cd $(COBDIR)/safenet
./MFLicenseServerInstall.sh force
```

### AutoPass Licensing considerations

- The installation of this product could affect the AutoPass licensed components running on your machine. During installation, the licensing shuts down to allow files to be updated. To ensure the processes running on your machine are not affected, you need to use the `-skipautopass` option, which skips the installation of AutoPass:

```
./setup file -skipautopass
```

- To protect the AutoPass installation from accidental updating, you can create an empty file named `SKIP_AUTOPASS_INSTALL` in `/opt/microfocus/licensing` as follows:

```
touch /opt/microfocus/licensing/SKIP_AUTOPASS_INSTALL
```

While the file is present, the AutoPass installer does not make changes to the installation or shutdown the running license daemons. If licensing needs to be updated later, you can rerun the `MFLicenseServerInstall.sh` from within the `$(COBDIR)/safenet` folder with the force command line option:

```
cd $(COBDIR)/safenet
./MFLicenseServerInstall.sh force
```

## 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.

# Licensing Information



## Note:

- Personal Edition licensing is only available with Visual COBOL for Visual Studio 2019 and Visual COBOL for Eclipse
- 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.
- This package provides a license per supported Micro Focus Development Hub platform.
- 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 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

### Windows: To start the GUI Micro Focus License Administration

<b>Windows 8.1, and Windows Server 2012 R2</b>	From the Windows <b>Start</b> screen, click the <b>License Administration</b> tile.
<b>Windows 10 and Later</b>	From your Windows desktop, click <b>Start &gt; Micro Focus License Manager &gt; License Administration</b> .

### Windows: 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**.

### UNIX

Log on as root, and from a command prompt type:

```
/var/microfocuslicensing/bin/cesadmintool.sh
```

## 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

### Windows: 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 LicensingHelp > Micro Focus > 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 **AuthorizeFinish** to install the license.

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

### Windows: 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.

### UNIX

1. Start the Micro Focus License Administration tool and select the **Manual License Installation** option by entering 4.
2. 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.

## Windows: 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.

## Windows: 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**.

## UNIX

1. Start Micro Focus License Administration.
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.

## Windows: 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**.

## Windows: 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.

## UNIX

In order to authorize your product 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.

[Click here](#) to see the *Preparing to Raise a Support Case* topic on the Product Documentation pages on Micro Focus Customer Care.

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](#)).

[Click here](#) to see the *Preparing to Raise a Support Case* topic on the Product Documentation pages on Micro Focus Customer Care.

## 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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