



Micro Focus Enterprise Developer 9.0 for Visual Studio

Release Notes

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Micro Focus Enterprise Developer 9.0 for Visual Studio Release Notes

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



Note:

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

Product Overview

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

You can develop applications that have been migrated from the mainframe and that use mainframe technologies like CICS, JCL, and IMS. These compile to native COBOL code, as `.exe` or `.dll`. You then deploy and further debug the application under Enterprise Server.

The product is available in the following variants - Enterprise Developer for Visual Studio 2022. The execution environment for applications created with any of these product variants is Enterprise Server.

Upgrading from earlier Micro Focus products

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

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

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

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

What's New

This *What's New?* document covers some of the new features and functions in the latest release of the Micro Focus Enterprise Product Suite. Updates apply to the following products:

- **Micro Focus Enterprise Developer** which provides a contemporary development suite for developing and maintaining mainframe applications, whether the target deployment is on or off the mainframe.
- **Micro Focus Enterprise Test Server** which provides a comprehensive test platform that takes advantage of low cost processing power on Windows environments, to supply scalable capacity for testing z/OS applications without consuming z/OS resources.
- **Micro Focus Enterprise Server** which provides the execution environment to deploy fit-for-purpose mainframe workload on Linux, UNIX and Windows (LUW) environments on IBM LinuxONE (IFLs), standalone servers, virtual servers, or the Cloud.
- **Micro Focus Enterprise Server for .NET** which provides the execution and modernization platform to deploy fit-for-purpose mainframe workload on a scale-out .NET infrastructure and the Azure Cloud.

This document helps you to quickly understand the new capabilities within the 9.0 release.

Enhancements are available in the following areas:

- [Learn Micro Focus™ Learn COBOL extension and Micro Focus™ COBOL Fundamentals Course](#)
- [Micro Focus Enterprise Extension for Visual Studio Code](#)
- [Micro Focus COBOL Extension for Visual Studio Code](#)
- [.NET Support](#)
- [COBOL Language](#)
- [Compiler Directives](#)
- [Data Modernization Advice](#)
- [Debugging](#)
- [Enterprise Server](#)
- [Enterprise Server Common Web Administration \(ESCWA\)](#)
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- [Micro Focus Unit Testing Framework](#)
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- [Terminal Emulation](#)
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- [Visual Studio Integration](#)

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

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Micro Focus has released a new video-based training course in COBOL, Micro Focus™ COBOL Fundamentals Course. The course teaches the fundamentals of the COBOL language, introduces the Micro Focus™ 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™ 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™ COBOL Extension for Visual Studio Code, visit www.cobol.com.




Note: This extension is not included with the Enterprise Developer installer.

Micro Focus™ Enterprise Extension for Visual Studio Code

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The following features are now available in the Micro Focus™ Enterprise Extension for Visual Studio Code when you use it with Enterprise Developer 9.0:

- A PL/I Language Server is available. This enables the following advanced features in the PL/I editor - Find All References, Peek, **Outline** view, collapsible regions, Rename, Navigate To, background error reporting, variable highlights.
- A new button, , **Debug PL/I Program** or **Run PL/I Program** in the top right corner of the editor, is present for the current PL/I program.
- You can now specify the PL/I main file context for include files if an include copybooks is referenced in more than one program.




Note:

- This extension is not included with the Enterprise Developer installer.
- This extensions also installs the Micro Focus™ COBOL Extension for Visual Studio Code.

Micro Focus™ COBOL Extension for Visual Studio Code

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The following features are now available in the Micro Focus™ COBOL Extension for Visual Studio Code when you use it with Enterprise Developer 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 Enterprise Developer installer.

.NET Support

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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

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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

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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 and Mainframe Subsystem 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 .NET COBOL programs as byte arrays (the default is to expose as string objects).
- ILSTRINGLOAD - where .NET 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 ILGEN.
- 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.

Data Modernization Advice

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The product Help now includes advice on moving your COBOL data files, such as flat files, VSAM, indexed or sequential files, etc. to a relational database (RDBMS). The documentation lists the solutions included in Enterprise Developer that enable you to achieve this, including advice on the best option for your application as well as performance considerations.

Debugging

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This release provides the following new feature:

- In Visual Studio, you can now debug .NET COBOL projects in WSL.

Enterprise Server

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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.
- Enterprise Developer CICS now supports the MAPPINGDEV option of SEND MAP and RECEIVE MAP commands.
- Application diagnostic reporting now enables you to collect JCL process failures. See *Application Diagnostic Reporting for Enterprise Server* for more information.

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 Enterprise Developer. 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.

HCO for PostgreSQL

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This release includes support for the following:

- PostgreSQL Global Development Group (GDG) community edition and Amazon AWS via new options for the TARGETDB directive.
- Migration of z/OS DB2 COBOL programs to PostgreSQL GDG community edition.



Attention: Support for PostgreSQL Global Development Group (GDG) community edition 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.

IMS Support

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This release includes the following new features for IMS:

- A new environment variable, `ES_IMS_DISPLAY_NEW`, has been added to enable the new z/OS / `DISPLAY` timestamp output format.
- APARM handling has been updated to use EBCDIC APARMS obtained from EBCDIC applications. In addition, the APARM positional parameter for DLI has been changed from 19 to 20 to be consistent with the IBM IMS documentation. The APARM positional parameter for BMP applications remains at 19.
- The `ES_IMS_APARM_DLI` environment variable has been added to enable the APARM handling behavior of previous releases. See *ES_IMS_APARM_DLI* for details.

Interface Mapping Toolkit

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This release provides the following enhancements:

- YAML support is now available for COBOL client generation. OpenAPI schemas can now be in YAML, in addition to JSON format.
- The Interface Mapper user interface for COBOL program-based service interfaces has been updated. The **Interface Fields** pane available in earlier versions is now represented by two panes — **Interface Fields - Input** and **Interface Fields - Output**. The **COBOL Entry Points** pane is situated between these two new panes. The relationships between COBOL entry points and corresponding interface, COBOL assignment, and reusable fields are depicted visually using arrows. The panes can be repositioned for easier viewing of arrow relationships.

JCL Support

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- In this release the security around running programs from JCL jobs has been enhanced to enable you to limit:
 - The location of the programs to load
 - Permission to run particular programs based on user ID

This release writes several additional messages to the job log as a JCL job runs, including the location from which each program is loaded. For example:

```
JCLCM0303I Program IDCAMS (MFJAMS) loaded from library
SYS1.LOADLIB
```

When running one of your own programs, you might see messages such as:

```
JCLCM0305I Failed to find program JCLREAD in private libraries
and SYS1.LNKLIB.
JCLCM0306I Number of SYS1.LNKLIB entries: 0.
JCLCM0303I Program JCLREAD loaded from library SYS2.LOADLIB.
```

Combined, these three messages indicate that the program was not found in the main program search path (SYS1.LNKLIB) but has been loaded from the JES Program Path (SYS2.LOADLIB).

For more information about increased JCL security checks including a configuration example, see *JCL Enhanced Security Checks* in your product Help. For information about suppressing security check messages in the job log, see *ES_JES_HIGHER_SECURITY_LEVEL*, also in your product Help.

- The `MF_SPLJNO_LOCK` environment variable has been added. Using this variable, you can change the process by which the JES engine accesses the job number of a JCL submission to enable enqueueing, which can increase throughput, reduce latency, and reduce disk/file access. For details, see *MF_SPLJNO_LOCK*.

Mainframe Access

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This release includes the following new features for:

- Mfdaemon vault usage - the Mfdaemon persistent stored secrets are now stored in the vault.
- TAUZCAPP master configuration file location from JCL - MFA Server now enables you to specify the location for the master configuration file, required by TAUZCAPP, to be performed via JCL instead of having to edit a REXX script.

Micro Focus Unit Testing Framework

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The Micro Focus Unit Test Seam pre-processor (mfupp) has been enhanced to aid the creation of self-contained unit tests that contain EXEC CICS or EXEC SQL statements. These EXEC statements can be removed or mocked depending on the requirement of the test case.

The Micro Focus Unit Test Runner has also been enhanced to aid the development of these styles of unit tests by the addition of new code generation arguments available from the command-line interface.

OpenESQL

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In this release, OpenESQL applications now support z/OS DB2 syntax for the community version of PostgreSQL provided by the Global Development Group (GDG).

PL/I

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This release includes enhancements in the following areas:

Open PL/I Compiler:

The following enhancements make the migration of existing applications to new platforms easier. They also provide an improved functionality when using Open PL/I to develop z/OS applications.

- The QUICKSORT and QUICKSORTX built-in functions are now supported.
- Restricted expression evaluation now also takes place on AUTOMATIC, DEFINED, and BASED declarations in addition to STATIC which was added previously.
- Support is available for the XMLCONTENT attribute.
- The use of the RELEASE statement now implies OPTIONS(FETCHABLE).
- Improvements have been made to the support for factored lists used in the INIT attribute of a variable declaration.
- DEFAULT RANGE(*) with no attributes no longer causes the compiler to abort.
- Support is available for the FIXEDOVERFLOW condition.
- Support is available for the FOFLONASGN, FOFLONDIV, FOFLONMULT, FORCEODD Fixed Decimal behaviors.
- Support is available for validation of FIXED DECIMAL data.

- Support has been added for more than 2GB of static data in a single procedure.
- Support has been added for placing uninitialized static data in the .BSS section.
- Improved diagnostics when passing an array to a procedure which expects an array with differing attributes.
- Improved diagnostics when passing CONTROLLED variables as parameters and attributes are in conflict.
- PL/I FETCH xxxx SET() syntax supports setting a PL/I ENTRY LIMITED.

Open PL/I Debugger:

- Performance improvements on the display of arrays and complex structures.
- Support for arrays declared with negative array bounds.
- Improved debugger performance when watchpoints are set but not active.
- Improved breakpoint clean-up and handling in-between debugger sessions under Enterprise Server.
- Added a message to PLIDUMP to print {cond static external} for CONDITION declarations in the locals section rather than printing a generic "variable not found" message.
- Added support for decorated symbol/variable names in PLIDUMP on Windows.
- New watch points are now honored after a CONVERSION condition was raised.
- Remote debugging is supported on Solaris (SPARC).

Open PL/I EXEC Preprocessor:

- It is now possible to specify DB2 LUW OPT guidelines within static SQL.
- The stability of CICS API calls on 64 Bit Solaris (SPARC) has been improved.

Open PL/I Macro Preprocessor:

- The COMMENT built-in function now supports comments larger than 100 bytes in length.
- The -tagmin preprocessor option supports skipping of %SDEBUG; and %RDEBUG; statements when the replacement text fits on the same line as the macro invocation without wrapping.
- The conditional statements processing has been improved.

Open PL/I Language



Note: These features are in Early Adopter Program (EAP) release status. We intend to provide the finalized features in a future release. Please contact Micro Focus Customer Care if you require further clarification.

- Open PL/I now supports ordinals via the DEFINE ORDINAL statement, the ORDINAL attribute for the DECLARE statement, and the ORDINALNAME, ORDINALPRED, and ORDINALSUCC built-in functions.
- The DO statement now supports UPTHRU and DOWNTHRU.

Open PL/I Run-Time System:

The following enhancements are available:

- Support for more than 2GB of static data in a single procedure.
- Support for placing uninitialized static data in the .BSS section.
- JSONPUTMEMBER now supports quotation marks within its input.
- Support for the XMLCONTENT attribute.
- The PL/I Run-Time System optionally provides the ability for ERROR to be driven in place of STRINGRANGE and SUBSCRIPTRANGE.
- PLIDUMP display of the offset within prologue code a signal is received within the prologue of a PL/I procedure.
- Support for FIXEDOVERFLOW condition.
- Support for FOFLONASGN, FOFLONDIV, FOFLONMULT, FORCEODD Fixed Decimal Behaviors.
- Support for validation of FIXED DECIMAL data.

- The speed for FIXED DECIMAL operations has been improved.
- The stability of CICS API calls on 64 Bit Solaris (SPARC) has been improved.

Product Help:

- The product Help includes a new section on Open PL/I Conditions.
- A new section, *Open PL/I Problem Determination* is available. Reference this section to learn how to mitigate execution, link, and debugger problems, how to use PLIDUMP to resolve issues, and also to learn about specific PL/I-related information pertaining to the use of the Consolidated Tracing Facility. This new documentation also includes a list of data items you need to collect before raising a PL/I problem with Micro Focus Customer Care.

Terminal Emulation

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This release provides the following new features.

