Micro Focus Visual COBOL Development Hub 9.0

Release Notes

Contents

Visual COBOL Development Hub 9.0 Release Notes

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

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 documentation updates.

Product Overview

Visual COBOL Development Hub (Development Hub) is a part of the Visual COBOL product portfolio from Micro Focus which includes testing and developer productivity tools.

Development Hub is a companion of Visual COBOL for Eclipse. It enables the developers to use intelligent, integrated development tools in Eclipse while keeping the application source on a UNIX or Linux production-like server with access to middleware and test data. Developers get the power of Eclipse on their Windows or Linux desktop and can test their applications in a realistic environment without duplicating source code or emulating server behavior. With Visual COBOL, Visual COBOL Development Hub can be used for distributed development of COBOL for JVM applications.

What's New

Enhancements are available in the following areas:

- *Learn Micro Focus^{TM} Learn COBOL extension and Micro Focus^{TM} COBOL Fundamentals Course*
- *Micro Focus COBOL Extension for Visual Studio Code*
- *.NET Support*
- *COBOL Language*
- *Compiler Directives*
- *Enterprise Server*
- *Enterprise Server Common Web Administration (ESCWA)*
- *Enterprise Server Security*

Learn Micro Focus^{TM} COBOL Extension for Visual Studio Code and Micro Focus^{TM} COBOL Fundamentals Course

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Micro Focus has released a new video-based training course in COBOL, Micro Focus^{TM} COBOL Fundamentals Course. The course teaches the fundamentals of the COBOL language, introduces the Micro Focus^{TM} COBOL syntax, and usage of Micro Focus COBOL tools.

The course is ideal for developers familiar with C, Java, or .NET who want to learn COBOL. It doesn't matter what language you know, as long as you have experience of standard programming concepts, this course is for you.

A new Learn Micro Focus^{TM} COBOL Extension for Visual Studio Code is available. The extension comes with the training materials for the COBOL training course. For information about the COBOL course, and the Learn Micro Focus^{TM} COBOL Extension for Visual Studio Code, visit *www.cobol.com*.

> **Note:** This extension is not included with the Visual COBOL installer.

Micro Focus^{TM} COBOL Extension for Visual Studio Code

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The following features are now available in the Micro Focus^{TM} COBOL Extension for Visual Studio Code when you use it with Visual COBOL 9.0:

- JVM COBOL debugging
- COBOL notebooks where you can have text and executable blocks of COBOL code in the same file.
- Colorization for COBOL directives files, `cobol.dir`.
- A new button, , **Debug COBOL Program** or **Run COBOL Program** in the top right corner of the editor, present for the current COBOL program.
- Configuration setting for custom tab stops.
- A Micro Focus COBOL terminal in the TERMINAL pane.
- You can now specify the COBOL main file context for copybooks if a copybooks is referenced in more than one program.

Note: This extension is not included with the Visual COBOL installer.

.NET Support

This release provides the following enhancements to *.NET* support:

- This release installs several NuGet packages each of which contains the assemblies for a specific Micro Focus functionality. New .NET projects, as well as existing projects you edit or build in 9.0 are linked to a core package, MicroFocus.COBOL.Runtime.Core, that includes the basic functionality for the projects. You need to add any additional packages (such as a specific file handler, COBOL Accept/Display etc.) manually to the projects. The new packages enable better granularity of distributions, and provide more flexibility and control over what is packaged with the application.
- New SDK version - the Micro Focus SDK version has changed to version 2.1. See *Upgrading existing .NET COBOL project files* in your product Help for details on how to upgrade your existing projects.

COBOL Language

This release provides the following new features and enhancements to the COBOL language:

- Double-colon, `::`, qualification is now available as a qualifier for data names and when dereferencing pointers.
- PERFORM frame local variables - variables that are DECLAREd are now properly scoped. Reentering the SECTION, whether recursively or after leaving, gives a new instance of such variables. This provides better locality of data, and helps with writing of better structured code.
- Parameterized sections - syntax that allows program sections to accept arguments and return values.

  - PERFORM of a SECTION can now pass arguments to that SECTION.
  - A result can be returned to the code that PERFORMed the SECTION.
  - Sections that return a value can be used as functions, in contexts where an identifier is expected.
- Compiler can identify platform at compile time - the compile-time constants `__unix`, `__windows`, `__dotnet`, `__jvm`, and `__native` have been introduced. These can be tested in $if statements to tailor code to the platform being used.
- Enhanced CBL_STRING_CONVERT library routine - CBL_STRING_CONVERT can now convert strings to and from Base64.

The following enhancements add further support for the IBM Enterprise COBOL version 6.4:

- User-defined functions - user-defined functions are now available in an Enterprise COBOL dialect for version 6.4 compatibility. Reference the product Help, *General Reference > COBOL Language Reference > Part 3. Additional Topics > Additional Dialect Support > Enterprise COBOL Syntax Support > User-Defined Functions* under ENTCOBOL dialect. A new Compiler directive, MANAGED-FNC-PARAM-BY, enables you to specify whether the managed behavior of numeric function parameters should default to BY VALUE or BY REFERENCE.
- Enhanced mechanism for interoperation between Java and COBOL - The COBOL and Java interoperability has been enhanced to extend the capabilities of your COBOL applications with Java. It removes the need to write object-oriented (OO) COBOL, as your native COBOL and Java programs can now interoperate in the following scenarios:

  - COBOL programs can be marked as JAVA-CALLABLE, meaning that they can be called from Java as though they were Java static methods.

- COBOL program can call Java static methods using the java.class.method call.
- COBOL data can be shared with Java programs by marking it as JAVA-SHAREABLE.
- Comprehensive support for automatic conversion between a wide variety of popular Java data types and their corresponding COBOL types so that parameter passing and returned value handling require no special processing in user code.

Compiler Directives

This release provides the following enhancements.

A new mechanism for setting Compiler directives (Technology Preview):

- Common directives files - this release introduces common directives files, `directives.mf` files, that enable you to automatically provide all required directives needed to compile multiple COBOL applications without having to specify the directives individually. This feature is not available for Assembler or IMS.

    Note: This is a technology preview feature only. It is being made available to allow you to test and provide feedback on this new capability; however, this feature is not intended for production use and it is not supported as such. Furthermore, Micro Focus does not guarantee that this feature will be delivered at a GA level and if it is, then the functionality provided might differ considerably from this technology preview.

New Compiler directives:

- ALPHA-LIT-CONT - determines whether the right margin or the end-of-line is used to delimit the continuation of a non-numeric literal.
- DECLARE - defines the behavior of locally declared variables.
- ILEXPOSEALPHA/ILEXPOSEGROUP - these two directives can expose alphanumeric or group items passed by value to parameterized sections or methods in JVM COBOL programs as byte arrays (the default is to expose as string objects).
- ILSTRINGLOAD - where JVM COBOL programs with a very large number of distinct alphanumeric literals cause internal limits to be exceeded, use this directive to create these literals in a backing file, which can then be converted to strings at run time.
- MANAGED-FNC-PARAM-BY - determines whether user-defined function parameters are passed BY VALUE or BY REFERENCE by default when compiled with JVMGEN.
- INITIAL - determines how Working-Storage is initialized for programs marked as IS INITIAL.

A family of new Compiler directives has been introduced to support the new mechanism for interoperation between Java and native COBOL:

- JAVA-SHAREABLE - use the JAVA-SHAREABLE ON and JAVA-SHAREABLE OFF directives to bracket one or more WORKING-STORAGE data items to indicate that they are to be made read and write accessible from Java applications interoperating with this COBOL program.
- JAVA-CALLABLE - instructs the Compiler to make the COBOL program automatically callable from Java.
- JAVA-GEN-PROGS, JAVA-GEN-STRG, JAVA-OUTPUT-PATH, and JAVA-PACKAGE-NAME - control the behavior of COBOL programs that interoperate with Java through the JAVA-CALLABLE or JAVA-SHAREABLE directives or by calling Java static methods using the CALL statement.

Enterprise Server

This release provides the following enhancements:

- A new `casverify` command-line utility is available. This utility enables you to verify the configuration of a specified enterprise server region without attempting to start it, and also enables you to create immediate diagnostics information in JSON or human-readable output. Verification stages are modular, enabling you to specify which validation checks to run.
- You can now list job steps to enable users to perform advanced restarts. Job steps can be output to JSON by specifying `casout /%jnumber` or output to a table by specifying `casout /%tnumber`. See *casout* for more information.
- Installation improvements on UNIX - when upgrading from releases 6.0, 7.0, or 8.0 on UNIX, Visual COBOL now preserves more configuration details. During the installation of the product, a set of configuration files are moved to a config location before the upgrade occurs. These are linked back to the product install location on completion. When you reinstall the full product, install a patch update, or install an upgrade to the same location, the previous configurations settings are maintained.

  Previously, the upgrade process required manual intervention to redeploy existing configuration settings. This now occurs automatically.

Enterprise Server Common Web Administration (ESCWA)

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Enhancements are available in the following areas:

- Accessibility improvements - provide improved compliance with 508 and WCAG 2.1 standards.
- API, version 2 extensions - includes updated versions of some of the existing API version 1 endpoints, and has been extended to contain more endpoints.
- Merged Archived Spool - you can now configure an enterprise server region to view a merged archived spool in the UI. You can view multiple archived spools from a single region, and view old spool information for multiple jobs that have ran under a previous name
- Page search facility - you can now search for a page that contains a specified search string. This enhancement is part of the WCAG 2.1 requirements for accessibility.
- PAC clients - the ESCWA UI lists all TN3270 clients connected to a PAC. This enables you to administer and monitor clients across the entire PAC from a single PAC region.
- TLS-enabled Redis connections. ESCWA now supports administering and monitoring PACs with a TLS Redis SOR.

Enterprise Server Security

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This release provides the following new features and enhancements:

- Demo CA - the component has been completely redesigned and is now included as part of Visual COBOL. Demo CA supports multiple installations, uses up-to-date cryptographic support, and generates modern version 3 certificates with SANS, PKIDs, AKIDs, etc. signed by an intermediate CA. Demo CA is now easier to use and has improved interoperability with third-party SSL/TLS systems.