- Enterprise Developer and Enterprise Server now incorporate Host Access for the Cloud (HACloud) to provide 3270 emulation. HACloud is the leading Web-based emulator and requires no additional desktop installation. HACloud replaces the Rumba+ Desktop emulator previously supplied with Enterprise Developer. Customers that have Rumba+ Desktop entitlement can continue to use it within Rumba+ Desktop.
- In this release, Host Access for the Cloud supports session configuration options, as well as creating and using macros.
- IDE support for Micro Focus Reflection Desktop - you can now select Reflection Desktop as the default TN3270 display to open from the IDE when you run or debug your TN3270 applications. You can now play Reflection or Rumba+ Desktop macros with Reflection Desktop.

Tracing

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This release provides the following enhancements and new features:

- Improvements have been made to the to the Common Communications Interface (CCI) tracing. CCI tracing can now be enabled using only the Consolidated Trace Facility (CTF) configuration, without needing to set trace options in CCI.INI or the environment as well. SSL/TLS trace points have been added to the CCI CTF trace, making it easier to control. It uses the same mechanism as other components such as the COBOL RTS. SSL/TLS tracing is now incorporated into CTF, placing all communications trace output in one place and adding timestamps and other useful information to these tracepoints. See *Enabling CCI Tracing* for more information.

Visual Studio

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This release provides the following new features:

- Converting JSON data to COBOL classes - you can now copy JSON data and use the **Paste JSON As Classes** command to copy it into a .NET COBOL file. This generates COBOL classes that enable you to deserialize the data in those classes.
- Document Outline window for COBOL files.
- Editor support is available for local variables and parameterized sections.

- Format with code cleanup can now be configured to change any keywords in your code to lowercase or uppercase.

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).

- [.NET Support](#)
- [Compiler](#)
- [Data Tools](#)
- [Documentation](#)
- [Enterprise Server](#)
- [File Handling](#)
- [HA Cloud](#)
- [IMS Support](#)
- [JCL Support](#)
- [Micro Focus Directory Server](#)
- [PL/I Support](#)
- [Runtime System](#)
- [Setup Issues \(Windows\)](#)
- [Visual Studio IDE](#)

.NET Support

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- The 9.0 release installs several .NET 6 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.

Building existing .NET COBOL projects created prior to 9.0 might result in build errors. You can ensure compatibility by enabling the use of the `MicroFocus.COBOL.Runtime` metapackage. Alternatively, you need to add any required NuGet packages manually to the older projects.

See *Upgrading existing .NET COBOL project files* in the product Help for details on how to upgrade.

Compiler

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- Preprocessor options of more than 256 bytes are now supported, and no longer cause the Compiler to crash.

02289875 02308713 (272069)

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)


Documentation


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- To correct an error that sometimes occurred when generating IMTK clients, you must install the latest version of the Visual Studio MSVS Workload > C++ x64/x86 component.
(400031)
- When using the cob command to link PL/I programs targeting Enterprise Server, you must include the `-lmfpdfpz` parameter in your link command to avoid problems in multi-step jobs.
02451241 (386064)
- FIXEDOVERFLOW conditions are now implemented and will occur when detected.
02163371 (203207)

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, the **Spool** page can now display multiple **Spool Output** types.
02503214 (401184)
- ESCWA now supports Expiration Dates for Catalog DCB.
02159515 (202201)
- 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)
- ESCWA now supports merged archive spool. See *Spool* in your product Help for more information.
(245050)
- 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 CAS11405S 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)
- A recent change resulted in EXEC CICS TIME(...) expiring immediately. This has been fixed.
02525957 (411120)
- 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)
- When submitting JCL by content via ESCWA or the JCL command `cassub`, Enterprise Server will now authorize the request against a new `cassub.content` resource class under `OPERCMD5`. If this class is

not specified then Enterprise Server will revert to existing behavior. See Resource Classes for ESMAC and Operator Command Security in your product Help for more information. A prototype definition has been provided in the standard LDIF files shipped with the product.

(313048)

- A new parameter, `-i` has been added to the `cassub` utility. This parameter enables the user to specify a correlator up to 32-bytes long comprised of ASCII printable characters. The JCL engine will ensure this correlator has not previously been supplied for a JCL JOB. If a duplicate correlator is detected, the job submission will be rejected and the previous JOB ID will be returned. See `cassub` in your product Help for more information.

02462072 (394004)

- 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)

- When a CICS abend occurs, the 4 letter abend code now appears after the Transaction ID in HSF records. There has been no change in behavior in the case of an RTS abend, where the transaction name followed by ABEND still appears.

(246037)

- EXEC CICS INQUIRE TASK LIST now includes dispatchable (queued) tasks in the returned LISTSIZE parameter.

(365089)

- When performing a DPL targeting a program that had an installed PPT specifying that it was remote, the use of the TRANSID option on the LINK would be ignored. This has been fixed.

02434323 (386136)

- 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)

- ICETOOL emulation now supports the RESIZE operator.

(350035)

HA Cloud

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- The default color scheme for HA Cloud in Enterprise Server has been updated to cyan on black.

(291041)

- The bundled Host Access for the Cloud (HACloud) Session Server has been updated to 2.7.0.6.

(375012)

- Micro Focus Host Access for the Cloud shipped with Enterprise Developer now offers session customization options such as connection, and display options, and the functionality to record, and run macros.

(392026)

IMS Support

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- A problem that occurred when a restart call (XRST) referencing a checkpoint ID received checkpoint data that originated from a different program when a shared checkpoint log file was used and the other program issued the same checkpoint ID has been fixed. IMS now requires that the name of the program issuing the XRST must match the name of the program that issued the checkpoint.

(310065)

- The JES alias feature is now supported for IMS application main programs executed from JCL.

02356855 (308032)

JCL Support

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- After the release of Enterprise Developer 7.0 PU17 and 8.0, the structure of the M_SPL_JOB.dat file was updated. If you are upgrading to this release from a release that does not contain the update, you must rebuild M_SPL_JOB.dat using the following command, and then replace M_SPLJOB.dat with NEW_M_SPLJOB.dat before executing the merge spool job.rebuild M_SPLJOB.dat,NEW_M_SPLJOB.dat /r:v344-604

02516141 (407126)

- When performing an IDCAMS REPRO on a cluster with the LIKE parameter set, if the LIKE cluster has data or index references associated with it, then similar data and index references are now created for the new cluster.

02358077 (363063)

- If an XA switch module failed while a DSNRLI program was using it then there was no way to programmatically restart the switch module. This has been corrected. If a module fails with an TX_FAIL error code (-7) the module can be reassociated with the unit of work by calling DSNRLI IDENTIFY. In this case the check for the correct DSNRLI call ordering has been suspended so that IDENTIFY can be called after an TX_FAIL error. The TX_FAIL return code will be passed back to the calling program so that it is aware of the error. TX_FAIL is -7 and will replace the normal DSNRLI return code (8).

02364792 (323018)

- System symbols, defined in SYS1.PARMLIB(IEASYM00) can now be filtered by use of the LPARNAME entry. See INITSYS.JCL in the jcl-symbols examples.

(387029)

- Security for loading utility programs, either supplied by the user or any Micro Focus utilities, has been increased. Users can now specify a number of libraries that hold program modules and who can use them. See JCL Enhanced Security Checks in the product Help for more information.

PSEC:103014 (86177)

- When a dataset is required by MFFTP to be sent (put) or received (get), then MFFTP issues a dataset lock that remains in effect until the end of the step. The location of the physical files used by MFFTP are also validated against the PHYSFILE rules (if implemented). This access validation could cause security errors if access is not allowed to the location of the FTP input and output file and might require that the location be changed. This is usually the default allocation location, but may also be specified by MFFTP_TEMP_DIR, or by adjusting the PHYSFILE rules to accommodate the location.

02210700 (244030)

- A step running IKJEFT01 was incorrectly returning the highest return code of all commands executed instead of the return code of the last command executed. The MF_IKJEFT_KEEP_MAX has been added to correct this problem. Its default setting is MF_IKJEFT_KEEP_MAX=N. However, if the new behavior leads to a change in the COND CODE, and this is a problem for your application, you can return to the original behavior by setting MF_IKJEFT_KEEP_MAX=Y.

02532126 (415094)

- When the return code from an IKJEFT step exceeded 4095 it could be incorrectly adjusted depending on the IKJEFT program called. To remedy this, the return code when IKJEFT01 is called is changed to 12. Also, when IKJEFT1A or 1B is called, the return code is adjusted to RC modulo 4096.

02514544 (406145)

- DSNRLI return codes did not always correctly reflect the outcome of the SRRCMIT and SRRBACK functions. This has been fixed.

(408001)

- When the result of a SRRCMIT or SRRBACK call was a MIXED status, meaning that some XA modules committed or rolled back and some did not, then DSNRLI issue either commit or rollback upon shutdown at the end of the step. This was incorrect. DSNRLI will not issue commit or rollback at step end. The XA Recovery processing maybe able to recover the 'in doubt' transaction.

02512717 (406089)

- MFFTP has been enhanced to pass relevant file transfer information for FTP operations such as PUT, GET, and DEL, to a user exit defined by the new environment variable, MFFTPXIT. To enable the exit, set MFFTPXIT to a user-exit program file, for example, the provided MFFTPXIT.cbl sample file. A list of valid parameters is in the provided mfftpxit.cpy copybook. When the user exit is enabled and an FTP step returns a non-zero code, a copy of the *.op FTP output file is created using the *.out extension in either the defined MFALLOC_LOC or MFFTP_TEMP_DIR location. Use the *.out file to determine the cause of FTP operation failures.

02287628 (259117)

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)

PL/I Support

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- When assigning a PICTURED item into a FIXED DECIMAL, FIXEDOVERFLOW is now triggered if enabled and the target source or precision is not large enough to fit the PICTURED representation.

(400099)

- The Open PL/I compiler erroneously allowed OFFSETVALUE(POINTER)), namely offsetvalue(sysnull()). The correct usage is: offsetvalue(binarvalue(sysnull())).

(386070)

- The internal consistency error in the PUT EDIT statement with a DO-loop that was never iterated has been fixed; however, we recommend avoiding dead DO-loops in PUT EDIT statements as they result in redundant code.

02518315 (407194)

- The Open-PLI compiler now performs Restricted Expression Evaluation on AUTOMATIC, DEFINED, and BASED declarations in addition to STATIC declarations as in previous releases.

00368483 (11358)

- The OPTIONS and LIMITED attributes now imply type ENTRY to correct a problem wherein type was not specified and the default type was set by applying the I-N rule to the variable name.

02048549 (165087)

- The behavior of the PRECISION built-in was incorrect for most data types, except FIXED BIN, FIXED DECIMAL, and PICTURE. This has been corrected.

(363237)

- When passing an array argument to a procedure with differing array dimensions or extents of the corresponding parameter descriptor, a dummy argument was created. To correct this, a Severe diagnostic message is now generated instead. In addition, when an array argument with variable extents was passed to a procedure whose corresponding parameter descriptor had constant extents, a dummy argument was created. To correct this, the array argument is now passed by reference and a Warning diagnostic is generated. Both of these issues apply to passing arrays without surrounding parentheses.

02310772 (286006)

- Previously OPTIONS(FETCHABLE) was not implied by the coding of a RELEASE statement for an ENTRY. This has been fixed.

01862366 (120035)

- Data exception 8097 now occurs when the sign nibble of a fixed decimal value does not contain a valid sign 0x0A thru 0x0F during an arithmetic operation, conversion, or assignment.

02198788 (222107)

Run-Time System

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- 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)

- Previously, .NET COBOL applications that use OpenESQL/ODBC could fail to run with a license error when deployed to a COBOL Server. This has now been fixed.

02490119 (406153)

- 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)

- 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)

Setup Issues (Windows)

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- Micro Focus Host Access for the Cloud emulator replaces the Micro Focus Rumba+ Desktop emulator previously supplied with the installer for Enterprise Developer for Eclipse or Visual Studio. Customers that have Rumba+ Desktop entitlement can continue to use it within Rumba+ Desktop.

(335003)

- In Windows 11 it is now possible to open COBOL 32-bit and 64-bit command prompts from the Terminal application.

(421016)

- On Windows, you must uninstall earlier versions of this product before installing 9.0.

(380028)

- 32-bit Windows is no longer supported.

(382034)

Visual Studio IDE

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- In this release, new native COBOL and PL/I projects in Visual Studio are configured to build on both x86 and x64 platforms. If the project is added to an existing solution, the build target configured for that solution will be used. For new solutions, the x64 targets are always selected by default. This change in behavior does not apply to Dialog System projects or imported 32-bit Net Express projects. There are some known limitations of x64 templates - e.g., Assembler is 32-bit only, so users will need to set the correct platform. Some templates remain 32-bit only.