  Note: Micro Focus strongly recommends that Demo CA is only used for SSL/TLS development and testing and is not intended for use in a production environment.
- `esfupdate` support for the Vault Facility - the `esfupdate` utility now supports the use of the Vault Facility for credentials it needs to connect to MFDS.
- OpenSSL 3.0 - OpenSSL has been updated to use the current Long Term Supported OpenSSL cryptographic library.
- VSAM External Security Manager (EAP) - the VSAM ESM Module is a new option for Enterprise Server security which is simpler and more convenient than using LDAP-based security. The VSAM ESM Module provides a security manager for Enterprise Server which keeps security data in COBOL data (VSAM) files. It provides many of the features of the MLDAP ESM Module but does not require an LDAP

server or other third-party solution. Security data can be imported from a YAML file, facilitating the securing of Enterprise Server and the modification of its security data.

> ⚠️ **Attention:** This feature is in Early Adopter Program (EAP) release status. We intend to provide the finalized feature in a future release. Please contact Micro Focus Customer Care if you require further clarification.

HCO for SQL Server

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This release includes support for the following:

- The Define Lists tool in the HCOSS UI has been enhanced to enable you to select a dependency mode to use when creating a transfer list. The available modes are:

Default	Automatically include all parent objects of the selected object.
Family tree	Automatically include all parent objects of the selected table.
	Automatically include the child objects of each parent object.
	Repeat until no more parents and children are found.
No dependency handling	Include the selected table only (do not include any parent or child objects).

- The Transfer Data Tool now includes the start and end date and time for each table transfer.

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 Incident Numbers followed by the Defect number (in parentheses).

- *Data Tools*
- *Enterprise Server*
- *File Handling*
- *Micro Focus Directory Server*
- *Runtime System*

Data Tools

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- A new print function available from the **File** group and the **File** menu enables you to print the records shown in the editor.

  00367084 (12432)
- An enhancement to the **Compare Files** function has been added, so that when a comparison is made, the **File Information** option shows a statistics overview of the comparison being displayed.

  02200177 (222157)
- In the Data File Editor, the **Compare Files** function has been enhanced to allow you to select start and end columns in which to compare, so only a subset of a record is compared, rather than the entire record.

  02306654 (222159)
- A **Quick final page access** option has been added to the **Preferences** dialog box of the Data File Editor. When selected, large variable sequential files (files > 10,000 records) immediately jump to the last page of the file when it is opened.

  02330923 02365033 02399254 (294002)

Enterprise Server

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- A new option to uninstall a PAC installed on an enterprise server region before deleting the region has been added to ensure that all PAC components are properly removed.

  01907370 (124107)
- ESCWA now validates the TLS properties to help prevent errors on entry.

  > **Note:** If ESCWA has an invalid TLS configuration, it reverts to starting without TLS enabled.

  01983736 (203178)
- In ESCWA, a **Stop** for IMS MPRs, JES Initiators, and JES Printers now operates correctly.

  02311796 (286178)
- An issue with not being able to update or navigate the ESCWA UO though the job output in the spool while it is still running has been resolved.

  02322494 (286142)

- In ESCWA, the default dashboard can now be modified for all users of a server.

  02458710 (392040)
- In ESCWA, the FCT Fix Up button has been added to the Active FCT page. See *Active FCT* in your product Help for more information.

  (374021)
- The **Job View** page in ESCWA now includes a list of job steps that have run during the current enterprise server region up time.

  (347033)
- A new configuration property has been added to ESCWA to enable the default language the UI displays to be overridden from the user's browser locale.

  02227239 02307446 (260128)
- ESCWA now supports TLS enabled Redis repositories.

  (306097)
- In ESCWA, the **Process ID** column has been added to the table on the **Dynamic Debug** page. See *Dynamic Debug* in your product Help for more information.

  (350029)
- In ESCWA, a new PAC **Client List** page has been added. This page displays a list of PAC members and associated information. See *PAC Client List* in your product Help for more information.

  (384037)
- An alternate index has been added to the non-recoverable temporary storage file TXTSNR. This is to enable queues to be returned in alphabetical order when browsing with INQUIRE. When warm starting non-recoverable TS, if TXTSNR has only a single key then the file will automatically be upgraded to include the alternate index. If there is a problem during the upgrade process then message CASI1405S will be written to the console indicating the failure and that the enterprise server region will fail to start. In this case, the file will either need to be repaired or temporary storage will need to be cold started.

  > **Note:** Once TXTSNR has been upgraded it can no longer be used on an older version of the product that does not contain this fix.

  02441509 (389045)
- Corrected the spelling for the **db_server_name** Configuration Manager property. You will need to update existing 8.0 enterprise server region configurations by either applying any change on the ESCWA **General >Advanced** page, or by updating the **mfConfigManagerData** MFDS property through the ESCWA API. If this is not performed, the warning message `CASCF0071W Configuration Manager - The requested property (db_sever_name) was not found` will be displayed in the Console log during region initialization. This will not cause any issues if the **Region Database Server Name** property was not previously used, or if it was set though the ES_DB_SERVER environment variable. Otherwise, you will need to reset this property using the above methods as the previous configuration for **Region Database Server Name** will not be honored, which might result in the region failing initialization.

  (350050)
- In the context of a multi-hop Distributed Program Linking (DPL), if the last stage used the default mirror transaction, its back-end could be left hanging if a SYNCPOINT was invoked by the upstream partner. This has been fixed.

  02432614 02434318 (377071)
- You can now list job steps to enable users to perform advanced restarts. Job steps can be outputted to JSON by `casout /%jnumber`. Job steps can be output to a table by `casout /%tnumber`. See *casout* in your product Help for more information.

  (401023)
- The Redis server supplied with the product is now version 6.2.6.In ESCWA, you must now specify the **Certificate Authority Filepath**, **Certificate Filepath**, and **Private Key Filepath** properties on the

Advanced Region Properties page for all enterprise server regions that are members of a PAC that has a TLS-enabled Redis Scale-Out Repository (SOR). See *Scale-Out Repositories* in your product Help for more information.

00373756 (12618)

- During XA recovery, if a resource manager reports an in doubt transaction which has no log entry, a CASXO0040W message will now be displayed in the console.

(425081)

- If a SOR cannot be connected during enterprise server region start up, then the region no longer starts. Previously, this only applied to the PSOR, but now applies to other SORs which were only used for TS and TD queues. This change was made because the previous behavior could lead to queues being written to different locations (SORs or disk) across the PAC. If a PSOR cannot be connected during a process start up when the region is already running, then the process will be blocked until the connection can be established. Retries will be attempted at increasingly longer intervals. If a (non-PSOR) SOR cannot be connected to at process start up when the enterprise server region is already running, then the process will continue to start up. At queue access time, for a queue that must go to that SOR, the connection will be retried. If this is unsuccessful then the command will receive an IOERR.

02399193 (356005)

- ESMAC is disabled by default. ESMAC can be enabled from the **Advanced Region Properties** page in ESCWA.

(397027)

File Handling

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- The SQL Server ENQ/DEQ implementation has been modified to eliminate any possibility of ENQ request failures occurring due to an intermittent Service Broker problem. The new implementation introduces a new ENQ stored procedure, and modification of the existing DEQ one to allow it to work with both the Service Broker and non-Service Broker implementations.

(285197)

- The OPEN EXTEND operation now follows the behavior expected from the OPEN statement as documented.

02454638 (386087)

Micro Focus Directory Server

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- The External Security Manager (ESM) checks did not occur when an enterprise server region started or stopped. This has been fixed.

02402188 (355001)

- To query Enterprise Server security configuration information (details of configured external Security Managers and so forth) from the Micro Focus Directory Server when access is restricted, the authorized Enterprise Server user must have at least **Read** permission for the **Enterprise Server Administration** resource class **User Administration** entity.

(285199)

- Micro Focus Directory Server now restricts access to enterprise server regions that a signed-on user is not authorized to view.

02305916 (285169)

- Four new MFDS-only audit event codes (2 300, 2 301, 2 302, and 2 303) have been added. See *Audit Event Codes* in your product Help for more information.

02412285 (365149)

Run-Time System

- By default, CTF information no longer appears in AUX Trace of an enterprise server region. To enable it, you now need to set `mftrace.emitter.es#level` in the MFTRACE_CONFIG.

  (328008)
- If an error occurs during thread clean-up, the runtime will now attempt thread clean-up again. If it fails for a second time the runtime will call `_exit()` to terminate the process immediately.

  02286519 (258130)
- On UNIX platforms, when linking using the cob command in place of ldpli, you must include all of the specified ldpli -l options on the cob command line.

  (410018)
- Attempting to call COBOL functionality after calling the `cobtidy()` API, to de-initialise the COBOL RTS, will now result in a COBRT090 error message. Previously it was documented that the results were undefined and it could cause subsequent problems, and/or errors, especially in a threaded environment. The aim of this change is to give a more meaningful error message, earlier, to help diagnose such issues.

  (301136)
- The limit for the MAXGENERATION emitter property (for both BINFILE and TEXTFILE) has been increased from 10 to 100. The file size limit for each of these generations, as set by the MAXFILESIZE property, is 1000000KB.

  02405466 (359001)

Resolved Issues

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

- *COBOL Language Server*
- *Codeset Support*
- *Common Communications Interface*
- *Data Tools*
- *Documentation*
- *Enterprise Server*
- *File Handling*
- *Micro Focus Common Client*
- *Micro Focus Cryptographic Library*
- *Micro Focus Directory Server*
- *Micro Focus License Administration*
- *Run-time System*
- *Setup Issues (UNIX)*
- *SQL: COBSQL*
- *SQL: DB2 ECM*
- *SQL: MBDT Utilities*
- *SQL: OpenESQL*
- *XML Support*

COBOL Language Server

Back to the list

- Some performance issues when requesting workspace symbols in large workspaces have been resolved. The operation is now limited to files that are open or parsed.

  02384141 (338011)

Code Analysis

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- MFDASMX no longer crashes when download process is initiated.

  02411250 02427959 (363118)

Codeset Support

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- The DISJOINING clause now works as expected when a DBCS hyphen is specified as part of the prefix or suffix.

  (296145)

Common Communications Interface

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- A handle leak on failed ISC connection attempts has been fixed.

02413198 (381021)

- TLS connections failed when a trust anchor was not specified. This has been fixed.

02534509 (446004)

Data Tools

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- The Data Tools editor could display incorrect record numbers for variable sequential files following a Find operation. This has been fixed.