(409099)

Known Issues

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

In addition, note the following:

- An issue with the Call method in the COBOL RunUnit class prevents it from being used when you target the .NET Framework. A fix is going to be available with Patch Update 1 of this release. This issue does not affect .NET 6.
- .NET COBOL projects only support Windows and Linux OS. The **Create a new project** dialog box in Visual Studio, however, shows other platforms as supported.
- If, after installing the product for Visual Studio 2022, you cannot access the Micro Focus functionality, execute the following command from a Visual Studio command prompt:

```
devenv /updateconfiguration
```
- The Server Core form of Windows Server 2019 is not supported.
- In Enterprise Developer 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 Enterprise Developer 3.0 or earlier, then executed in Enterprise Developer 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 Enterprise Developer 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 Enterprise Developer.

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

Resolved Issues

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

- [CICS Support](#)
- [COBOL Language Server](#)
- [Code Analysis](#)
- [Codeset Support](#)
- [Common Communications Interface](#)
- [Communications Server](#)
- [Compiler](#)
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- [SQL: COBSQL](#)
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CICS Support

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- A problem with generating a COBOL copybook in the correct location and/or with the correct filename when the BMS mapset did not define the LANG parameter has been fixed.

(380001)

COBOL Language Server

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

02413198 (381021)

02534509 (446004)

Communications Server

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- The MFCS resource leaked under certain circumstances. This has been fixed.
- If an Enterprise Server listener was disabled at region startup, an attempt to start it while the region was running would fail, possibly generating an exception or signal logged by the MFCS process. This has been fixed.
- Enterprise Server now supports stopping and restarting a stopped listener even when conversations using that listener are still open. In previous releases, a listener could be stopped while there were open conversations, but not restarted until those conversations ended; this restriction has been removed.



Note: Open conversations continue to be usable.

(244018)

- ESCWA can now display the enterprise server region `console.log` file if its location has been changed from the instance system directory to another location.

01970295 (313012)

- An issue with the Micro Focus Communications Server failing when restarted automatically has been fixed.

(313031)

- An issue that caused a connection authorization failure for TN3270 clients that use ELF or DCAS to connect to Enterprise Server has been fixed.

(260042)

- An issue with using the Enterprise Server DCAS facility with TN3270 in "internal" mode on Linux and UNIX has been fixed.

02429147 02433532 (375009)

- In Enterprise Server, the Communications Server process (mfcs) now logs the correct messages when an HTTP conversation is terminated prematurely by the client.

02212920 (258094)

- Enterprise Server's handling of conversations aborted by the client or as the result of a network issue has been improved, including fixes to resource leaks and error reporting.

(364115)

- The `mfdepinst` command now uses the MFDS credentials supplied in the configuration file or on the command line for all requests to MFDS. This corrects a usability issue with installing COBOL Web services or EJBs under Enterprise Server when the directory server is secured.

02373698 (254038)

- An issue with the Web Services and J2EE connector that caused chunked HTTP requests to be improperly processed has been fixed.

02378445 (321037)

- The DCAS feature of Enterprise Server has been enhanced to support extracting the Enterprise Server user ID from the CN (Common Name) of the Subject name of the client certificate. This can be useful if you have many client certificates to provision. See *DCAS Security* and *DCAS conversation type* in your product Help for more information.

02442474 (384003)

- Enterprise Server's ability to detect conversations closed by the client or by errors such as network failures has been improved. These conversation failures are now detected sooner, releasing communications-related resources and providing better error reporting. See *[idle check] Section* in your product Help for more information.

02412841 (365106)

- A new option has been added to the `mfdepinst` utility, `--replace`, removes existing package and service definitions for the same namespace before installing the services defined by the CAR file. See *mfdepinst command* in your product Help for more information.

(363026)

Compiler

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- An 013-R error generated on compilation has been fixed.

02501331 (401125)

- A new directive, `ILSTRINGLOAD`, is now available for .NET COBOL programs, which can help in situations where a program with a very large number of distinct alphanumeric literals causes internal limits to be exceeded in a class (and at which point, an error is generated). Use the directive to create these literals in a backing file, which can then be converted to strings at run time.

02170649 (380058)

- A program containing a debug line as its first line of source now compiles with an expected syntax error, rather than a Compiler crash.

(306070)

- Querying the subordinate items of a group defined in a DECLARE statement now works as expected.
(414100)
- Debugging of a program with a copybook located via COBCPY, where the value of COBCPY is extremely long, now works as expected.
02298722 (276005)
- Using a PROPERTY as a call parameter now compiles and executes as expected.
(5357)
- A query expansion of OCCURS DEPENDING ON tables now correctly reflects the current size.
02500813 (405134)
- The Outline view in the IDE is now available for all programs, irrespective of syntax errors encountered.
02297623 (285151)
- An ALLOCATE statement RETURNING a subscripted pointer now executes as expected.
(369004)
- An ADD .. TO *property* statement now executes as expected.
(6503)
- The 'AT END' phrase of a file statement is now correctly distinguished from dereferencing syntax specified in the same context.
(6149)
- INSPECT CONVERTING TO HIGH-VALUES now works as expected with the CHARSET"EBCDIC" directive.
02317578 (286071)
- The CP preprocessor now respects the setting of the SOURCE-ENCODING Compiler directive.
02463619 (394012)
- Reference modification with an implicit length on the result of an intrinsic function now executes as expected.
02269123 (258090)
- A MOVE CORRESPONDING statement with nested subscripting now executes as expected.
02473286 (395097)
- A background parse of COBOL source containing illegal code and characters before the main COBOL program now produces full syntax checking consistent with previous releases.
02393247 (352074)
- INSPECT .. REPLACING *more-than-one-byte* BY SPACE is now producing the expected execution results.
02521582 (411107)
- The CP preprocessor now correctly expands copybooks when COPY REPLACING is active and the copybook name partially matches the replacing text.
02541659 (427024)
- A COPY REPLACING statement that results in a replacement line of more than 256 bytes is now processed as expected.
(301078)
- Programs called with a CHAIN statement, which use their own file handler to access the filename pointer in the FCD, now execute as expected.
(286017)
- A query of an item in a variable-length group with an UNBOUNDED table now returns the correct value.
02500660 (403177)

- Error message COBCH1554 More than 65535 statements in a paragraph. Cannot produce debugging information is no longer reported for compilations where debugging information was not requested (i.e., NOANIM specified).
02525192 (415062)
- Specifying dfheiblk and dfhcommarea as USING parameters on the Procedure Division header for a program compiled with CISECM() now works as expected regardless of the case used.
02538907 (439076)
- A CALL statement using the 'DATA AT' syntax to pass a dereferenced parameter BY REFERENCE now compiles and executes as expected.
(351091)
- For improved mainframe emulation, referring to the LENGTH OF a linkage item that does not have addressability no longer receives a warning message.
02520501 (410013)
- The user responses for the ERRQ Compiler directive are now all respected correctly.
(350010)
- COMP-1 and COMP-2 data types compiled with DIALECT"ACU" now receive a syntax error when a PICTURE description is absent.
(296032)
- When the LANG environment variable is correctly set to match the source encoding of the COBOL source file, the Compiler now completes the compile successfully.
(390023)
- The DIALECT"MF" Compiler directive no longer affects the user-specified setting of the SETTING directive.
02449496 (390008)
- A STRING statement with 'DATA AT' operands now executes as expected.
(260018)
- Level 88s defined in a typedef may now be referenced through pointer dereferencing.
(377067)
- A CALL ... BY VALUE operation of certain numeric types, which is not allowed on the IBM mainframe, is now correctly flagged under a mainframe dialect.
(310004)
- \$if syntax is now processed correctly in all cases.
(318040)
- For better mainframe emulation, a data declaration specifying 'OCCURS UNBOUNDED' without a minimum value is now accepted without error.
(414182)
- When using a typedef-item at pointer that was not unique in the typedef group, the Compiler compiled without error; however, the pointer sometimes dereferenced at the incorrect address. This scenario now produces a COBCH0005-S User-name not unique error message.
(415140)
- The reserved word FIXED is now treated as context sensitive, enabling you to also use it as a data name, and ensuring better emulation of IBM Enterprise COBOL.
02526399 (409102)
- The DISPLAY-PICU(UTF-8) option now operates correctly with OUTDD when using Enterprise Server.
(297005)
- A new Compiler directive, ALPHA-LIT-CONT, determines whether continuation of non-numeric literals includes spaces up to the right margin, or simply to the end of line.

(380072)

- A DECLARE value can now be expressed as an arithmetic expression in native COBOL.

(386138)

- The INITIALIZE *condition-name* syntax erroneously compiled without error. This now correctly returns a syntax error for all scenarios.

02468662 (394064)

- An INSPECT statement used inside a class method no longer causes generation of invalid .NET or JVM code. (This problem did not apply to procedural COBOL programs.)

02504599 (403183)

- When debugging programs compiled with `sourceformat(fixed)`, attempting to quick-watch variables with long names, or at a deep level of nesting within a group, could be unsuccessful. In addition, hovering over such variables while debugging failed to show the value of the variable. These issues are now fixed.

02489352 (401187)

- When using named parameters to access a method in a generic class, the Compiler could produce a spurious system error. This is now fixed.

02418658 (369012)

Containers

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- We strongly recommend that you create Micro Focus base product images with the `build.sh` script using the provided Dockerfile/Containerfile. Images created using alternative methods might fail with the message `245 There are no valid product licenses` unless the image includes the CONTAINER environment variable. This release ensures that the provided Dockerfiles/Containerfiles include this environment variable.

02555217 (439070)

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)

- The Data Tools editor Filter could timeout on large datasets opened through Fileshare, this no longer occurs and the Filter operation can now be stopped using the **Stop loading** button on the status bar.

02368849 (313029)

- 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 flickering of text within the DSN filter, when using the Data Explorer in the Data File Editor, no longer occurs.

02155507 02380648 (224010)

- 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)

- When using the Data Explorer to open data sets, the DSN filtering and Fileshare settings now persist when opening multiple files.

02396643 (351058)

- 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)

- A performance enhancement has been made when listing PDS members within the Data File Editor.

02380628 02381204 (331003)

Debugger

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- Debugging a statement that goes up to column 255, with the Autos window active, now works as expected.

02289017 (271031)

- Expanding a dereferenced group item in the debugger now correctly shows the data for subordinate items.
(363158)
- Previously, CBL_DEBUGBREAK did not invoke the debugger in .NET COBOL applications. This has now been fixed and the built-in "Choose Just-In-Time Debugger" dialog box appears during invocation.
02388923 (348042)
- An issue has been fixed where the list of processes for 'attach to process' debugging could be displayed incorrectly.
02458536 (386153)

Dialog System

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- An issue with the dialog system painter clearing the screen when resizing a control has been resolved.
02367685 (330012)

Documentation

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- Information on CICS internal transactions have been added to the product Help. See CICS Internal Transactions in your product Help for more information.
00367280 (13485)
- The ENDEVOR_DSNQUALIFIER and CHANGEMAN_DSNQUALIFIER parameters specify a HLQ and their values must be limited to 8 characters in length. This has been clarified in the product Help.
02477878 (393134)
- The product Help has been updated to provide a description for the Data Set Services error message MFMD5015E.
3206480 (12288)
- 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)
- The PL/I documentation has been updated to include information for the mfexecpp Utility.
00368502 (11640)
- The product Help for optimizing the performance of the CICS Terminal Control has been corrected.
3239997 (12590)
- The tutorial *CICS Web Service Provider from JSON* has been updated to provide additional guidance for the user.

3218247 (13347)

- The `casrdtup` utility supports the DEFINE and DELETE commands only.



Note: The combination of DEFINE with the command line option `/o` can be used to overwrite existing definitions as an alternative to ALTER.

02480002 (401027)

- 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)

- 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 product documentation now correctly lists the `MVSSPLPB` utility in upper case.

02328509 (351109)

- The documentation has been updated to include information on syntax and examples of usage for the `PUTENV` Dynamic File Allocation facility.

(207051)

- The product documentation clarifies that the Serial Scheduling option for defining an IMS Transaction is not supported.

00365817 (13338)

- The IMS Error Message `IMSRT0048E` has been documented in the product Help.

02227051 (245093)

- 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 that the paper size is calculated in one-hundredths of an inch for `.NET COBOL` programs using the `PC_PRINTER_DEFAULT_PROPERTIES` library routine.

(386105)

- Documentation for the `CBL_STRING_CONVERT` library routine has been enhanced to include information on converting from Base64 ASCII or EBCDIC to Base64 BINARY, and vice versa.