02516058 (411005)

- In the Data Tools editor, there was an issue with viewing the last page of records in a sequential variable file when the **Quick final page** preference setting was enabled and the file was defined with a minimum record length of 0 or a large variable record size range combined with a large **Records per page** preference setting. This has been fixed.

02487096 (397034)

- The performance of the **Search > Go To navigation** feature of the Data Tools editor has been improved for variable and line sequential files.

02399254 02480008 (399043)

- Editing/deleting line sequential file records no longer hangs when using Date File Tools.

02239120 (259127)

- When attempting to open data sets in the Data File Editor, file names containing a $ sign are no longer incorrectly trimmed.

02194216 (221086)

- Data File Tools no longer attempts to open unrecognized file formats. Instead, an error message appears explaining which format is invalid.

02308449 (281015)

- You can now copy hex values of selected records from the unpacked rows at the bottom of the screen using the **Copy Hex** option available on the context menu the **Edit** menu. This option is visible only when the hex toggle is enabled.

02396732 (352067)

- When copying a record to an external destination, the NULL Byte character is replaced by a character specified in the **Preferences** dialog box. The default replacement character is a period (.).

02396678 (350053)

- The **Toggle Hex** function now shows hexadecimal values under each line in the editor, not only the selected one.

02342260 (297080)

- Field values of the Data File Tools **File Information** dialog box can be selected and copied to clipboard.

02396730 (352047)

- Horizontal scrolling in files with variable-length records did not work as expected when a short record was selected. This is now fixed.

02150974 (202028)

- It is now possible to start `mfdatatools2` from the command line to open a catalogued file from an enterprise server region.

00501248 (71267)

- In the Data File Editor, a preference has been added to specify the maximum number of requested data sets in the **Data Explorer** view. If a catalog contains more data sets than the maximum requested number, a `More data sets in catalog` stub appears at the end of the list.

02396657 (350052)

- You must configure a TS model to ensure that Data File Editor correctly honors file locking across all enterprise server regions in a PAC.

  02529725 (413062)
- Previously, the DFCONV utility would produce an error when converting `sql://` database files. This has been fixed.

  02497741 (403103)

Documentation

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- Enterprise Server security configuration options have been updated. See *Security Configuration Custom Configuration Information* in your product Help for more information.

  (411024)
- Information on configuring an OpenLDAP server has been updated. See *Configuring the OpenLDAP server* in your product Help for more information.

  02387889 SF:02437494 02437494 (356021)
- The CASESM Security Manager was part of the legacy security model used in the Net Express and Server Express 5.0 and earlier products. As part of this, the legacy ESMAC user interface pages had Security Keys as configurable options. In ESCWA, these can only be accessed by the Client Web API and are not available in the ESCWA user interface pages that are equivalent to the corresponding ESMAC pages.

  02276034 (259095)
- The OSESM tracing option has been added to the configuration information in the product Help.

  02145921 (202197)
- Setting ES_PRODUCTION=Y will prevent debugging on Enterprise Server regions.

  02208272 (346026)
- The documentation sample in the *Using CobolBean for Instance Data Java* topic has been corrected.

  (409036)
- UNIX documentation has been updated to correct the case of the `mfcatxml` command.

  02386876 (335024)
- The product documentation has been updated with the current name and contact information for Micro Focus Customer Care. Any instance of the older terms for customer support remain in the documentation because it is present within the product itself.

  (377012)
- The SQL Server RM Switch Module topic has been updated to remove the [directives] option for build mssql. The option is not valid and ignored by the system.

  3172383 (13152)
- The documentation has been corrected to describe the duplicate cursor effect.

  3172533 (11320)
- The product documentation now correctly states PF_RO_CURSOR=8 as default when using BEHAVIOR=MAINFRAME with SQLServer.

  00372417 (12688)
- The *To convert Net Express projects to Eclipse projects* cheat sheet is no longer available on UNIX-only products.

  (238031)
- The documentation has been updated to show that only under an MF dialect can you omit the Working-Storage Section heading.

3245726 (28060)

- The documentation has been updated to clarify support for the following: the CBL_GET_ERROR_INFO and CBL_CREATE_STACKDUMP library routines, the stackdump_on_error tunable, and the cobgeterrorinfo function.

(385041)

- The `cob` command examples in the documentation have been updated.

(403044)

- New documentation has been added that gives more detail on how to use the CBL_CTF_* library routines. See *Using the CTF Library Routines* in the product documentation for more information.

(264040)

- The Micro Focus Unit Testing Framework documentation has been updated to explicitly state that the MFUPP preprocessor is intended for use only within the confines of the testing framework.

02259026 (258085)

- Some of the screen shots in the MFDBFH documentation have been updated to show MFDBFH-specific URLs in ESCWA.

(301083)

Enterprise Server

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- Now users who have overlapping long names like `USER1234` and `USER12345` will not have overlapping permissions when they have distinct mapped short names.

02529441 (440070)

- In Enterprise Server External Security Facility (ESF), requests to generate a passtoken (including for RACF-style passtickets used by DCAS) could sometimes be rejected as unauthorized attempts to create surrogate passtokens even though the passtoken request was not for a surrogate. This was due to a case mismatch between the request and ACEE. This has been fixed.

02433532 02442474 (399097)

- The ESF could corrupt the credentials used to connect to an LDAP server when auditing was enabled, causing a critical security failure and preventing enterprise server regions from starting. This has been fixed.

02518028 (415116)

- MLDAP ESM now supports the use of the `mfsecret:` syntax for retrieving the security manager credentials (authorized ID and password) from the vault. Those fields in the Security Manager definition in ESCWA can be specified using the forms:

      `mfsecret:`*configuration-name*`:`*secret-path*

  or:

      `mfsecret:`*secret-path*

02548082 02554256 (440042)

- `Mfsecrets` crashed when running as multithreaded. This has been fixed.

(381004)

- A problem that prevented the AES provider on big-endian platforms from correctly reading vault secrets has been fixed.

(430032)

- An incorrect signal 11 was generated from `mfsecrets` when getting the username for audit. This has been fixed.

(382026)

- For Enterprise Server LDAP-based security, two new options, **[Operation] group membership uses short name** and **[Operation] search users by short name**, permit applying user and group data to users known to that Security Manager only by their short name (the Enterprise Server user ID). See *MLDAP ESM Module Custom Configuration Information* in your product Help for more information.

  02344601 (301036)
- In ESCWA on the **Catalog** page, you can now use the **Line Wrap** switch to toggle line wrapping for long lines.

  02289615 (258187)
- The ESCWA SEPs page displays Transient and Debug SEPs.

  (327011)
- In ESCWA, accessing the Catalog file data has been improved by modifying the page layout.

  02154749 (202107)
- In ESCWA, focus would not be put into modal dialogs when opened. This has been fixed.

  01995433 (156067)
- In ESCWA, the maximum height of list menus have been limited so that they do not overflow the screen from their position, with a scroll bar to access all items.

  02499988 (403117)
- In ESCWA, the **SEP List** page did not correctly sort the list by ascending or descending order. This has been fixed.

  02382568 (352007)
- ESCWA was not able to bind to a hostname containing the `w` character. This has been fixed.

  (296023)
- The ESM password is no longer disclosed in the `/esf` endpoint request.

  02554256 (450046)
- Reduced the number of password save prompts encountered when navigating ESCWA using the Firefox Web browser.

  02324422 (306001)
- In ESCWA, the FCT Backward and Forward Recovery will no longer be disabled when **Use Catalog** is selected.

  02416596 (364107)
- When ESCWA was configured for TLS, it failed to stop when using `escwa --shutdown` from the command line. This has been fixed.

  02405704 02004795 (365071)
- Added missing annotation for ESCWA trace point.

  02538486 (415187)
- ESCWA had duplicate CTF trace IDs. This have been fixed.

  02524827 (409072)
- In ESCWA, the additional column File Size has been added to the catalog list view.

  (403123)
- ESCWA might fail to disconnect from a Redis instance and reconnect to another. If this occurs you can manually trigger a reconnect action by clicking the **Reconnect** button on the **Scale-Out Repository Information** page.

  (363105)
- If ESCWA auditing is enabled from the **Configuration** page, or when ESCWA ESF auditing is enabled from the **Security > ESCWA Configuration** page, then an auditing event is emitted, `2 19 (auditing stopped)`, or `2 20 (auditing started)`. See *Audit Event Codes* in your product Help for more information.

02412285 (365156)
- In ESCWA, you can now rename catalog data sets from the **Catalog** page. See *Adding and Editing the Catalog Entry* in your product Help for more information.

02501074 (403136)
- In ESCWA, the "**Historical Statistics Detail for Transaction**" and "**Historical Statistics**" pages now display time in milliseconds and the accuracy for latency and response information has been improved.

02504559 (405096)
- A new CGI threshold type has been implemented in Enterprise Server. This enables you to set up threshold values for ESCWA and ESMAC requests by applying the global =CGI to all ESCWA and ESMAC requests, or by specifying the corresponding casrdo or casrdj module that you want to control.

(377073)
- MFDS no longer supports XA reconnect attempts.

(427068)
- In ESCWA, the **PCT Security** flag is now displayed on the **Active PCT** page. See *Active PCT* in your product Help for more information.

(335002)
- Resolved an issue with a mutex deadlock created when MFDBFH attempted to emit a message during a cascd shutdown.

02468209 (406002)
- A problem that caused Web Service client calls to fail after an upgrade has been fixed.

02320601 (307054)
- An intermittent Access Violation in mfredis.dll sometimes occurred when a batch job abended. This has been fixed.

02328218 (296144)
- ECI transactions were not being committed at the end of task. This has been fixed.

02497005 (403085)
- An issue that resulted from pressing the **Clear** key following a EXEC CICS SEND PAGE command has been fixed.

02423737 (375058)
- The recovery of processes by casmgr now occurs in the same order in which they were terminated.

02449487 (389051)
- A bitism issue with the triggers provided with the product has been fixed.

02554978 (449002)
- An issue with updating a transaction ID in ESMAC has been fixed.

(264059)
- A WEB RECEIVE SESSTOKEN sometimes threw an RTS 114 error in cascwi. This has been fixed.

(409046)
- Dynamically enabling HSF sometimes resulted in shared memory corruption. This has been fixed.

(411104)
- In a PAC, closing an FCT that referenced a catalogued file sometimes resulted in a truncated filename after 44 characters. This has been fixed.