(395072)

- 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 PL/I documentation has been updated to provide reference information for the `-bifprec` compiler option.
02268330 (259038)
- 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)
- ESCWA now displays more clearly when operating in Windows high contrast mode.
01995438 (161036)
- 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)
- The ESCWA and ESMAC **JES Control** page now carries out backend authorization checks against cassub ESF resources.
(388029)
- In ESCWA, the **SEP List** page did not correctly sort the list by ascending or descending order. This has been fixed.
02382568 (352007)
- ESCWA skipped entries on JES Catalog and the Spool DD display if the page size was greater than the ESMAC limit. This has been fixed.
02501609 (407095)
- In ESCWA, some fields on the CICS DCT definition page have been fixed.
02340251 (296056)
- 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)
- You can now force the deletion of a JES Catalog entry if the first delete action fails.
02503936 (408004)
- Reduced the number of password save prompts encountered when navigating ESCWA using the Firefox Web browser.
02324422 (306001)
- The IMS transaction threshold was not being disabled when the Use System Value was set. This has been fixed.
02513511 (406144)
- In ESCWA, the FCT Backward and Forward Recovery will no longer be disabled when **Use Catalog** is selected.
02416596 (364107)
- ESCWA failed to display Spool DD Entries on remote machines for versions earlier than 7.0 patch update 11. This has been fixed.
02391716 (352054)
- 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)

- In ESCWA, the Spool view now maintains the filter used between browser sessions.
02497901 (402095)
- Added missing annotation for ESCWA trace point.
02538486 (415187)
- ESCWA had duplicate CTF trace IDs. This have been fixed.
02524827 (409072)
- In ESCWA, an issue prevented the reselection of the same file twice when submitting JCL. This has been fixed.
02198917 (222123)
- 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)
- ESCWA now reports the UUID of the PAC member that processes a batch job.
(289008)
- Implemented support for advanced job restart parameters on the JES job pages.
(271045)
- 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)
- In ESCWA, the additional columns LRECL, RECFM, and File Size have been added to the catalog list view.
02527126 02527132 (409103)
- The spool job-name page has been split into **General**, **Messages**, **DD Entries**, and **Job Steps** tabs.
02527108 (411136)
- In ESCWA, the **Socket Close** field has been added to the **CICS URIMap** resource. See the *Universal Resource Identifier Map* and *Active Universal Resource Identifier Map* topics in your product Help for more information.
(363101)
- In the ESCWA page for displaying spool output, it is no longer possible to request more than 99,999 lines. This limitation has also been addressed in the ESCWA interactive API documentation.
02212126 (246026)
- In ESCWA, the **IMS Transactions** page now has additional columns for Class, Priority, and Process Limit.
(252019)
- 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)

- ESCWA now supports merged spools. See *Spool* in your product Help for more information.

(246044)

- 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)

- An RTS 114 error related to CICS PPT RESCOUNT processing has been fixed.

02380883 (331015)

- 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 user ID was not sent across on a Distributed Program Linking (DPL) from a CICS Web Interface (CWI) request. This has been fixed.

02357738 (306068)

- 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 `casawi`. This has been fixed.

(409046)

- CICS WEB SEND commands were sometimes directed to an incorrect communications process. This has been fixed.

02394770 (351065)

- The `_FROM` option on the CICS START command can now be used with AMODE compiled programs.



Caution: Do this only when instructed to do so by Micro Focus Customer Care.

02340979 02547874 (297112)

- PAC performance optimization has been enhanced to avoid PSOR access when the `_FROM` option is used on CICS START.

- 02541046 (425006)
- Temporary storage queues of type Process Local now work in AMODE applications.
- 02341118 (296055)
- Using the CICS TRANSFORM command within a pipeline handler program sometimes resulted in a LANG ABEND. This has been fixed.
- 00365824 (13246)
- 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)
- In a PAC, multiple updates of the same CICS resource within the same millisecond could result in an inconsistent state between different enterprise server regions. This has been fixed.
- (90011)
- JES active job recovery in a PAC failed to mark the job as complete when the enterprise server region originally processing the job was restarted. This has been fixed.
- (402004)
- The `casfile`, `casout`, `casstop`, `cassub`, `castran`, and `casutl` commands now find the enterprise server region successfully when `mfd`s 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)
- In a CICS Web Interface, after the Analyzer is called, the decoder function now receives the data unescaped.
- 02512069 (405161)
- 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 using function shipping between two enterprise server regions, one EBCDIC and one ASCII, the records are now correctly converted.
- (405010)
- EXEC CICS DELAY was monitored for DEAD LOCK timeout, resulting in the transaction being killed. This has been fixed.
- 02399944 (350093)
- The start CICS transaction was not producing the correct trace for HSF. This has been fixed.
- 02385015 (340004)
- 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 sorting by Submitted, the spool records are now returned correctly.
- 02404702 02431279 (365041)

- 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)
- An EXEC CICS RELEASE was cancelling a program even if the rescount was not 0. This has been fixed.
02400119 (355025)
- When trying to load an ASM data table using `castran` with `-b` for AMODE, the pointers were not always converted to AMODE addresses. This has been fixed.
02528581 (414049)
- When using EXEC CICS DELAY in an AMODE program a RTS114 could occur. This has been fixed.
02505696 02428286 (406176)
- 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 a CICS Web Interface (CWI) Analyzer that was compiled with AMODE 31, an ABEND MFPM would occur. This has been fixed
02427963 (374003)
- 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)
- In an HTTP CICS Web Interface (CWI) request with the analyzer returning a converter program to execute, the decoder parameter for `decode-data-ptr` was not set. This has been fixed.
02432166 (377025)
- 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 EXEC CICS DELAY before EXEC CICS RETRIEVE and ENDDATA was returned as the DELAY, it resulted in resetting the data sent to the application. This has now been fixed
02526457 (419004)
- 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)
- An incorrect IOERR was returned from CICS READNEXT when the record was locked. This has been fixed.
02526497 (413214)
- CESL now respects the case of the password entered. No upper-case translation occurs.
02501164 (407012)
- 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)
- If `ES_ESM_PLTPIUSR` is defined, programs in PLT/PI are executed under the `ES_ESM_PLTPIUSR` user.
02472002 (407025)
- The RAS process is now correctly identified on a dump.
(385051)
- An issue where MQ Security Resources were prefixed when using `ES_ESM_SECPRFX` has been fixed.

- 02483959 (406062)
 - 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)
 - Enterprise Server CICS now supports the MAPPINGDEV option of SEND MAP and RECEIVE MAP commands.
- 02497790 (407132)
 - Support has been added for the MILLISECS option of EXEC CICS DELAY.
- 02428286 (377024)
 - A CICS distributed program link over SNA for which the target enterprise server region was unavailable resulted in EIBRESP=ISCINVREQ instead of SYSIDERR. This has been corrected.
- 02249191 (255023)
 - 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)

- When using LU6.2 communications infrastructure between an enterprise server region and mainframe CICS, sync point requests executed on the target would result in an orphaned UOW. This has been fixed.

02322602 (297014)

- 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)

- Changed the first occurrence of CASA_ECI_Function in HSF records for EXCI calls to show the transaction ID if one is specified in the TRANSID option on the EXEC CICS LINK.

02383644 (339001)

- 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 `casst` 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)

- The JCL command `casstsub` is now designated as a system program and as such will not be cancelled by runtime container de-initialization.

02356121 (307019)

- Issues with CICS NEWCOPY and Phase In when used in a PAC environment have been fixed.

(259078)

- 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)

- The spool view page no longer displays errors even if another spool page has not been loaded.
02514961 02518028 (407109)
- 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)
- EIBCALEN now has the correct value after an invalid transaction from a previous CICS RETURN transid.
SF:# 02416565 (387026)
- PDS member names are no longer be truncated in the Data Editor when PDS names and member names are longer than 44 characters combined.
02358793 (306041)
- 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)
- An RTS 114 error on a CICS LINK to a remote system has been fixed.
02336344 (297044)
- CICS FILE OPEN was returning ILLOGIC when user catalog was enabled. This has been fixed.
02418777 (364137)
- An issue with EXEC CICS VERIFY PASSWORD when the application was compiled with the AMODE directive has been fixed.
02461716 (393128)
- The EXEC CICS WEB READ HTTPHEADER and WEB READNEXT HTTPHEADER commands no longer include trailing spaces in the value returned in the VALUELENGTH field. For example, the VALUELENGTH for a header with a value of "myValue " (three trailing spaces) is now 7 instead of 10.

02451501 (406070)

- 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 (OPERCMD5) 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)

- Option USERID is now supported for EXEC CICS QUERY SECURITY.

02419858 (363211)

- 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 TCPIP SERVICE 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)
- EXEC CICS START requests which expired immediately were being delegated to another process for scheduling. This has been fixed.
(386090)
- When invoking a program over a SyncLevel 2 connection which executed an EXEC CICS SYNCPOINT, the backend would raise an ISCINVREQ condition and the session state would subsequently result in a SYSIDERR on the client side.
02312326 02329428 (285057)
- HSF reported latency for incoming remote DPL requests were not being reported correctly. This has been fixed.
02455011 (392023)
- Windows Performance Counters now work using a V2 provider DLL and will appear in Performance Monitor under 'Micro Focus Server System V2'.
(286029)
- Security checks are now supported for Dynamic Debugging operations. Checks are carried out against the `casdebug` entry under the OPERCMDS resource class.
02337725 (296095)
- If an enterprise server region is running in a PAC with both IMS and CICS features enabled, then single sign-on is enforced for both CICS and IMS. If you want to change the behavior, set `ES_CICS_SINGLE=N` and/or `ES_IMS_SINGLE=N` to enable the same user to sign on to multiple terminals for CICS and/or IMS.
(345001)
- When using `casesxml`, if the enterprise server definition has been exported using the `-c` option then you must import using the `-c` parameter.
(351045)

- If an XA commit verb returned retry n times, where n is the configurable number of retries, then the DSNRLI function incorrectly received a return code of zero. This has been fixed.
02495509 (408003)
 - An issue with the TType page (Signoff attribute) affecting ESCWA and ESMAC has been fixed.
(402014)
 - In ESCWA, the **Spool Completed** field did not display the correct time. This has been fixed.
02470813 (393069)
 - Attempting to delete a job in the input state from the Spool in ESCWA would intermittently fail. This has been fixed.
(394029)
 - 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)
 - An issue existed when filtering the spool without wildcards. This has been fixed.
02486979 (397072)
 - In ESCWA, when displaying JES Catalog entries the record count information is now correct.
02209327 (246002)
 - An issue where ESMAC display Count Override was not being applied when viewing files from the job list view has been fixed.
(406141)
 - In ESCWA, the limit of jobs that can be deleted from the spool has been increased to 100000.
02332690 (291038)
 - Both ESCWA and ESMAC JES Control pages now carries out back end authorization checks against `cassub` ESF resources.
02427674 (375006)
 - Added support for passing advanced job restart parameters through the **Spool Job View** page.
(273030)
 - Added the ESCWA **JES Default User Job Submission** property to the **Advanced Region Properties** page in ESCWA. This property changes the default user behavior for JCL Job Submission through ESCWA and the IDE.
02378712 (365132)
 - 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)
- 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)
- At the end of a CICS transaction that calls batch programs, all opened cursors are now closed.
02423443 (369016)
- 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)

Enterprise Server for .NET

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- The LDAP External Security Module for Enterprise Security for .NET now correctly implements the optional retry configuration parameters.



Note: This was not and is not an issue with the MLDAP ESM Module implemented in native Enterprise Server.

02444873 (385093)

File Handling

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- 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)

- The OPEN INPUT of an optional file, which is not referenced in the JCL, now behaves as it does on the mainframe.

02418838 (350105)

- 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)

- The performance of filtering the Enterprise Server JES Spool has been improved when ordering the content by Job ID while filtering by a specific Job Name.

02293524 02299724 (264085)

- 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)

- Performance when filtering the Spool queue has been improved in situations where the filtered field does not match the field by which the queue is being sorted.

02516560 (410086)

- 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)
- A Y2W date comparison is now supported in EBCDIC.
02423850 (364166) 02326205 (285173)
- MJFTOOL now correctly converts EBCDIC to ASCII output when the file is LSEQ.
02393322 (350028)
- During a SORT, SUM now correctly works with `MF_CHARSET=EBCDIC`.
01909282 02349849 (124117)
- The DFSORT INCLUDE statement now supports the Y2U format with a constant.
02351201 (303076)
- A 9/139 file status no longer occurs when submitting a SORT job with an OUTFIL statement containing FTOV and HEADER1 parameters.
02522665 (411123)
- An issue has been fixed where the TRAILER1 MIN and MAX functions were returning high values instead of zeros when used on an empty file.
02539611 (421035)
- When using the OUTFIL statement under DFSORT emulation, RECFM is correctly set to FB (previously, it was VB) during a COPY operation.
02353490 (303058)
- The discrepancy in MFJSORT VB Outfil LRECL checking has been resolved.
02501782 (406117)
- The MFJTOOL SORT emulation's SELECT LAST operation now behaves correctly for VB files.
02474360 (395098)
- Generating SPLICE with KEEPNOUDUPS using an empty input file was generating an invalid output file. This has been corrected to generate an empty output file.
02403474 (356016)
- The validation checks that were causing unexpected behavior in ICETOOL emulation have been corrected.
02412147 (365082)
- MFJSORT now throws an error message when the unsupported DATE4 operand is used in the SORT card.
02435356 02389969 (375072)
- A correction has been made to the temp/dump file creation of a SORT process.
(387134)

- The OUTFIL LRECL calculation has been corrected when there is a newline literal in the OUTREC statement.
02500082 (402125)
- Support has been added for the ON(VALCNT,formatting) parameter of the MFJTOOL OCCUR operator.
02474081 (395127)
- The INCLUDE statement within a SORT now works with the SIGN-EBCDIC flag.
02366598 (314012)

HA Cloud Support

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- The `startsessionserver` batch or script file used to start an HA Cloud session no longer launches with `CMSClassUnloadingEnabled` in the Java options.
(382033)
- Additional logging capabilities have been added to the HA Cloud session server. You can set logging levels for additional properties in `hacloud.properties` such as `logging.level.com.microfocus.zfe.enterprise.ConfigurationServiceEnterprise`, `logging.level.com.microfocus.zfe.enterprise.ConfigurationLoader`, and `logging.level.com.microfocus.zfe.enterprise.VaultAccess`.
(375033)

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- A fault in CEE3DLY that caused an COBRT227 error has been corrected.
02462693 (372005)

IMS Support

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- A problem that prevented users from broadcasting a message to IMS terminals has been fixed.
01912390 (150003)
- A problem that erroneously caused a run-time error on start-up when a message-queue error was detected has been fixed by replacing the run-time error with a console message.
02557482 (446006)
- A problem that delayed transactions invoked via MQ-IMS Bridge when the MQ request queue was nearly full has been fixed. In addition, sporadic transaction-not-found errors no longer occur.
02268086 (258040)
- A database no longer fails to close in certain situations when work has been done after a QC.
02030160 (166042)
- A problem that occurred when multiple XAs were used in IMS BMP programs prevented changes from being committed to each XA separately, even when a 2-phase commit was requested. This has now been corrected.
02287414 (260260)
- The IMS /REFRESH PROGRAM command now forces a QC for the next GU from scheduled MPPs allowing MPRs to cancel loaded executable modules.
(303085)
- IMS intermittently failed to dispatch new work. This has been fixed.

(333001)

- Enterprise Server IMS TM erroneously dispatched new transactions while the DLI database was suspended. This has been corrected.

(405164)

- A problem that caused IMS TM on 64-bit systems to continue dispatching when the database was commanded to suspend has been fixed.

(410077)

- A problem that caused false SYNCPOINT failure reports during an IMS /REFRESH PROGRAM ALL operation has been fixed.

02311796 (385010)

- IMS REFRESH command no longer causes a false XA error message for WFI transactions.

02311796 (319028)

- The existing ES_CESN_NO_OS390 environment variable now also applies to IMS. When set, both an invalid user ID and an invalid password give return code 8.

02485549 (400037)

- An incorrect RX status code was sometimes returned when replacing a concatenated (LC|LP) segment with different logical parent data, even when the virtual replace rule was specified. This has been corrected.

02437342 (397002)

- A problem with MFS option 2 that occurred when no data was received from the screen prevented the input segment from being compressed out of the input message even when input literals were defined. This has been corrected.

02390758 (386139)

- To correct a problem that caused data to be mapped to the screen incorrectly, the value in the ZZ2 byte of x' 40 ' is now used to recognize the first segment of a new page.

02390758 (351023)

- A problem with completely clearing currently displayed data when the last page was requested with =L has been fixed. Data is now cleared completely before formatting the last page.

02512396 (407063)

- A problem that prevented device physical paging from working correctly on multiple screens, both from the MFS menu and via PF keys, has been fixed.

02127948 02226814 (222064)

JCL Support

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- If a DD entry did not have a dataset name defined, it was excluded from the analysis when the job was restarted using the auto-adjust option. This sometimes led to the job restarting at the wrong step. This fault has been corrected.

02349857 (304005)

- A problem that caused incorrect symbols to be passed to a procedure when a DD override was applied to a procedure step prior to the last step in the procedure has been corrected.

02457317 (389036)

- When listing catalog entries using the TSO command LISTCAT, the LRECL value was truncated to 4 digits and the high order value was not displayed. This has been corrected and the LRECL value is not displayed using 5 digits.

02331981 (296001)

- To fix a problem that sometimes occurred when either the IMS MPR process shut down or when a CICS SSTM region shut down and ES_SSTM_JOB_FLUSH_ACTIVE=Y, the lex files for the SSTM job are now removed.
02322067 (285165)
- An error that occurred when using FREE to free a dynamically allocated new GDS has been corrected.
02424185 (363221)
- A problem with the TSO LISTCAT command that caused it to display datasets with similar names to those requested but that were outside the scope of the entry specified has been corrected.
02532129 (415117)
- A fault that caused a new GDG version to be incorrectly removed at the end of the step that created it has been corrected.
02344573 02342424 02354398 (301037)
- The JCL File Handler has been updated such that when SRRRCMIT or SRRBACK is called, all XA modules associated with the current unit of work are notified. The last module referenced by a SWITCH TO call is notified last so that the focus of the next SQL statement is the same module as before the commit or rollback.
02552872 (442022)
- A problem that resulted in the failure to load MFJDBFH_CHECK_FILE_EXIST when viewing spool files has been corrected.
02472170 (395102)
- Do not delete the JESYSMSG using the ESMAC/ESCWA interface for a job that is currently active. To do so could result in job failures. If the SSTM job cannot be set up for a new process, error messages are written to the console.log file indicating the reason, for example, the JES000041E and JES000018E messages.
02363373 (313022)
- An error that caused the CICS spool process to abend when no CICS SSTM job was defined has been corrected. Instead of an abend, an error message is issued in the console.log file indicating that the spool file could not be added to the job because the SSTM job does not exist.
02186416 (220036)
- An incorrect error reported when using mfcattxml with the environment variable ES_SERVER set has been removed.
02455029 (395082)
- If a DD card specified a UNIT value that was interpreted as a tape volume, that value incorrectly overwrote the value for the SPACE units. This has been fixed.
02330375 (294011)
- The FTP issue that sometimes occurred while performing a GET to a GDG dataset has been fixed.
02298846 (286031)
- The public catalog API has been updated to provide information about the GDG bias whether rolled in or rolled out.
00425417 (411100)
- COND=EVEN behavior has been updated to work correctly when it is placed along with another return code test.
02413227 (364100)
- The START operation on a dummy dataset was not returning FS=23, which is required to emulate mainframe behavior. This has been fixed.
02261850 (258069)
- The mvscatpb function now correctly updates the SPACE-EXTENT-UNITS field of a dataset in the catalog.

- 02429430 (372030)
 - An issue with the MFFTP MPUT command caused it to search beyond the scope of the LCD DSname. This has been corrected.
- 02333250 (296003)
 - A problem that caused datasets to be locked exclusively when a job was restarted has been corrected.
- 02343791 (301057)
 - A problem that prevented spool housekeeping from removing orphan job spool entries from the catalog when it removed the JESYSMSG of that particular job has been fixed.
- (393056)
 - MFJAMS LISTCAT of a nonexistent dataset now returns condition code 4.
- 02478830 (393163)
 - The %PCDSN extension syntax checking has been fixed so that an invalid catalog entry is not passed through the JCL.
- (326003)
 - Dynamic System Symbols, such as &LDATE or &HHMMSS are now resolved when a JCL job is parsed.
- 02379833 (351055)
 - An RTS 173 error that occurred on region shutdown in the printer exit process when no datasets had been printed has been corrected.
- 02382404 02392374 (351034)
 - MVSCATPB, the public catalog API, now returns the pc-dsn of a PO; however, that value might be empty if one has not been assigned.
- 02436618 (382024)
 - A problem that caused the value of SYSUT2 LRECL to be incorrect when copying from SYSUT1 in IEBGENER/ICEGENER has been corrected.
- 02422566 (372032)
 - The REN (RENAME) command was not recognized by IKJEFT01. This has been corrected.
- 02529686 (413035)
 - To avoid an MFFTP error, execute SAF authority checks against permanent datasets with the resolved dataset name, and not against temporary datasets.
- 02423925 (363236)
 - MFFTP now supports DDNAME.
- 02265813 (264046)
 - Spool housekeeping now returns COND code 4, when the bulk delete operation fails with an FS=23, record not found.
- 02478798 (399068)
 - MFFTP now provides the local PC filename to the user exit instead of the temporary EOL file that was used in the file transfer.
- 02512749 (405100)
 - You can now pass more JOB information to the MFFTPXIT user exit, including job name, job number, step name, step number, proc name, and proc number.
- 02386513 (340016)
 - MFJAMS now correctly updates the SPACE attributes of each VSAM component in the catalog.
- 02434035 (379009)
 - The MERGESPL.jcl file is now correctly located in the cpylib folder specified in the documentation.
- (264034)

- A problem that prevented the altered disposition of a dataset from being reported when using UCC11 settings and restarting a job has been fixed.
02394363 (350045)
- A display statement in a CICS program sometimes encountered a problem when the process terminated, potentially leaving an orphaned lock in the region. This has been resolved.
02554567 02554929 02562916 02574430 (451017)
- A problem with the REPRO of a VSAM dataset using the PATH to the alternate index has been fixed.
(10367)
- Informational messages that show the library from which a PROC or an INCLUDE group was loaded are now written to the job log.
02354463 (304076)
- An EXPDT entry consisting of a year and 0 (zero) days is now accepted, and an informational message issued (JCLCM0644I).
02074959 02558534 (183053)
- An issue with nested IF conditions not being correctly evaluated within an IF ABEND condition has been resolved.
02456500 (386115)
- A problem that resulted in limiting the deletion of spool records via the ESCWA interface to only one has been corrected.
(414167)
- A problem that caused the expect next GDS version to be out of sync with the actual version has been fixed by improving GDS tracking. The listing of a GDG Base using the IDCAMS LISTCAT command with the ALL option has been enhanced to show the rolled-in GDS, but not showing associations until the GDG has been used in a job following the update).
02207067 (246045)
- To ensure that the DCB parameter is honored, do not copy the LRECL from DATACLAS if the dataset is allocated using DCB=MODEL in the DD statement.
02352955 (308001)
- A problem that caused the create date/time of a spool file to be erroneously initialized when it was updated using mfjctlbp has been corrected.
02394543 (351038)
- During a job restart, cataloged datasets that had not yet reached their expiration date were not deleted properly. These are now deleted without any errors.
02503936 (401156)
- A problem that caused an incorrect return code to be set for an S422 abend when the job card specified JOBRC=LASTRC has been fixed.
02454664 (392024)
- A new environment variable, ES_IEBGEN_TO_ICEGEN, has been added to enable VSAM copy using MFGENER.
02469299 (393078)

Mainframe Access

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- The MFMON2 command-line utility would throw an exception when it was unable to delete a temporary file. This has been fixed.
02515298 (411041)

- The `strupr()` function was occasionally abending when the text to be folded was in the last allocated page. This has been fixed.
(468028)
- When downloading job output that had a single or multiple blanks for a record, this could result in the MFA Server abending. This has been fixed.
(407110)
- Syncmon2 now supports 10 character Panvalet member names.
02301547 (301002)

Micro Focus Batch Scheduler Integration

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- Control-M : `%%SET` expression containing `%%BLANK(nn)` was causing blank character(s) to be incorrectly suppressed. This has been fixed.
02476823 (395144)
- An issue in `mfbsijcl` related to Control-M LIBSYM/GLOBAL has been corrected.
02519366 (405218)
- The handling of a Control-M symbol file (`GLOBAL/LIBSYM`) containing an incorrect end-of-file delimiter was incorrect. This has been fixed.
02476611 (393144)
- The `mfbsijcl` utility has been updated to detect lost connections to redis, and then reconnect.
02319798 02537263 (313011)
- The `mfbsijcl` and `mfbsiemx` utilities have been updated to detect lost connections to redis, and then reconnect.
02537263 (441005)
- In previous versions of Enterprise Developer and Enterprise Server, when the Control-M AutoEdit function `%%MINUS` was used, the numeric result value had the same number of digits as Operand length. For example:

```

// * %%SET %%MIN3      = 005
// * %%SET %%MIN3_R   = %%MIN3 %%MINUS 3

```

sets `MIN3_R` to 002.