02421476 (364152)
- The casfile, casout, casstop, cassub, castran, and casutl commands now find the enterprise server region successfully when mfds is started with the -b option.

02307940 02202467 (286003)

- An error message was unnecessarily exposing input credentials. This has been fixed.

  02409369 (363126)
- When using `casout`, the `/y` option could fail depending on the order of options used. This has been fixed.

  02371843 (313041)
- An internal transaction (ITR) was not sent to a SEP that had an EZASOKET listener started. This sometimes resulted in a close file request failing to be processed by the SEP running the EZASOKET listener. This has been fixed.

  02394276 (350047)
- When an XA issue occurred, the reason code was not always returned. This has been fixed.

  02532560 (425053)
- An intermittent crash in `casmgr` has been fixed.

  02431740 (377040)
- When performing a NEWCOPY on a data table in a PAC, not all enterprise server regions in the PAC reloaded the new member. This has been fixed.

  02406797 (364015)
- Thresholds are now started before the XA start for a transaction has been issued, enabling the process to be killed if the transaction is stuck in the Resource Manager.

  02365811 (306124)
- When using the CICS command `castran` with the `-b` option, the message was not sent to the `console.log` file. This has been fixed.

  02389970 (348041)
- When multiple requests were made from the same browser, a new TCTS was allocated, resulting in an SOS situation. This has been fixed.

  02419170 02404921 (364124)
- When using TRANCLASS and refreshing ESMAC, the data sent to a started transaction could be lost, resulting in ENDDATA returned on the retrieve. This has been fixed.

  02526457 (451029)
- The sample exit program DFHUSYNC has been modified to not return cics-syncpoint-normal-88 by default as this could overwrite the correct return-code set on a previous call to an RM.

  02492604 (409026)
- The RAS process is now correctly identified on a dump.

  (385051)
- Fixed a memory corruption that occurred when logging in-doubt XA transactions in the PAC.

  02304565 02319810 (284038)
- Replaced ESF Admin API LISTRESOURCE with ESF Auth for querying MQ Security Resources.

  02154003 (202145)
- Updated XID generation to support UTF-8 code pages with PostgreSQL.

  02296723 (273006)
- A shared memory corruption issue occurred when reinstalling a TCPIP Service or URIMAP. This has been fixed.

  (204047)
- Improved error reporting when applying advanced configuration updates in a PAC environment.

  (364113)
- The `casesxml` utility now provides a relevant error message when no work location is provided.

  02531150 (413115)

- The `casstop` command output misleading error messages when immediate shutdown was used. This has been fixed.

  02490512 (403132)
- The dynamic region configuration updates occasionally failed to apply. This has been fixed.

  (245030)
- If an enterprise server region contained $ES_SERVER in its configuration, then it would not be handled by `casesxml`. This has been fixed.

  02531150 (417037)
- To improve efficiency, when an enterprise server region is configured with multiple RMs and a task uses only one, no XA log is created for the transaction.

  02537701 (430016)
- When calling APPC functions, you could pass an invalid value in the first parameter which would result in an error in the communications server layer. This has been fixed.

  02428147 (372009)
- When using LU6.2 communications infrastructure between enterprise server regions, when a COMMIT was executed by the originator, the target would incorrectly attempt to send a commit request back to the region which sent the sync point request. This has been fixed.

  02339327 (296039)
- When using LU6.2 communications infrastructure between enterprise server regions, the processing of SYNCONRETURN on a Distributed Program Link was preventing switching between remote systems (SYSIDs). This has been fixed.

  02336501 (296104)
- When using LU6.2 communications infrastructure between enterprise server regions, an ABEND in the target region would result in the SEP which was processing the request hanging. This has been fixed.

  02287147 (259103)
- A DPL request from Tuxedo over LU6.2 could result in an RTS 114 error being reported. This has been fixed.

  02531060 (421001)
- HSF records for Java ECI transactions now display the transaction name instead of CASECIP.

  02338437 02353043 02394280 (296126)
- The latency value in HSF records could be incorrect for transactions started via DPL. This has been fixed.

  02504559 (407143)
- Some Redis connections from `castmc`, `castrc`, and `cassi` processes were not being disconnected and remained open. This has been fixed.

  02198949 (222162)
- The `casstart` utility now accepts variable wait times for the `/w` parameter. See *casstart* in your product Help for more information.

  (365010)
- HSF now reports that 100% of transactions meet performance criteria when no transactions are measured for that period.

  (385065)
- Dynamic Debugging failed on secure enterprise server regions with certain security configurations. This has been fixed.

  02408468 (363059)
- Enterprise Server Clustering is now deprecated. Micro Focus recommends that you adopt the Scale-Out Performance and Availability Cluster (PAC) solution for your clustering requirements. See *Scale-Out*

Performance and Availability Clusters in your product Help for more information. In addition, the LOCKDB feature has been added to replace the functionality of the Enterprise Server Cluster Global Lock Manager (GLM). See *Enterprise Server LOCKDB* for more information.

(363157)

- An enterprise server region sometimes crashed after MFCS and the ADMIN SEPs were killed. This has been fixed.

02415369 (364089)

- A new CGI threshold type has been implemented in Enterprise Server. This enables you to set up threshold values for ESCWA and ESMAC requests by applying the global `=CGI` to all ESCWA and ESMAC requests, or by specifying the corresponding `casrdo` or `casrdj` module that you want to control.

02426463 (370004)

- You can use the new ES_HARD_KILL_PROCESS environment variable to modify how Enterprise Server kills a process. See *General Enterprise Server Environment Variables* in your product Help for more information.

02365440 (355015)

- Added a new Retrieve action to the `caspac` utility to enable you to retrieve binaries loaded on an SOR. See *caspac* in your product Help for more information.

(284104)

- A new `/z` parameter has been added to the following commands-line utilities: `casfile, casout, casstart, casstop, cassub, castran,` and `casutl.` The parameter enables you to pass user credentials through an interactive prompt or a redirection from the console. See the respective command-line topics in your product Help for more information.

(303013)

- In Enterprise Server with LDAP-based security, the effect of the value `0` for the attribute `microfocus-MFDS-User-MTO-Timeout` was documented incorrectly. When this value is `0`, the enterprise server region's default user timeout is used. See *Defining a User with LDIF* in your product Help for more information.

02305957 (276010)

- The following environment variables can now be configured as properties on the ESCWA **Advanced Region Properties** page: ES_SEP_DORMANT_TIME, CAS_SRV_CANCEL, and ES_MAX_CATALOG_LINES.

(348002)

- The following environment variables can now be configured as properties on the ESCWA **Advanced Region Properties** page: ES_DDBG_PORT_RANGE, ES_ESMAC_DISP_MAX_OVERRIDE, and ES_SOR_RETRIES.

(306023)

- The supported list of cipher suites has been updated to TLS v1.3.

02320601 (401139)

- An issue that prevented the user ID from being found and that then failed to report this back to the application has been fixed.

02459379 (395007)

- When running with futex support, enterprise server regions would no longer start due to a logic error. This has been fixed.

(308024)

- In TRANCLASS enterprise server regions, non-TRANCLASS Temporary Storage Queue (TSQ) processing can now be enabled by setting ES_TRANCLASS_EXCEPT_TS=Y.

(387013)

- Support for TS queues of type Exclusive has been improved by correcting error conditions and now retaining queue recoverability after a DELETEQ.

  (386014)
- A bug in the `castsc` process meant that it could trap in casstore when a terminal disconnects. This has been fixed.

  (368001)
- In a PAC, access to an FCT could immediately reopen an FCT that had just been closed by another enterprise server region. This has been fixed.

  02421476 (375005)
- A WRITEQ TS using the REWRITE option against a non-existent queue was incorrectly returning ITEMERR instead of QIDERR when running with ES_TRANCLASS_EXCEPT_TS=Y. This has been fixed.

  02515519 (405171)
- An issue with the start initiator button not being correctly disabled when a user was not authorized for the `casout` resource (OPERCMDS) has been fixed.

  02503261 (401173)
- A loop that occurred when trying to recover PIDs after MFDBFH lost the connection to the database has been fixed.

  02373280 02362273 (322009)
- MQ security was being disabled when **Allow unknown resources** was enabled. This has been fixed.

  02328521 (288019)
- When a process dies in a PAC, `casmgr` in the recovery process tries to call MFDBFH to recover the process, close all files opened by that process, and release all the locks. If the connection to the database was lost, the call to MFDBFH would fail and the process only recovered if the connection was restored at region termination. Updates in this release now keep track of the process that could not be recovered and retries when the connection is restored. On region shutdown, all orphan ITRs that belonged to the current region are now removed. At start up, all orphan ITRs that were targeted to the region are removed.

  02345487 (303043)
- An incorrect HSF latency calculation when the transaction was using a TCPIPSERVICE has been fixed.

  02439855 (387136)
- When using DEFINE LIBRARY, `casrdtup` was hanging. This has been fixed.

  02422104 (372043)
- You can now specify thresholds for ESCWA and ESMAC requests using the new type CGI and by specifying the `casrdxxx` module name or a global threshold =CGI. This ends the request abnormally if the threshold is exceeded, and stops the admin SEPs from being blocked on long requests accessing ESCWA or ESMAC.

  (372055)
- Invalid messages have been removed from the Catalog Display when details are enabled.

  02501609 (405074)
- A local memory leak that occurred when logging XA transactions in a PAC has been fixed.

  02319834 (285102)
- An issue with MQ security checks when security resource prefixes are used has been fixed.

  02483959 (397010)
- Ambiguous MQ security rules failed to enable security checks. This has been fixed.

  02375426 (314055)

- The subsystem security switch was not being set to OFF when the MQADMIN class was not defined. This has been fixed.

  02483959 (399003)
- All authentication checks for Dynamic Debugging operations are now skipped if the `casdebug` entry is not available under the OPERCMDS security resource.

  02367824 (314007)
- An issue with MQ security console messages not containing the actual resource being checked has been fixed.

  02483959 (399002)
- Return code handling for create process requests on Windows platforms has been improved.

  02290153 (307032)
- When using LU6.2 communications infrastructure between enterprise server regions, an ABEND raised by the target application would result in subsequent attempts to establish a conversation to fail. This has been fixed.

  02339327 (297043)
- HSF reported latency for incoming remote DPL requests were not being reported correctly. This has been fixed.

  02455011 (392023)
- Security checks are now supported for Dynamic Debugging operations. Checks are carried out against the `casdebug` entry under the OPERCMDS resource class.

  02337725 (296095)
- When using `casesxml`, if the enterprise server definition has been exported using the `-c` option then you must import using the `-c` parameter.

  (351045)
- An issue with the TType page (Signoff attribute) affecting ESCWA and ESMAC has been fixed.

  (402014)
- In ESCWA, the field did not display the correct time. This has been fixed.

  02470813 (393069)
- The JSON ESMAC spool details module now reports the UUID of the PAC member which processed a batch job back to ESCWA.

  (293036)
- The ESCWA API call `/native/v1/regions/host/port/region/users/resource` has been fixed.

  02382647 (340024)
- When using the OpenLDAP client library on Linux, if the Timeout parameter is set in the [LDAP] configuration section, the MLDAP ESM Module will instruct OpenLDAP to set the TCP_USER_TIMEOUT socket option to correspond to the Timeout value. This improves OpenLDAP's ability to honor the timeout. However, the TCP_USER_TIMEOUT socket option only applies when sent data goes unacknowledged, or data cannot be sent because the server's receive window is closed.

  02446931 (387139)
- In some circumstances MFDS incorrectly granted permissions. This has been fixed.

  (365086)
- An Enterprise Server Security Manager using the MLDAP ESM Module with caching enabled no longer incorrectly caches partial results when an LDAP search cannot return the full result set due to the server's size limit on responses. The module will always switch to an LDAP paged search when necessary, bypassing the cache. This corrects an issue where customers with a large number of resource rules might sometimes get incorrect security results (typically access denied when it should not be) after the first time that resource class was queried.

> ✎ **Note:** If you cannot apply this fix, you can work around it by disabling caching for the Security Manager. ESF caching, which is set in the Security properties for the enterprise server region, can remain enabled.

02475614 (397047)

- Enterprise Server security did not always assign supplemental groups to users in certain configurations with multiple **Security Managers**, **Federation** enabled, and **All Groups** enabled. This has been fixed.

02145921 (202146)

- The ability to change passwords through the OS ESM Module was broken in version 1.10.4 of that module. That has been fixed.

02408023 02417238 (363081)

- Issues with changing passwords through the OS ESM Module have been fixed.

02408023 02425417 (370007)

- When using the OpenLDAP client library on Linux, the MLDAP ESM Module can now optionally set the connection-specific TCP keepalive parameters (idle time, interval, and number of lost probes before terminating the connection). See *MLDAP ESM Module Custom Configuration Information* in your product Help for more information.

02446931 (385125)

- For Enterprise Server LDAP-based security, a new configuration option, **[Operation] check constraints for already-verified users**, lets an MLDAP Security Manager deny sign-on for a user even if an earlier Security Manager has chosen to allow the Verify request. See *MLDAP ESM Module Custom Configuration Information* in your product Help for more information.

02346703 (297133)

- The `esfupdate` utility now supports the Micro Focus Vault Facility for retrieving secrets. See *To Update Security Manager Changes Using esfupdate* in your product Help for more information.

02510669 (406066)

- When both BATCHONLY and LOCALTX are set to true, one-phase-commit batch jobs no longer trigger two-phase commit connection in the recovery transaction.

02407338 (364098)

- The XA ODBC switch module now gets the correct server status, enabling the Enterprise Server RECONNECT feature to work correctly.

02408845 (362020)

- XA switch modules that use OpenESQL now work correctly when the applications in Batch transactions are compiled with XAID directive option.

02327393 (293012)

- The DB2 switch module now sets the PackagePath after switching to the user.

02269497 (258224)

- XA switch modules no longer return an MFDBFH registration error to Enterprise Server, ensuring that non-MFDBFH transactions continue using the XA connection.

02452753 (385055)

- The correct OCI_ATTR_SERVER_STATUS is now used to query Oracle Server status.

02391332 (335016)

- XA recovery is now performed correctly for DB2 in-doubt transactions when the enterprise server region is next started.

02474721 (402001)

- You can now build the SQL Server RM switch module on UNIX platforms. See *SQL Server RM Switch Module* in your product Help for more information.

(365126)

- The Region Trace Control process (`castrc`) was incorrectly creating multiple connections to Redis after a RD-NOAUTH return code. This has been fixed.

  02319798 (335004)
- Intermittent CONNECT_ERROR issues occurred when accessing data from MF Directory Server via ESCWA. This has been fixed.

  02532852 (425068)
- A socket handle leak occurred if the connection to the MF Directory Server process failed. This has been fixed.

  02435329 (382013)

File Handling

- The performance the Data File Editor has been improved when navigating within variable-sequential or line-sequential files accessed through a Fileshare server.

  (401106)
- File Status no longer returns `corrupt index file` for a non-corrupt file, under high traffic.

  02513640 (406155)
- A COBRT114 error no longer occurs when using read-direct on VB file header records.

  02490607 (400074)
- Background changes have been made to the external file handler when dealing with sequential files.

  (382072)
- Performance improvements have been made when navigating to the last page of a variable-length file in the Data File Editor.

  02476713 (394163)
- Fileshare could crash when processing some unexpected sequences of operations for a connected Data File Editor. This has now been fixed.

  02409270 (365144)
- In some scenarios, zombie processes could result in an incorrect reporting of open files in the system. This has now been corrected to better detect when such scenarios occur.

  (297118)
- It was possible for an ODBC/OCI exception (such as a connection timeout) to occur in the optimized I/O thread when accessing files via MFDBFH. This could cause the process to hang, and so defensive measures have been taken to resolve this.

  02481017 (405157)
- An issue where MFDBFH would incorrectly return a 9/139 error when attempting to open a file that did not have a key definition area specified in the FCD has now been fixed. The behavior is now the same as it is on disk.

  02394334 (350036)
- Oracle statements were previously using deprecated `OciStmtPrepare` calls, which meant that the Oracle application failover/transaction replay could not be used. This has been updated to now use `OciStmtPrepare2`.

  02441885 (384027)
- A timing issue when closing the connection to the database caused an SEP to crash on region shutdown. This has been resolved.

  (254034)

- The time required to return after reading a large number of records from large files hosted in MFDBFH was excessive due to the large number of SQL queries being executed. These queries have now been optimized to improve performance.

  02396919 (384007)
- Enterprise Server sometimes failed to recover processes that died after losing and then reestablishing a connection to the database. To mitigate this, Enterprise Server has been updated to attempt recovery of these processes at a later time in the event that the database connection cannot be reestablished.

  (326009)
- SYSOUT SSTM data sets were being incorrectly marked as using an In-Memory record-locking strategy when hosted within MFDBFH, which returned a 9/100 status due to multiple processes attempting to write display statements to the data set. In this scenario, SYSOUT SSTM data sets now use the default Table record-locking strategy.

  (299014)
- MFDBFH has been updated to be sensitive to the FAN settings on an Oracle Database, and is now immediately notified when the database attempts to drain connections. In this case, MFDBFH attempts to establish a new connection.

  (375030)
- When registering an XA connection with MFDBFH, the registration process attempted to connect to each entry in the `MFDBFH.cfg` file to determine if it matched the details of the XA resource. Underlying improvements have been made to reduce the number of connections made when the `MFDBFH.cfg` file contains duplicate entries.

  02459182 (390041)
- If the connection to an Oracle RAC environment was lost at a specific time, a COBRT114 error was sometimes thrown in the XA Switch module. Additional checks have been added to the code to ensure that this is no longer the case.

  02366126 (350015)
- When using an Oracle database, if the connection was lost, the process failed to reconnect once the connection to the database was reestablished. This has now been resolved.

  02410660 (363051)
- Oracle queries that issued searches against large files used a full-table scan, slowing performance. Performance has been improved by instructing the Oracle optimizer do a range scan instead of a full-table scan in this case.

  02516560 (406164)
- Additional diagnostics information has been added to assist in determining the cause of an RC 3 on MFDBFH recovery processing.

  02344102 (299021)
- A WRITE operation that used ADVANCING *mnemonic-name* sometimes threw an error. Support has now been added to handle WRITE operations with mnemonic usage.

  02209654 (246009)
- When a database ran out of available connections, stored procedures and functions were sometimes lost. This release contains updates that reduce this risk.

  02155281 (203093)
- A progress bar has been added to `dbfhdeploy` operations.

  (381028)
- A new environment variable, MFDBFH_GRANT_USER_PERMISSIONS, has been added for Oracle databases only to allow MFDBFH to grant execute privileges on types/procedures to specific users/ roles. This provides easier user privilege restriction on Oracle and creates a more secure environment without having to manually modify the MFDBFH scripts.

  02459320 (389032), 02441860 (384006)

- Additional checks have been added to verify the integrity of the region/cross-region database tables before running `dbfhadmin -casprocess -recovery`. If required, you are prompted to run `dbfhadmin -verify` to fix the table integrity before recovery can continue.

  02326339 (297036)

Micro Focus Common Client

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- Programs using the Micro Focus Common Client (MFCC) component, such as COBOL applications invoking a Web Service proxy created by the Interface Mapping Toolkit (IMTK), can now be built as single-threaded applications on Linux and UNIX. They no longer need to be executed under the multi-threaded COBOL runtime. Note: Multi-threaded applications are still supported.

  (306131)
- The Micro Focus Common Client now adds Accept and Origin headers with default values to HTTP requests if the invoking program has not set its own values for those headers. This improves interoperability with some Web services.

  Note: This affects COBOL Web service client proxy programs.

  (104096)

Micro Focus Cryptographic Library

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- The version of OpenSSL provided with the product has been updated to 1.1.1t.

  (407184)

Micro Focus Directory Server

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- MFDS stopped when supplied with the incorrect mfServer property when updating an enterprise server region. This has been fixed.

  02547102 (442003)
- The `casstart /s` option incorrectly copied the start-type parameter. This has been fixed

  02250159 (244185)
- An issue that sometimes caused MFDS to crash when starting multiple enterprise server regions simultaneously has been fixed.

  02310876 02409262 (286081)
- Micro Focus Directory Server internal session identifiers have been increased in size and complexity to reduce vulnerability to attack.

  02365249 (344004)
- Starting or stopping an enterprise server region using ESCWA or the MFDS UI intermittently terminated the process. This has been fixed.