Starting in this release, you can obtain the a value of 2 for `MIN3_R` by specifying the `%%MINUS=CTM` parameter in `mfbsi.cfg`. This ensures compatibility with Control-M z/OS.



Note: To stay compatible with previous versions of Enterprise Developer and Enterprise Server, do not specify the `%%MINUS=CTM` parameter, or do specify `%%MINUS=MF`.

02524163 (411121)

Micro Focus Common Client

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- 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, CICS Web Interface clients, and CICS Web Services clients.

(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)
- In ESCWA, modifications have been made to MQ Listeners, JES Initiators, JES Printers, and IMS MPRs so that they persist across MFDS restarts.
02341059 (297067)
- 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)
- 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)

PL/I Support

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- A problem with CICS API calls on 64 Bit Solaris has been resolved.

(204210)

- UNSPEC('any-literal') returned an incorrect result when `-bitsltr` was in effect. This has been corrected.

02332714 (297013)

- A problem that caused the compiler to abort on a DFT RANGE(*) without attributes has been fixed.

02134010 (198020)

- A problem that occurred when the first operand of the PRECISION built-in was type PICTURE has been fixed.

02386647 (352016)

- All variable names in evaluations are now rendered in upper case according to the existing style.

(405076)

- A problem that occurred when using a JCL User Exit written in COBOL that called PL/I subroutines prevented the FINISH condition from being correctly driven when multiple jobstreams ended with STOP and SIGNAL ERROR. This has been corrected.

02426916 (371002)

- PL/I triggered a FIXEDOVERFLOW when a FIXED DECIMAL target was assigned for the ADD, SUBTRACT, or DIVIDE built-in functions that specified an even precision for the optional third parameter. This behavior did not match mainframe behavior, and has now been fixed.

02163371 (306065)

- The open and close parenthesis were erroneously included in the start/end column information for a variable reference when used within and EXEC CICS statement. This has been corrected.

(405098)

- The PL/I macro preprocessor erroneously merged keywords split by a new-line character. This has been fixed.

02382436 (331016)

- A problem with an incorrect result for the DAYS built-in function with `-bifprec 31` on Solaris and AIX is now fixed.

(338010)

- A problem that caused an abort on comma-separated assignments with concatenated string constants has been fixed.
02040800 (167025)
- A problem that occurred when `array of fixed bin unsigned (8)` was passed as an argument to entry has been fixed.
02267392 (259072)
- A limitation with Restricted Expression Evaluation has been resolved.
00368484 (13137)
- A problem calculating the result length of the STRING built-in when applied to non-connected storage has been fixed.
02514231 (406150)
- An erroneous diagnostic, MFPLI00349E Invalid Defined Overlay, has been corrected when CHAR type alignment attributes differ.
02522533 (410043)
- A problem that caused the Open PL/I compiler to misdiagnose missing arguments in a CALL statement when OPTIONS(VARIABLE) was not specified on the ENTRY declaration has been fixed.
02498133 (402105)
- A problem that prevented the PLI EDIT built-in function from working with EDCDIC data has been fixed.
02413874 (364086)
- A problem with a keyword following a string literal with no space between, e.g., `dcl y pic'99'def c ;`, has been fixed.
(327006)
- The compiler cross-reference (`-xref`) listing now ensures alignment of line/fileid, nesting, and source margins in the listing file.
02159460 (285036)
- A problem with using a function call without parentheses as an array index has been corrected.
02053467 (167108)
- When the ROUND built-in function is given a negative scale factor, MFPLI00554W (now W-level) is issued and a zero-scale factor is no longer supplied by the compiler. The negative scale produces the intended result.
02380701 (350017)
- A problem with DEFAULT RANGE (*) BUILTIN overriding previous DEFAULT RANGE (*) type attributes for non-built-ins has been fixed.
(400017)
- A problem that caused the DB2 ECM to generate little/big endian conversion loops for each element of an indicator array has been fixed to only convert it once for the entire array.
02373551 (321012)
- The PL/I PLIDUMP report has been extended to support decorated external symbols and variable names when running under Windows. The variable name, type, and value (if known) are now displayed for these decorated external types. Note: If the external variable is not currently being used or accessed in the program that generates the PLIDUMP report, its type and value is not identified as that information is not present in the program's PDB file. The error message displayed for a variable in this category has been amended to suggest that this is the issue.
02557839 (441078)
- The QUICKSORT and QUICKSORTX built-in subroutines are now supported.
00368505 (28200)

- Open PL/1 now supports the MIN and MAX built-ins with array arguments. In addition, the maximum number to arguments allowed is 64.
02040835 (167026)
- Open-PLI now accepts ENDF as an abbreviation for the ENDFILE condition.
02048350 (167074)
- The following compiler options now imply `-nolaxif: -cics, -sql, -dli, -mvs, and -ims`
(402054)
- A problem that occurred when trying to read an ASCII LSEQ dataset using the SYSIN FILE opened with an explicit OPEN, in a program compiled with `-ebcdic`, prevented the input records from being automatically translated to EBCDIC. This has been fixed.
02388783 (346010)
- A problem that stopped the Open PL/I PLISAXA parser from parsing when the UNKNOWN_CONTENT_REFERENCE event was driven, and which then triggered an EXECEPTION event with a code of 26 has been corrected.
02552959 (441034)
- When attempting to do a REWRITE of a VSAM record using a BIGENDIAN CHAR VARYING scalar as the argument to the FROM option, a RECORD condition was sometimes erroneously raised. This has been corrected.
02544322 (429073)
- An implicit open of a CTLASA dataset targeted as a SYSOUT in the JCL and with a RECFM of V failed with an UNDEFINEDFILE condition when the implicit open immediately followed an open/close cycle. This has been fixed.
02503905 (401159)
- A problem that caused an ERROR condition when attempting to do a REWRITE to a fixed-length file from a CHAR VARYING even though the length of the CHAR VARYING was exactly the same as the fixed-length record needed when the program was compiled with `-bigendian` has been fixed.
(327004)
- The B format specification in a PL/I PICTURE variable was not always honored properly. This has been corrected.
02397067 (351067)
- An erroneous severe MFPLI00092S diagnostic related to a missing locator has been fixed.
00368488 (415071)
- PL/I BiFs JSONPUTVALUE and JSONPUTMEMBER wrongfully adding structure-member closing tags. This has been corrected.
02298471 (267008)
- The PL/I JSON built-in function sometimes returned an incorrect number for bytes processed. This has been fixed.
02491557 (399091)
- The PL/I SUBSTR built-in was producing incorrect results. This has been fixed.
02338555 (297035)
- The PL/I JSONGETVALUE built-in function now correctly parses JSON escape characters.
02399600 (352078)
- The PL/I macro `-tagmin` option now covers both built-ins and procedures.
02310267 (284005)
- A problem with the PL/I compiler caused it to issue correct diagnostics on an uninstalled license and when the licensing daemon was stopped. This has been corrected.
02409479 (386043)

- The PL/I `xmlcontent` attribute is now supported.
02292363 (260198)
- Diagnostics for the CONTROLLED argument has been improved.
02130963 (195071)
- The incorrect result returned by the LENGTH built-in function when used with the TRIM built-in has been fixed. For example:

```
pic1 = LENGTH(TRIM(string1)) ;
```


Where `pic1` is any PICTURED variable, and `string1` is any CHAR or CHAR VARYING string.
02291604 (264004)
- A problem that occurred when passing a CHAR(*) VAR BIGENDIAN argument to an ENTRY without parameter descriptors has been fixed.
02393040 (350031)
- A problem at compile time with evaluating expressions involving the LENGTH and MAXLENGTH built-in functions has been fixed.
02453457 02453465 02453476 02453510 (385057)
- A problem concatenating based bit strings has been fixed.
02384231 (331026)
- A problem with the HEX built-in when used in conjunction with the two-argument form of the CHAR built-in has been fixed.
02371250 (314032)
- A message was added to PLIDUMP to print {cond static external} for CONDITION declarations in the locals section rather than throwing the following errors:
MFCWD06102E EXTERNAL variable not found in map. MFCWD09121E Invalid type to fetch.
(393106)
- The PL/I documentation has been updated to include the `-laxother` and `-nolaxother` compiler options.
(27357)
- The MFP_RAISEERROR environment variable has been added to enable the direct raising of ERROR when STRINGRANGE or SUBSCRIPTRANGE would otherwise be triggered. Valid values are STRINGRANGE;SUBSCRIPTRANGE (for both), STRINGRANGE, and SUBSCRIPTRANGE.
00696776 (368012)
- The FIXEDOVERFLOW condition was sometimes raised erroneously when FIXED DECIMAL division and dividing 0 by another number This has been resolved.
02430977 (372028)
- A problem that caused memory corruption in PL/I JSONPUTMEMBER() with a value containing double quotes has been fixed.
02496895 (401074)
- A problem related to STRING pseudo-variable with PICTURED type has been fixed.
02062482 (180008)
- A problem with an IF/ELSE block not behaving as expected when the IF clause was not of type BIT(1) has been fixed.
02459207 (390029)
- Previously, if an EDIT-directed output was specified with a B() format, an RTS Error 137 would be generated if the length of the B() format item was less than the length of the underlying variable being displayed.
02382223 (387115)

- The documentation for PL/I run-time messages and codes has been updated with new explanations and error codes.
02423667 (364163)
- The PL/I EXEC preprocessor has been updated to allow comments containing DB2 optimization guidelines.
02474554 (393114)
- A problem that caused the PL/I macro preprocessor to SIGSEGV on PARMSET evaluation has been fixed.
02378658 (327002)
- A problem that caused the PL/I EXEC preprocessor to skip % statement parsing has been fixed.
02343270 (301024)
- A PL/I member declaration was missing for DB2 SQL INSERT using arrays. This has been corrected.
02421921 (365182)
- A problem causing a MFPLI00465W: The expression is a duplicate of one found in a previous WHEN clause warning to be erroneously generated has been fixed.
02425404 (370011)
- A problem with named constants of type BIT resulting in a conversion error during initialization has been fixed.
02425272 (365219)
- A problem that caused the PL/I macro preprocessor to produce a SIGSEGV on PARMSET evaluation has been fixed.
02359139 (308041)
- The PL/I COMMENT() built-in function incorrectly handled strings spanning over multiple lines. This has been fixed.
02490439 (399077)
- A problem that caused the PL/I macro preprocessor to misalign source output has been fixed.
02366044 (306123)
- PL/I nested macro procedure in a built-in now provides correct %SDEBUG and %RDEBUG tags.
02311393 (286018)

REXX Support

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- MVSVAR(' SYMDEF ' , ' SYSTEMA ') now returns the value of SYSTEMA if it has been specified in an IEASYSxx member of SYS1.PARMLIB
02398875 (350090)
- Submitting JCL that runs REXX code that resulted in a fault had the potential to cause the failing REXX program to become locked in the REXX program cache. This has been fixed.
02387862 (351002)

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)

- Programs using the public SPOOL API - MVSSPLPB - failed when run outside of an enterprise server region. This is now fixed.

02328509 (291012)

- 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)

- The LE370 module CEE3DLY will now be found when compiling and running a program on UNIX platforms.

(375014)

- Printer settings, such as the paper size, etc., selected in the **Printer** dialog box loaded from PC_PRINTER_SET_DEFAULT when browsing for a default printer, were not in effect during printing from native and .NET COBOL programs. This is now fixed.

02260752 (285002)

- Using a DISPLAY statement from a SQL CLR stored procedure sometimes resulted in a System.NullReferenceException. This is now fixed.

02533532 (415173)

- The validation of the logical printer position in PC_PRINTER_SET_POSITION assumed that paper size/printable area size properties always matched printer orientation, and therefore sometimes erroneously reported error 31 (BadPosition) when printing from .NET COBOL programs. This is now fixed.

02478164 (394154)

- Selecting a custom paper size in the **Printer** dialog box loaded from PC_PRINTER_SET_DEFAULT when browsing for a default printer sometimes resulted in Run-time System error 9/004 when printing from .NET COBOL programs running in remote Azure VMs. This is now fixed.

02416340 (365222)

- Selecting a custom paper size in the **Printer** dialog box loaded from PC_PRINTER_SET_DEFAULT when browsing for a default printer sometimes resulted in a Run-Time System error 9/004 when printing from .NET COBOL programs. This is now fixed.

02416340 (365116)

- Publishing a program with an XML GENERATE statement in an SQL stored procedure now works as expected once the project files are manually edited appropriately.

02508845 (407057)

- When using CBL_THREAD_CREATE_P to create a thread in a .NET COBOL application, the stack-size parameter was ignored so the created thread always used the default stack size. This has now been fixed.

02344128 (296105)

- When printing using printer redirection in .NET COBOL programs, written records are buffered by default for performance reasons. Previously, this could have resulted in misaligned text if a record starting with many leading spaces ends up split between different buffers. This has now been fixed.

02260785 (284116)

- Native preprocessors (including COBSQL, HTMLPP, and PREXML) are not currently supported in .NET 6 applications.

(425003)

SQL: COBSQL

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

02236464 (260248)

- COBSQL has been 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 been updated to handle EBCDIC conversion of group variables used in INSERT statements.

02316688 02316681 (285067)

- The COBSQL precompiler has been updated to correctly convert redefined EBCDIC variables when present.

02421843 (364169), 02444639 (382084), 02453885 (385123), 02426534 (385109)

- COBSQL has been modified to handle EBCDIC conversion of group variables.

02316681 (288015)

- COBSQL has been 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: HCO for DB2 LUW

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

(424053)

- An RTS 114 error sometimes occurred when SQLCODE was set to 0 (zero) and an SQL program built as 64-bit called either DSNTIAR or DSNTIAC. This has been corrected.

02304281 (393071)

- A problem that caused DB2 database values to return ASCII values in EBCDIC mode when using the DB2 ECM, the dialect"ENTCOBOL" directive, and a customize character set translation, has been resolved.

(425023)

SQL: HCO for PostgreSQL

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- HCOPG returned unexpected values for TIMESTAMP_ISO statements. This has been corrected.

02513681 (406103)

- A problem that occurred when using the CURRENT SQLID in SELECT INTO statement with SQL(DIALECT=MAINFRAME) has been fixed.

02356934 (306026)

SQL: HCO for SQL Server

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- HCOSS returned unexpected values for TIMESTAMP_ISO statements. This has been corrected.
02513681 (406103)
- When the DATE and TIME directives were used with HCOSS for PostgreSQL, the incorrect format was applied to datetime literals. The correct corresponding format is now applied.
(397080)
- OpenESQL has been updated to return SQLWARN4=space with DIALECT=MAINFRAME and SQLCODE=-811.
02360026 (308064)
- A problem that caused HCOSS to return a space in SQLWARN0 when no other SQLWARN field contained a W has been fixed.
02397838 (351070)
- A problem compiling a COBOL SQL program with multiple fetch statements using WITH ROWSET POSITIONING has been fixed.
02340840 (297057)
- A problem with passing numeric or blank values for unsupported parameters to the HCOSS DSN bind utility caused a DSN syntax error. This has been resolved.
02338931 (296093)
- A problem with inserting a DEFAULT value as the only item in the list of an INSERT statement with SQL(DIALECT=MAINFRAME) has been fixed.
02354547 (303098)
- When using an EXEC SQL DECLARE *host-variable* VARIABLE FOR BIT DATA statement you can now specify multiple host variables as a comma-separated list. If you use multiple DECLARE *host-variable* VARIABLE FOR BIT DATA statements in one EXEC SQL block, a compile error now occurs.
02167287 (203217)
- ErrRow options have been added to the command-line version of the HCOSS Transfer Data tool.
02523081 (410056)
- A problem that sometimes occurred then running the HCOSS mfdatatransferctlr command to transfer data from DB2 to SQL Server has been fixed.
02473761 (393118)

SQL: Mainframe Batch Database Utilities (MBDT)

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- 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 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

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- 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)
- HCOSS date expressions missing the date part compiled incorrectly. This has been fixed.
02501717 (407018)
- A problem that prevented HCO for SQL Server and 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)
- DSNREXX now handles SQLIND in SQLDA correctly when a NULL record is returned.
02540551 (419034)
- DSNREXX now successfully executes SQL statements larger than 512 bytes.
02442341 (389037)
- 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)
- When run under Enterprise Server with an XA connection, HCOSS stored procedures were being called without the DIALECT=MAINFRAME directive being set. This has been resolved.
02318095 (286138)
- A problem with using `msbuild` from a Visual Studio prompt caused build warnings referring to the SQL native runtime DLL. This has been resolved. The required dependency file was added to the ODBC SQL Runtime Nuget .NET 6 packages.
02474156 (393120)
- A problem that sometimes occurred when compiling DBCS code in SJIS locale for embedded SQL applications has been fixed.
02349559 (301080)
- An exception error that occurred when trying to run .NET Core/.NET 6 COBOL SQL applications with the SQL ODBC runtime Nuget packages with a Windows command prompt has been resolved.
02351590 (306091)

SQL Option for DB2

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- An issue with the XDB ODBC Driver failing to get output arguments returned from a stored procedure due to the setting of null indicators has been resolved.
02420241 (377058)
- An issue involving nested scalar/aggregate functions operating on a view containing a union of other queries resulted in query common space being exhausted. This has been resolved.
02434830 (375074)
- An invalid return of X004 Number value overflow has been resolved when using Java to send a BigDecimal value of zero into a DECIMAL(1,0) value.
02444253 (380071)
- A problem that caused the DB2 TIMESTAMPDIFF function to give incorrect results when setting XDB Server to DB2 V10 or DB2 V11 has been fixed.
02260541 (253025)
- A server thread violation on a union query containing the RID scalar has been resolved.
(5425)
- The XDB Migrate utility has been enhanced to allow for the substitution of object qualifiers in the CREATE VIEW source retrieved from the STATEMENT CLOB in a source location SYSIBM.SYSVIEWS table.
02418490 (365153)
- A problem with COMMIT WORK statements performed dynamically by XTEP2 that caused the COMMIT query descriptor in the client side communication layer to leak has been fixed.
02310413 (285128)
- Local XDB engines now allow a single expression within an INSERT VALUES clause that is not surrounded by parentheses.
02333579 (296112)
- The BOPT40N utility now dumps the usage information to standard out when invoked with the -h option.
02346831 (297134)

Visual Studio IDE

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- **Server Explorer** now displays the enterprise server regions if ESCWA was not started as a Windows service.
02458571 (415100)
- An issue with the **Dialog System Painter** menu item using an incorrect path location in Visual Studio 2022 has been resolved.
02466323 (395008)
- Using the Micro Focus transport on the **Attach to process** dialog box now works correctly in Visual Studio 2022.
(264035)
- The option to debug a core dump from a Mainframe Subsystem project now works for 32-bit core dump files in Visual Studio 2022.
(441046)
- When the .idy file for a project cannot be found when debugging, Visual Studio no longer accesses the disk continually in an attempt to find it.
(258033)

- Visual Studio now passes credentials when enabling a server for dynamic debugging.
(295085)
- Projects using Pro*COBOL can now be built from the command line using `MSBuild`.
(382060)
- An issue where pressing F5 to launch a Unit Test Project would fail to run any test cases has been resolved.
(264092)
- Projects that use a mainframe COBOL dialect could fail to set the `RTNCODE-SIZE` Compiler directive correctly due to the use of explicit setting or unsetting of the `P64` Compiler directive depending on the project configuration. This has been fixed.
02523704 (410091)
- An issue with the installation of the Visual Studio extensions has been resolved.
02516155 (399062)
- Large data reference counts are now shown correctly in the IDEs.
02130631 (195070)
- The keyword string is no longer highlighted as a verb when it represents a `System.String`.
(254035)
- Code cleanup can now change the case of keywords in your code. You can specify the preferred case in the code cleanup preferences, then use the **Format Document with Code Cleanup** or **Format Selection with Code Cleanup** commands on your code to apply the transformation.
02503932 (403171)
- Previously, the editor would display a data item as grey and not red if it has been previously referenced 32766 times. This limit has been increased to 65533.
02426569 (371012)

XML Support

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- The XML runtime now performs better when reading a large XML file.
02526445 (417029)

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 Enterprise Developer features, you might be required to obtain and install additional third-party software.

See this information on the Product Documentation pages on Micro Focus Customer Care, in the product help for Enterprise Developer for Visual Studio 2022 ([click here](#)).

Installation

Before Installing

Downloading the Product

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

In the **File Type** column, you see entries for "Software" for any GA products, and "Patch" for any patch updates.

6. Click **Download** on the relevant row.

On Windows

System Requirements

Hardware Requirements

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

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

The maximum disk space requirements are, approximately:

Enterprise Developer	Sentinel RMS License Manager
2.3Gb	75MB

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

Operating Systems Supported

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

Note:

- A 64-bit Windows is required. You can produce both 32-bit and 64-bit applications with Enterprise Developer installed on a 64-bit operating system.

Software Requirements

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

Besides the software listed below, the setup file also installs the 64-bit AdoptOpenJDK 17.0.4 (LTS) with Hotspot.

This product includes OpenSSL version 3.0.

- [Visual Studio IDE](#)
- [Selecting the Visual Studio components to install](#)
- [Installing Visual Studio features that are not currently installed](#)
- [License Manager requirements](#)
- [Other Requirements](#)

Visual Studio IDE

You must have Microsoft's Visual Studio 2022 version 17.4 or a newer one installed in advance.

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

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

Microsoft's Visual Studio Express Edition is not supported.



Important:

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

The following software is also required:

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

Selecting the Visual Studio components to install

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

If not already installed, the Enterprise Developer setup file will install the following components:

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

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

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



Important: The latest version of the **C++ x64/x86 build tools** component, which is part of the MSVC Workload, is required to generate some IMTK clients.

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

Installing Visual Studio features that are not currently installed

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

Rerun the Visual Studio installer:

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

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

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

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

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

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

Follow the instructions in the installer to install the missing feature.

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

License Manager requirements

- The Micro Focus License Administration tool requires Java to run. It supports Java 1.7 or later.
- For local servers, you do not need to install the Micro Focus License Administration tool separately, as the setup file installs a new Enterprise Developer 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 Enterprise Developer 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.

Other Requirements

Various actions and operations within your COBOL development environment depend on certain files that Microsoft distributes in the following package: the Windows SDK package. See *Microsoft Package Dependencies* for a full list of actions and operations that require one or both of these packages.

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

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

Product Co-Existence

- Enterprise Developer and Enterprise Server (or Enterprise Test Server) cannot coexist on the same machine.
- Visual COBOL and Enterprise Developer cannot coexist on the same machine regardless of which IDE (Visual Studio or Eclipse) you install.

Installation Restrictions and Requirements

Before starting the installation you should consider the following:

- If, when you install Enterprise Developer, the machine does not have Microsoft Visual C++ 2017 Redistributable Runtime already installed, it is installed as required by Enterprise Developer. The installation of Microsoft Visual C++ Redistributable Runtime adds a number of `.dll` files, without digital signatures, into the `winsxs` directory.
- You need to be logged in with a user-ID that has write access to the registry structure under `HKEY_LOCAL_MACHINE`, `HKEY_CLASSES_ROOT`, and `HKEY_CURRENT_USER` so the installation software can set the environment appropriately. You also need to be logged on with Administrator privileges.
- Various actions and operations within your COBOL development environment depend on certain Microsoft files distributed in the following packages: the Windows SDK package and the Microsoft Build Tools package. By default, a standard product installation downloads and installs these. Refer to *Microsoft Package Dependencies* to see if these packages are required. If you do not plan to use your development tool in a way that will depend on any of these packages, you can run a non-standard installation, which will skip their download and installation, thus saving disk space and time taken for installation. Refer to *Advanced Installation Tasks* for details on the available installation options.