  (415049)
- Modifying or deleting an enterprise server region's MFRHBINP Request Handler via the ESCWA user interface or API is no longer allowed.

  02525461 (413117)
- The **Validate** feature on an enterprise server region running on a UNIX platform sometimes incorrectly flagged a valid Web Services and J2EE listener as not startable.

  02370910 (318020)

- Enterprise server region start-up performance was slow when a large number of regions were specified on a Micro Focus Directory Server with a large number of values stored in the vault facility. This has been corrected.

  (394122)

- If the MFDS process could not access the TCP port it was configured to use, it failed to start and emitted the error message `HS0001S HTTP server failed to initialize, rc=6: CCITCP-0006E An invalid server or machine name was presented to CCITCP.` It now fails with the message `HS0001S HTTP server failed to initialize, rc=57: CCITCP-0057E Insufficient permission to complete an operation.`

  (388038)

- If the MFDS process could not access the TCP port it was configured to use, it failed to start and emitted the error message `HS0001S HTTP server failed to initialize, rc=6: CCITCP-0006E An invalid server or machine name was presented to CCITCP.` It now fails with the message `HS0001S HTTP server failed to initialize, rc=57: CCITCP-0057E Insufficient permission to complete an operation`

  02433110 (380037)

- Some audit events output when setting the **Create Audit Events** option for the MFDS process using the MFDS Web interface were not being output when using ESCWA to change the same configuration. This has been corrected.

  02412285 (365078)

- MF Directory Server Enterprise Server Administration HTML Web interface was accepting UNC paths as input values for some import and export operations. This has been fixed.

  02423785 (369017)

Micro Focus License Administration

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- Micro Focus License Administration now displays the licenses for the same product and serial number but with a different expiry date on separate lines.

  (365148)

- Some libraries have been updated to fix current known vulnerabilities.

  (295042) (295068) (309006)

- The SafeNet server list can now be used as expected.

  02341760 (259135)

Run-time System

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- The memory associated with a dynamic length item declared in local-storage was not released when the program instance exited, which led to memory leakage. This has been fixed.

  (443004)

- The Run-time System now produces an RTS error if the Profiler attempts to output an `.ipf` file in a read-only directory.

  (407092)

- An issue in the native Run-Time System's clean-up logic sometimes resulted in a crash when a .NET AppDomain running a .NET COBOL program was unloaded. This has now been fixed.

  02259505 (301047)

- Previously, in some ES region configurations, enabling CTF tracing for RTS API events could result in very large CTF trace log files, and cause an ES region to take a very long time to start. This has now been fixed.

  02320601 02497148 (403104)

- If a debugger process was killed on Linux (using kill -9 <pid>) then the debugger process could hang in certain circumstances. This has now been resolved.

  (387100)

- If multiple asynchronous run-units are created, with CBL_EXEC_RUN_UNIT on UNIX/Linux, then it was possible for some of them to be left marked as "<defunct>" in the OS process table. This has now been resolved.

  02537643 (422001)

- The CBL_CULL_RUN_UNITS API now more closely complies with the documented behavior on UNIX. It now clears all asynchronous run-units, when multiple run-units have terminated, and does not clear child processes that are not run-units.

  (439075)

- The event priority of a CTF API entry is set to a default value of 0 when CBL_EXIT_PROC is called with a function code that does not expect a priority or provides an invalid one.

  (380019)

Setup Issues (UNIX)

Back to the list

- The RPM installer for Enterprise Developer for Eclipse was missing some of the required components. This has been corrected.

  02366247 (306126)

- You can use the environment variable TMPDIR when installing the product. See *Visual COBOL Development Hub Installation Options* in your product Help for more information.

  (252002)

SQL: COBSQL

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- A problem with COBSQL that prevented it from handling the FETCH conversion of more than 100K rows has been fixed.

  02236464 (260248)

- COBSQL has ben updated to handle ENTRY statements broken into multiple lines.

  02417156 (367003)

- COBSQL has been modified to handle inline comments in EXEC SQL statements when using the SYBASE precompiler.

  (285007)

- COBSQL has been updated for SYBASE such that it no longer inserts a period when an EXEC SQL statement is coded inside of an IF block.

  01886033 (125015)

- COBSQL has ben updated to handle inline comments inside DECLARE blocks when Informix is used.

  02380790 (348020)

- The COBSQL preprocessor has been updated to support the ALPHA-LIT-CONT directive.

  02544092 (430025)

SQL: DB2 ECM

- The DB2 ECM now correctly sets the length of the PIC G host variables before CHARSET conversion.

  (424053)

SQL: Mainframe Batch Database Utilities (MBDT)

- A problem that occurred when loading a data record into a specific partition of a table in DB2 LUW where the partition column was of the DECIMAL data type has been fixed.

  02236304 02391344 (264096)
- A problem outputting a cataloged SYSPRINT in LSEQ format from SQLTP2 has been fixed.

  02493612 (405166)
- MINVALUE and MAXVALUE in the partition definition of a table in DB2 LUW are now supported.

  02552457 (442029)
- A performance issue that occurred when executing a large number of SELECT statements (>2000) using SQLTP2 has been fixed.

  02452507 (387078)
- A problem with tokenizing SELECT and FROM when they were the last word of a line has been fixed.

  02369123 (313049)
- A problem that caused `COND Code=004` to be returned when no rows were unloaded by SQLTUL or DSNTIAUL has been fixed.

  02564044 (448064)
- A problem that prevented the full description of SQL Warnings and Errors from appearing in the SYSPRINT generated by SQLTUL has been fixed.

  02368699 (314014)
- A problem that occurred when using empty string '' in the projection list of SELECT statement with SQLTUL has been fixed.

  02333999 (296042)
- A problem with using SQLUTB LOAD to print SYSPRINT for concatenated SYSIN that has multiple LOAD commands has been fixed.

  02457219 (385098)
- A problem loading SQTUL into Enterprise Server for execution on Linux caused an RTS114 error. This has been fixed.

  02430243 (393022)
- A problem with defining DCB with RECFM only for SYSREC when using SQLTUL UNLOAD has been fixed.

  02430243 (394076)
- A problem that occurred when using POSITION(*) and POSITION(*+*n*) in the field specifications for SQLUTB LOAD has been fixed.

  02355299 02456205 (307056)
- A problem that occasionally caused an ABEND by SYSPRINT, FCD3 STATUS: 9 when executing the SQLUTB utility to unload/reload DB2 LUW tables multiple times in one JCL job has been fixed.

  02432703 (372071)
- A problem unloading data from empty views (or tables) that contained varchar/varbinary columns using SQKUTB has been fixed.

02500000 (405182)

- A problem loading the implied decimal data into tables with SQLUTB has been fixed.

02361847 (310040)

- A problem with using SQLTUL to unload CLOB and BLOB data into a record with other fields when the LOGFILE parameter was not specified has been fixed.

02463342 (389044)

- A problem that occurred when setting null values to 0x00 bytes in the unloaded data sets generated by SQLTUL/DSNTIAUL has been fixed.

02348857 (372004)

- A problem with executing SELECT statements that had a large number of rows with SQLTUL has been fixed.

02398804 (363147)

- A problem using a large-size SQL statement (up to 64K) as SYSIN input for SQLTUL has been corrected.

02335290 02346228 (272013)

- The DEFAULTIF option in DSNUTILB LOAD and SQLUTB LOAD is now supported when the condition parameter is a character-string.

02456269 (386112)

SQL: OpenESQL

Back to the list

- A problem that caused erroneous memory usage in the OpenESQL run time has been fixed.

02321779 (293023)

- A problem that prevented parameters in the ADO UNBIND CONNECTION statement from being replaced has been fixed.

(406004)

- A problem that prevented a temporary table from being created has been fixed.

02494026 (401152)

- A problem that prevented PostgreSQL from applying the expected values when set statements contained three or more host variables has been fixed.

02506484 (405077)

- The .NET 6 ODBC Nuget package was missing some dependencies. These are now included.

02474422 (395110)

- The column length of a VARCHAR type column was returned incorrectly when the SQL statement was being prepared dynamically. This has been corrected.

02503856 (405091)

- A problem that prevented database locks from being released at the end of an DSNALI transaction when using switch modules that use OpenESQL has been fixed.

02307521 (296031)

- A problem that occurred when specifying the SQL(CLOSE_ON_ROLLBACK=NO) directive caused SQL Server to automatically close a cursor after a rollback statement has been corrected. The cursor is now defined as a fast-forward cursor instead of a fire-hose cursor.

(401104)

- A problem with the ODBC ECM that produced a subscript-out-of-range error when using a host variable with a leading FILLER item before a data item in an SQL statement has been fixed.

02334866 (312064)

- A problem that sometimes occurred when compiling DBCS code in SJIS locale for embedded SQL applications has been fixed.

  02349559 (301080)

XML Support

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- The XML runtime now performs better when reading a large XML file.

  02526445 (417029)

Known Issues

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

In addition, note the following:

- In Visual COBOL 4.0 and 5.0 in an extremely small and limited set of cases, an issue could occur with running .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 the newer versions of Visual COBOL.

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

- On the Solaris platform, Enterprise Server Common Web Administration (ESCWA) cannot enable the External Security Facility (ESF). This results in ESCWA failing to enable user authentication and authorization. However, you can still enable authentication and authorization for the Micro Focus Directory Server (MFDS) and corresponding enterprise server regions.

Other Issues Resolved in This Release

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

- (295041)
- 02508043 (407049)
- 02479358 (393153)
- 02504425 (424001)
- 01901711 (127012)
- 02287394 (258209)
- 02558536 (447020)
- 02190101 (363024)
- (381007)
- (384016)
- 02450685 (386098)
- 02423113 (364179)
- 02439474 (382038)
- 02453576 (385060)
- 00373758 (448044)
- 02500115 (406011)
- (402012)
- 02458038 (387132)
- 02544746 (425075)

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 - release 10.0. The SafeNet Sentinel licenses will not be supported after release 9.0. You can only use AutoPass licenses starting with release 10.0.

  You can replace your SafeNet Sentinel licenses with AutoPass licenses starting with release 8.0. However, it is not necessary to switch to AutoPass licenses unless you are adopting release 10.0. Contact Micro Focus Customer Care for further information.

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

Additional Software Requirements

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

Click here to see this information on the Product Documentation pages on Micro Focus Customer Care, in the product Help for Visual COBOL Development Hub.

Installing Visual COBOL Development Hub

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.

Installation on UNIX and Linux (Known Issues)

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/1b/
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.

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
x64 running Amazon Linux 2	Micro Focus	588 MB	2.35 GB	1.18 GB	50 MB
Amazon for Docker	Micro Focus	587 MB	2.35 GB	1.17 GB	50 MB
POWER running AIX	Micro Focus	1.06 GB	4.06 GB	2.03 GB	41 MB
System Z running Red Hat Linux	Micro Focus	482 MB	1.93 GB	964 MB	39 MB
x86-64 running Red Hat Linux	Micro Focus	865 MB	3.46 GB	1.73 GB	50 MB
64 running Red Hat Linux	Micro Focus	502 MB	2 GB	1 GB	50 MB
Red Hat for Docker	Micro Focus	592 MB	2.37 GB	1.18 GB	50 MB
SPARC running Solaris	Micro Focus	756 MB	3.02 GB	1.51 GB	42 MB
x86-64 running Solaris	Micro Focus	724 MB	2.90 GB	1.45 GB	33 MB
System Z running SUSE SLES	Micro Focus	435 MB	1.74 GB	870 MB	39 MB
x64 running SUSE SLES	Micro Focus	628 MB	2.5 GB	1.26 GB	50 MB
x64 running Ubuntu	Micro Focus	597 MB	2.39 GB	1.19 GB	50 MB
SUSE for Docker	Micro Focus	627 MB	2.51 GB	1.25 GB	50 MB
Ubuntu for Docker	Micro Focus	627 MB	2.51 GB	1.25 GB	50 MB
x86-64 running Rocky Linux	Micro Focus	865 MB	3.46 GB	1.73 GB	50 MB

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
Rocky Linux for Docker	Micro Focus	592 MB	2.37 GB	1.18 GB	50 MB
x86-64 running Oracle Linux - Red Hat Compatibility Kernel	Micro Focus	865 MB	3.46 GB	1.73 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 some platforms, there is only a 64-bit version of this product. 64-bit versions of the product support compiling to and running 64-bit programs only.

Software Requirements

Note: This product includes OpenSSL version 3.0.

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

* *Software required by the setup file*
* *Libraries required by the setup file*
* *Software required to run the product*
* *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.
* 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 always 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[1]	SUSE 15	Red Hat 7	Red Hat 8	CentOS 7	Ubuntu 18 and 20
glibc[2]	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[3, 4]	X	X	X	X	X	X	X	X	
cpp[3]		X				X	X	X	
libgc1c2		X							X

- Libraries marked with an 'X' are not included in the platform and need to be installed separately.
- [1]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.
- [2]On 64-bit Red Hat 7, you only need to install glibc-2.17*.x86_64 and glibc-2.17*.i686.
- [3]On Red Hat, these libraries are required to enable COBOL to compile.
- [4]On Red Hat, only the 64-bit gcc libraries are required.

Visit the *Red Hat Web site* for more information.

Software required to run the product

- Java 1.8 (64-bit) or later is required to run Visual COBOL Development Hub. The recommended version is Adoptium's OpenJDK Temurin 17 (LTS) with HotSpot. You can download Adoptium's OpenJDK Temurin 17 (LTS) with HotSpot from *Adoptium's Web site* and unpack the archive anywhere on your machine.

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/java*n*.*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.

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 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_9.0_platform
   ```
2. Run the installer with superuser permissions:
   ```
   ./setup_visualcobol_devhub_9.0_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 affects 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_9.0_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
  ```

Advanced Installation Tasks

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

The advanced installation tasks include:

- *Installing as an Upgrade* - included in these Release Notes
- *Command line installation options* - included in these Release Notes
- *Installing using an RPM installer on Linux* - available in the product Help and in the Micro Focus Infocenter

Click here to see this information on the Product Documentation pages on Micro Focus Customer Care.

Installing as an Upgrade

This release works concurrently with the previous version of Visual COBOL Development Hub, so you do not need to uninstall it.

Install the latest version in a different location and set the environment to point to it. To do this, run the Visual COBOL Development Hub installer with the –installlocation option:

1. Execute the following command:

    `./InstallFile -installlocation="/opt/microfocus/VisualCOBOL"`

    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"`

2. Execute cobsetenv to set the environment and point to the new install location:

    `. <product-install-dir>/bin/cobsetenv`

    Note: `cobsetenv` is only compatible with POSIX-like shells, such as bash, ksh, or XPG4 sh. It is not compatible with C-shell or pre-XPG4 Bourne shell.

Preserving Product Configuration

The following information applies when you are upgrading from releases 6.0, 7.0, or 8.0.

If you install this release to the same install location as release 6.0, 7.0, or 8.0, the product in the current location is moved to a backup directory name.

For example, if the 7.0 product is installed in the default install location, `/opt/microfocus/VisualCOBOL`, during the installation process it is moved to `/opt/microfocus/VisualCOBOL.BKP.YYYY-MM-DD.HH:MM:SS`. The new release will be installed in `/opt/microfocus/VisualCOBOL`. The backup location will store your original installation along with any files you deployed to that directory. It will also contain any configuration files you modified post-install.

When installing 9.0 the installer moves a number of specific configuration files to a different configuration location and symbolically links them back to the new release install location. The configuration location will be one of the following:

*   The default `config` location is `/opt/microfocus/config/`.
*   For non-root installation, the default location is `$HOME/microfocus/config/`.
*   To specify your own configuration location, run the setup file with the following command-line option: `-mfconfiglocation=[location]`

The setup file creates a directory in the configuration location using a 5-digit checksum of the $COBDIR path. This is so that each configuration location is unique to each product installation. The configuration files and directories are then placed in this COBDIR checksum directory. In the following example, the install location generates a checksum of `39082`.

The file `/opt/microfocus/config/39082/COBDIRlocation.txt` details the COBDIR the configuration area is associated with.

If you have changed any other files in the original installation, you need to be copy these manually from the backup directory, `/opt/microfocus/VisualCOBOL.BKP.YYYY-MM-DD.HH:MM:SS`, into the install location after the upgrade installation is complete.

You can access the configuration area from `$COBDIR/etc/config`.

Currently, the setup file only moves the following files and directories, where applicable:

Source	Destination
$COBDIR/etc/mfds	/opt/microfocus/config/39082/mfds/mfds
$COBDIR/etc/ccsid	/opt/microfocus/config/39082/config/ccsid
$COBDIR/etc/secrets	/opt/microfocus/config/39082/secrets
$COBDIR/bin/mf370ctl.cfg	/opt/microfocus/config/39082/config/mf370ctl.cfg
$COBDIR/bin/CCI.INI	/opt/microfocus/config/39082/config/CCI.INI
$COBDIR/deploy/.mfdeploy	/opt/microfocus/config/39082/deploy/.mfdeploy
$COBDIR/etc/cas/CTFesjcl.cfg	/opt/microfocus/config/39082/cas/CTFesjcl.cfg
$COBDIR/etc/cas/dfhdrdat	/opt/microfocus/config/39082/cas/dfhdrdat
$COBDIR/etc/commonwebadmin.json	/opt/microfocus/config/39082/escwa/commonwebadmin.json
$COBDIR/etc/mfdsacfg.xml	/opt/microfocus/config/39082/mfds/mfdsacfg.xml
$COBDIR/etc/mfdsacfg.dat	/opt/microfocus/config/39082/mfds/mfdsacfg.dat
$COBDIR/etc/mf-client.dat	/opt/microfocus/config/39082/mfds/mf-client.dat
$COBDIR/etc/mf-server.dat	/opt/microfocus/config/39082/mfds/mf-server.dat
$COBDIR/etc/cobol.dir	/opt/microfocus/config/39082/config/cobol.dir
$COBDIR/etc/cobopt	/opt/microfocus/config/39082/config/cobopt
$COBDIR/etc/cobopt64	/opt/microfocus/config/39082/config/cobopt64
$COBDIR/etc/cobjvm.cfg	/opt/microfocus/config/39082/config/cobjvm.cfg
$COBDIR/etc/cobutf8.cfg	/opt/microfocus/config/39082/config/cobutf8.cfg
$COBDIR/etc/default.tcf	/opt/microfocus/config/39082/config/default.tcf
$COBDIR/etc/mfescache.cfg	/opt/microfocus/config/39082/config/mfescache.cfg
$COBDIR/etc/dsdef.cfg	/opt/microfocus/config/39082/config/dsdef.cfg

Visual COBOL Development Hub Installation Options

Installing into a different location

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

```
./setup_visualcobol_devhub_9.0_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.

Configuring the Enterprise Server installation

You can use the following options to configure the Enterprise Server installation: `[ -ESsysLog="Y/N" ]` `[ -ESadminID="User ID" ] [ -CASrtDir="location" ]`, where:

-ESsysLog	Use this to enable ("Y") or disable ("N") Enterprise Server system logging. Logging is enabled by default. Log files are saved in `/var/mfcobol/logs`.
-ESadminID	Sets the Enterprise Server System Administrator Process User ID from the command line - for example, `-ESadminID="esadm"`. The default user ID is the one that runs the installer.
-CASrtDir	Specifies the location were the Enterprise Server run-time system files are placed - for example, `-CASrtDir="/home/esuser/casrt/es"`. The default location is `/var/mfcobol/es`.

Installing Silently

You can install Micro Focus products silently by using command line parameters to specify the installation directory, user information, and which features to install. You must execute the command with superuser permissions.

You can use the following command line arguments to install silently on UNIX/Linux. You need to execute the commands as root:

```
-silent -IacceptEULA
```

For example, execute:

```
setup_filename -silent -IacceptEULA
```

Installing using the TMPDIR environment variable

By default, the product installer uses `/tmp` for temporary files and log files during installation. If `/tmp` is not available on your system you can set the environment variable TMPDIR to an alternative location:

```
TMPDIR=/home/user/tmp
Export TMPDIR
```

Then run the installation as normal.

✏ **Note:**

The TMPDIR setting is lost when the installer is elevated to root user within the installer. This occurs when you run the installer as a non-root user, and are prompted for the root password during the installation process. Micro Focus recommends that you log in as root, set TMPDIR and then run the installer. If you use sudo to run the installer, then use the following command-line syntax:

```
sudo TMPDIR=$TMPDIR setup…
```

or:

```
sudo TMPDIR=/home/user/tmp setup…
```

After Installing

- Check the *Product Documentation* section of the *Micro Focus Customer Support Documentation Web site* for any documentation updates.

Setting up the product

If you have installed the product to a directory other than the default one, you need to set the environment as described below.

Note: The default directory is `/opt/microfocus/VisualCOBOL`.

1. To set up your product, execute:

```
. <product-install-dir>/bin/cobsetenv
```

2. To verify that your product is installed, execute:

```
cob -V
```

Important: These commands set the environment only for the current shell. You need to execute them for each new shell that you start.

To avoid having to run `cobsetenv` for every shell, add these commands to the shell initialization files (such as `/etc/profile`, `/etc/bashrc`).

Note that `cobsetenv` is only compatible with POSIX-like shells, such as bash, ksh, or XPG4 sh. It is not compatible with C-shell or pre-XPG4 Bourne shell.

Note: If there are two or more products installed on the machine or the products are installed in non-default locations then the `/opt/microfocus/logs/MicroFocusProductRegistry.dat` data file can be used to find the product locations.

The file contains the following entries:

```
[ Install Location ]#[ Date of Installation ]#[ Product Name ]
```

For example:

```
/home/user1/VisCobol30#2017-01-20#Micro Focus Visual COBOL Development Hub
3.0
```

```
/home/user1/CobolServer30#2017-01-20#Micro Focus COBOL Server 3.0
```

Configuring the Remote System Explorer Support

Note: The following only applies if you are using Visual COBOL Development Hub with Visual COBOL for Eclipse.

The remote development support from the Eclipse IDE relies upon Visual COBOL Development Hub running on the UNIX machine and handling all requests from the IDE for building and debugging programs. Visual COBOL Development Hub provides a UNIX daemon, the Remote Development Option (RDO)

daemon, which initiates the RDO as Eclipse clients connect to it. Whichever environment is used to start the RDO daemon will be inherited for all servers and hence all build and debug sessions.

Configuring the Environment

You may need to configure some aspects of the environment before you start the daemon. This is because when a build or debug session is initiated on the Development Hub from one of the Eclipse clients, the environment used will be inherited from whatever was used to start the daemon. A typical example of the kind of environment that might need to be set up would include database locations and settings for SQL access at build/run time.

Starting the Daemon

⚠ **Important:** Before starting the daemon you must have the following on your UNIX machine:

- A version of Perl.
- A version of Java 8 or later.
- The `as` (assembler) and `ld` (linking) programs on the path, as specified by the PATH environment variable.

The daemon can be run with or without parameters. If no parameters are specified, the process relies on the default values in `$COBDIR/remotedev/rdo.cfg`.

Use the following syntax to start the daemon (with super-user authority) on the remote host:

```
$COBDIR/remotedev/startrdodaemon [<port> <low port>-<high port>]
```

where:

- *<port>* is the port number that the daemon should use to listen for connections from Eclipse. If no value is given, it will default to the value specified in `$COBDIR/remotedev/rdo.cfg`; the default value on installation is 4075.

  Example: To start the daemon listening on port 4999:

  ```
  $COBDIR/remotedev/startrdodaemon 4999
  ```

  This command will override the default port in `rdo.cfg`.

- *<low port>-<high port>* is the range of ports on which the servers (launched by the daemon) should use to communicate with Eclipse on the client machine. If no values are given, the range defaults to that specified in `$COBDIR/remotedev/rdo.cfg`; the default range on installation is 10000-10003.

  Example: To instruct the daemon (on port 4999) to instantiate servers using a range of ports 4090-4993:

  ```
  $COBDIR/remotedev/startrdodaemon 4999 4090-4993
  ```

  This command will also override the default ports in `rdo.cfg`.

If the server has an active firewall, it is important that these ports are open in the firewall settings. You can use the `configrdo` utility to set the default ports in `rdo.cfg` to ones already open in the firewall. If you are running on Red Hat 7.2 (or later) or CentOS 7.2 (or later), you can also use the utility to open the required ports in the active firewall. See *Configuring the firewall* for more information.

Stopping the Daemon

To stop the daemon, type the following command with super-user authority:

```
$COBDIR/remotedev/stoprdodaemon <port>
```

Configuring the firewall

If the server on which Visual COBOL Development Hub is installed is running a firewall, you must ensure that certain ports and services are allowed through so that Eclipse running on a client machine can communicate with it.

To ensure successful communication between the IDE and Visual COBOL Development Hub when a firewall is active, use the `configrdo` utility after initial setup or if you experience problems establishing a connection between the two.

> 💡 **Tip:** If you run the client-side and/or server-side connection diagnosis tools, these include a number of tests relating to firewall configuration, and can indicate any problems with the current firewall settings.

Use `configrdo` to configure the following settings:

- Set the default RDO daemon and server ports used by Visual COBOL Development Hub.
- Open additional ports in the firewall.

    This option is only available on the following platforms: Red Hat 7.2 and later, or CentOS 7.2 and later.
- Add the ssh and samba services to the firewall.

    This option is only available on the following platforms: Red Hat 7.2 and later, or CentOS 7.2 and later.

These changes can be temporary (for the duration of the current firewall being active), or be made permanent (so that they persist after a system reboot). If you are not running any of the supported platforms listed above, use your operating system's firewall commands to perform the equivalent functions.

To configure the firewall settings

To be able to run this utility:

- You must have super-user authority (e.g. root user)
- $COBDIR must be set to the value of the product install folder for Visual COBOL Development Hub.

1. From a shell command, run the following:
   ```
   $COBDIR/remotedev/configrdo
   ```
2. At the `Daemon port` prompt, enter the port number that the daemon should listen on, or press **Enter** to accept the default.

   > 📝 **Note:** The default settings for these port prompts are specified in the `rdo.cfg` configuration file.

   The `Server range` is a range of port numbers that a required RDO server will be started on when the daemon receives a request.
3. At the `Server range low port` prompt, enter the starting number of the server port range and press **Enter**, or press **Enter** to accept the default.
4. At the `Server range high port` prompt, enter the ending number of the server port range and press **Enter**, or press **Enter** to accept the default.

   The defaults are written to the `rdo.cfg` configuration file.

   If you are running this utility on Red Hat 7.2 (or later) or CentOS 7.2 (or later), an additional prompt is displayed; otherwise, the utility closes.
5. At the `Do you want to configure the firewall` prompt, press **Y** and then **Enter** to configure further firewall settings, or press **N** and then **Enter** to close the utility. If you selected **Y**, the configured firewall zones are listed.
6. To configure an existing zone, press the corresponding number and then **Enter**, or press **Enter** for the default zone (as indicated at the end of the prompt).

> **Note:** At this point, you can also create a new zone: press **N** and then **Enter**, and then type the new zone name and press **Enter**. The new zone is listed, and you can now select its corresponding number to configure it.

The current firewall status is displayed, where it checks if the currently specified ports are open in the firewall; if they are not, the utility adds them to the firewall settings.

7. If you need to open more ports, press **Y** and then **Enter**, and then enter either a single port number, or a range, and then press **Enter**.

   The additional ports are opened.

8. If either of the ssh and samba services are not running in the firewall zone, you are prompted to add them: press **Y** and then **Enter** or **N** and then **Enter**, as appropriate, for each service.

   > **Note:** If the service is already running, you are not prompted.

   An overview of the firewall settings is displayed.

9. To save the changes permanently (that is, even after the firewall is restarted), press **Y** and then **Enter**; to save the settings for the firewall until it is next stopped, **N** and then **Enter**.

   The utility is closed.

> **Note:** If you need to remove any ports or services you have added to the firewall, use the `firewall-cmd` utility that is part of the operating system.

Enabling SHIFT-JIS

By default, support for the character encoding for the Japanese language, Shift-JIS, is not available on Ubuntu and on RedHat OS version 8 or later.

You need to generate the Shift JIS locale on your machine to be able to execute Shift-JIS applications on these platforms. You can do this as follows:

1. On RedHat 8, ensure that the `glibc-locale-source` package is installed.
2. Execute the following command with superuser rights in order to generate a Shift-JIS locale using the charset:

   ```
   sudo localedef -f SHIFT_JIS -i ja_JP ja_JP.sjis
   ```

3. Set the COBUTF8 environment variable to the generated Shift-SJIS locale and LANG to a UTF8 locale:

   ```
   export COBUTF8=ja_JP.sjis
   export LANG=ja_JP.UTF-8
   ```

4. Run the cobutf8 utility:

   ```
   cobutf8 <command>
   ```

   See your product documentation for more details about cobutf8.

Repairing on UNIX

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

Before performing a repair of the installation, Micro Focus recommends that you create backups of any configuration files of the product that you might have changed.

Uninstalling

> **Note:** Before you uninstall the product, ensure that the Enterprise Server instances and the Micro Focus Directory Service (MFDS) are stopped.

To uninstall this product:

1. Execute as root the `Uninstall_VisualCOBOLDevelopmentHub9.0.sh` script in the `$COBDIR/bin` directory.

   Note: The installer creates separate installations for the product and for Micro Focus License Administration. Uninstalling the product does not automatically uninstall the Micro Focus License Administration or the prerequisite software. To completely remove the product you must uninstall the Micro Focus License Administration as well.

   To uninstall Micro Focus License Administration:

   1. Execute as root the `UnInstallMFLicenseServer.sh` script in the `/var/microfocuslicensing/bin` directory.

      The script does not remove some of the files as they contain certain system settings or licenses.

   You can optionally remove the prerequisite software. For instructions, check the documentation of the respective software vendor.

Licensing Information

> ✏️ **Note:**
> - If you have purchased licenses for a previous release of this product, those licenses will also enable you to use this release.
> - 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*.

> ⚠️ **Important:** The SafeNet Sentinel licensing system has been deprecated and will be not available in this product starting with the next major release - release 10.0.
>
> The SafeNet Sentinel licenses will not be supported after release 9.0. You can only use AutoPass licenses from release 10.0.
>
> You can replace your SafeNet Sentinel licenses with AutoPass licenses starting with release 8.0. However, it is not necessary to switch to AutoPass licenses unless you are adopting release 10.0. Contact Micro Focus Customer Care for further information.

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

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

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

Installing licenses

You need a license file (with an `.xml` extension for AutoPass licenses). 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

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.

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.

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 Customer Care

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 Portal**.

> **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*.
- Micro Focus webinars: *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.

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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