On UNIX

Hardware Requirements

The disk space requirements for Micro Focus Enterprise Developer Unix Components are approximately:

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
POWER running AIX	Micro Focus	1.1 GB	4.40 GB	2.20 GB	41 MB
System Z running Red Hat Linux	Micro Focus	630 MB	2.52 GB	1.26 GB	39 MB
x86-64 running Red Hat Linux	Micro Focus	1.17 GB	4.66 GB	2.33 GB	50 MB
Red Hat for Docker	Micro Focus	809 MB	3.24 GB	1.62 GB	50 MB

Platform	Installer type	Setup file size	Disk space required for the installation	Disk space required for running the product	Licensing technology
x64 running Amazon Linux 2	Micro Focus	804 MB	3.22 GB	1.61 GB	50 MB
Amazon for Docker	Micro Focus	803 MB	3.21 GB	1.61 GB	50 MB
SPARC running Solaris	Micro Focus	877 MB	3.51 GB	1.75 GB	42 MB
System Z running SUSE SLES	Micro Focus	585 MB	2.34 GB	1.17 GB	39 MB
x64 running SUSE SLES	Micro Focus	865 MB	3.46 GB	1.73 GB	50 MB
x64 running Ubuntu	Micro Focus	834 MB	3.34 GB	1.67 GB	50 MB
SUSE for Docker	Micro Focus	864 MB	3.46 GB	1.73 GB	50 MB
Ubuntu for Docker	Micro Focus	864 MB	3.46 GB	1.73 GB	50 MB
x86-64 running Rocky Linux	Micro Focus	1.17 GB	4.66 GB	2.33 GB	50 MB
Rocky Linux for Docker	Micro Focus	809 MB	3.24 GB	1.62 GB	50 MB
x86-64 running Oracle Linux - Red Hat Compatibility Kernel	Micro Focus	1.17 GB	4.66 GB	2.33 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 for Micro Focus Enterprise Developer Unix Components

The following topic lists the software requirements for Micro Focus Enterprise Developer Unix Components.

- [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.
- 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.
- GNOME menus and buttons have been standardized across all applications so that icons are not displayed by default. To keep the icons and the look and feel of previous versions, enable the menus_have_icons property with the command:

```
gconftool-2 --type boolean --set /desktop/gnome/interface/menus_have_icons true
```

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.

Library	32-bit Librar y Name	64-bit Library Name	Platform						
			s390	SUSE 12 ¹	SUSE 15 ¹	Red Hat 6x	Red Hat 7	Red Hat 8	
glibc	glibc- *.i686	glibc- *.x86_64	glibc- *.s390				X	X	X
libgcc	libgcc- *.i686	libgcc- *.x86_64	libgcc- *.s390				X	X	X
libstdc++	libstdc- ++.i686	libstdc++- *.x86_64	libstdc++- *.s390				X	X	X
glibc-locale	glibc- locale- -32bit	glibc- locale-2		X	X				
glibc-devel	glibc- devel- *.i686	glibc- devel- *.x86_64	glibc- devel- *.s390				X	X	X
elfutils-libelf	elfutils- libelf.i 386 or elfutils- libelf.i 686	elfutils- libelf.x86- 64	N/A				X	X	X

Library	32-bit Library Name	64-bit Library Name	Platform					
			s390	SUSE 12 ¹	SUSE 15 ¹	Red Hat 6x	Red Hat 7	Red Hat 8
libelf-devel**	elfutils- devel. i386 or elfutils- devel. i686	elfutils- devel.x86 -64	N/A			X	X	X
libelf-devel**	libelf- devel- 32bit- 0.137- 8.19	libelf- devel-0.1 37-8.19	N/A	X	X	X		
libelf1**	libelf1- 32bit- 0.137- 8.19	libelf1-0.1 37-8.19	N/A	X	X			
gcc ²	gcc*.i 686	gcc*x86_ 64	X	X	X	X	X	X
cpp ²		cpp*x86_ 64				X	X	X
ld ²	Binutils*.i686	Binutils*x 86_64	X	X	X	X	X	X

- Libraries marked with an 'X' are not included in the platform and need to be installed separately.
- ¹On SUSE 12 and 15, you can only install the 64-bit version of Enterprise Developer. The glibc-locale-32bit library is still required by the SafeNet Sentinel licensed components.
- ²On Red Hat, these libraries are required to enable COBOL and PL/I to compile.
- * Additional libraries required to use the core_on_error run-time system variable. The gdb packages (for the GNU Project Debugger) can be installed from the install media for your OS.
- ** Operating system libraries required for PL/I support on both SUSE and Red Hat.

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 Micro Focus Enterprise Developer Unix Components. 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

- To execute JVM COBOL code, you need to set the environment as follows:
 - Set the JAVA_HOME environment variable. When installing the product, set this variable to a 64-bit Java installation or the installation terminates. For example, execute the following:

```
export JAVA_HOME=java_install_dir
```

where `java_install_dir` is the path to the JAVA installation directory such as `/usr/java/javan.n`

- Add `$JAVA_HOME/bin` to your system `PATH` variable. To do this, execute:

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

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

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

```
C, default, en_GB, en_GB.UTF-8, en_US, en_US.UTF-8
```

```
ja_JP, ja_JP.SJIS, ja_JP.UTF-8, ja_JP.eucJP, ja_JP.eucjp, ja_JP.sjis, ja_JP.ujis, ja_JP.utf8, japanese
```

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

```
export LANG=C
```

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

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

See *Using the LANG Environment Variable* for details.

License Manager requirements

- The Micro Focus License Administration tool requires Java to run. It supports Java 1.7 or later.
- For local servers, you do not need to install the Micro Focus License Administration tool separately, as the setup file installs a new Enterprise Developer 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 Enterprise Developer 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.

Installation on UNIX and Linux (Known Issues)

Installing on Ubuntu 10.10 and later

Every version of Ubuntu starting with 10.10 comes with a setting that prevents an application from using `ptrace` to attach to another process. This prevents the PL/I debugger from attaching to user processes, and therefore debugging fails. To prevent this problem, disable the offending setting as follows before installing Enterprise Developer:

1. Using any text editor, open the `/proc/sys/kernel/yama/ptrace_scope` file.
2. Set `ptrace=0`.

For more information, see *Debugging applications that run on Ubuntu (ptrace restriction)*.

Installing on Red Hat 8.x s390

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

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

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

Installing while using AFS/Kerberos authentication

If you are using AFS/Kerberos authentication to log onto your Linux system then you need to ensure you have a local user ID which SOA and Enterprise Developer 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.

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 and for installing the mainframe components, see *Advanced Installation Tasks* in your product Help.

Installing



Note:

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

To install this product:

1. Run the `edvs2022_90.exe` file and follow the wizard instructions to install the prerequisite software and the product.

The installer installs Enterprise Developer, Enterprise Server for .NET, Micro Focus Analysis Services Integration, and the Micro Focus Host Access for the Cloud TN3270 emulator. The setup file will also install any missing prerequisite software as listed in the topic *Software Requirements*.

2. If, after installing, there are issues with using the Micro Focus functionality, you might need to execute the following command from a Visual Studio command prompt:

```
devenv /updateconfiguration
```



Note:

- If you are installing onto a machine that has an existing Micro Focus product that uses an older Sentinel RMS License Manager, you might be prompted to remove it and install the Micro Focus License Administration. By doing this you maintain the existing Sentinel RMS license files while adding the Micro Focus License Administration. If you are unsure about existing licenses on your computer or removing the Sentinel RMS License Manager, consult your System Administrator. If you want to proceed, remove Sentinel RMS License Manager by using **Program and Features**, and rerun the installation file.
- Trial licenses cannot be used with remote desktop services. If you want to use your product in this way, please contact Micro Focus Customer Care to obtain a relevant license.
- We recommend that you install any updates for Visual Studio and the .NET Framework that are available at the [Microsoft Download](#) site.
- If you install JDK you might be prompted to install the latest update. The latest update is not required for use with Enterprise Developer but you can install it if you wish.

Installing Micro Focus Enterprise Developer Unix Components

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_entdev_9.0_platform
```

2. Run the installer from the Process User ID login:

```
./setup_entdev_9.0_platform
```

When the installer starts it will prompt you to enter the superuser password so it can perform operations that require root permissions.



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/EnterpriseDeveloper`, (COBDIR).

Enterprise Server System Administrator Process

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

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

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

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

SafeNet Sentinel considerations

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

```
./setup_entdev_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 and licensing Micro Focus Rumba* - available in the product Help and on the Product Documentation pages on Micro Focus Customer Care
- *Installing the Mainframe Components* - available in the product Help and on the Product Documentation pages on Micro Focus Customer Care
- *Installing on Microsoft Terminal Server and Citrix* - available in the product Help and on the Product Documentation pages on Micro Focus Customer Care

See this information on the Product Documentation pages on Micro Focus Customer Care, in the product help for Enterprise Developer for Visual Studio 2022 ([click here](#)).

On Windows

Installing as an Upgrade

- This release cannot be installed as an upgrade to an earlier release of Enterprise Developer. You must uninstall the previous version before installing 9.0.

Enterprise Developer Installation Options

To install Enterprise Developer you run `edvs2022_90.exe` which contains a number of product `.msi` files (Windows Installer packages). When run, `edvs2022_90.exe` performs some initial system checks then sequentially installs the `.msi` files.

`edvs2022_90.exe` can take a number of parameters, enabling you to specify a number of different types of installation:

- Standard Installation

Format:

```
edvs2022_90.exe
```

Summary:

Full installation including License Manager and Enterprise Developer. During installation you can specify options including the location to which the components are installed.

- Non-standard Installation

Format:

```
edvs2022_90.exe skipmstools=1
```

Summary:

Full installation, minus the Microsoft package dependencies. A standard installation downloads and installs the latest Windows SDK packages. Refer to *Microsoft Package Dependencies* to see if you will depend on these packages, and if not, use the option above to skip installation of the packages, thus reducing the footprint and duration of the installation process.

- Non-interactive Installation

Format:

```
edvs2022_90.exe /passive
```

Summary:

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

- Silent Installation

Format:

```
start /wait edvs2022_90.exe /q
```

Summary:

Full installation, but the components are installed non-interactively with no user interface, using default options and directories.

- Modified Silent Installation

Format:

```
start /wait edvs2022_90.exe /q InstallFolder=d:\otherdirectory
```

Summary:

Full installation, but the components are installed non-interactively with no user interface, and Enterprise Developer is installed to `d:\otherdirectory`.

Format:

```
start /wait edvs2022_90.exe /q RumbaCheckbox=1
```

Summary:

Full installation of Enterprise Developer and of the Micro Focus Rumba+ Desktop component. All components are installed non-interactively with no user interface.

To see what parameters you can use, execute the following from the command line:

```
edvs2022_90.exe /?.
```

**Note:**

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

On UNIX

Installing as an Upgrade

This release works concurrently with the previous version of Micro Focus Enterprise Developer Unix Components, 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 Micro Focus Enterprise Developer Unix Components installer with the `-installlocation` option:

1. Execute the following command:

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



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/EnterpriseDeveloper`, during the installation process it is moved to `/opt/microfocus/EnterpriseDeveloper.BKP.YYYY-MM-DD.HH:MM:SS`. The new release will be installed in `/opt/microfocus/EnterpriseDeveloper`. 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/EnterpriseDeveloper.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
<code>\$COBDIR/etc/mfds</code>	<code>/opt/microfocus/config/39082/mfds/mfds</code>
<code>\$COBDIR/etc/ccsid</code>	<code>/opt/microfocus/config/39082/config/ccsid</code>
<code>\$COBDIR/etc/secrets</code>	<code>/opt/microfocus/config/39082/secrets</code>
<code>\$COBDIR/bin/mf370ctl.cfg</code>	<code>/opt/microfocus/config/39082/config/mf370ctl.cfg</code>
<code>\$COBDIR/bin/CCI.INI</code>	<code>/opt/microfocus/config/39082/config/CCI.INI</code>
<code>\$COBDIR/deploy/.mfdeploy</code>	<code>/opt/microfocus/config/39082/</code> <code>deploy/.mfdeploy</code>
<code>\$COBDIR/etc/cas/CTFesjcl.cfg</code>	<code>/opt/microfocus/config/39082/cas/</code> <code>CTFesjcl.cfg</code>
<code>\$COBDIR/etc/cas/dfhdrdat</code>	<code>/opt/microfocus/config/39082/cas/</code> <code>dfhdrdat</code>
<code>\$COBDIR/etc/commonwebadmin.json</code>	<code>/opt/microfocus/config/39082/escwa/</code> <code>commonwebadmin.json</code>
<code>\$COBDIR/etc/mfdsacfg.xml</code>	<code>/opt/microfocus/config/39082/mfds/</code> <code>mfdsacfg.xml</code>
<code>\$COBDIR/etc/mfdsacfg.dat</code>	<code>/opt/microfocus/config/39082/mfds/</code> <code>mfdsacfg.dat</code>
<code>\$COBDIR/etc/mf-client.dat</code>	<code>/opt/microfocus/config/39082/mfds/mf-</code> <code>client.dat</code>
<code>\$COBDIR/etc/mf-server.dat</code>	<code>/opt/microfocus/config/39082/mfds/mf-</code> <code>server.dat</code>
<code>\$COBDIR/etc/cobol.dir</code>	<code>/opt/microfocus/config/39082/config/</code> <code>cobol.dir</code>
<code>\$COBDIR/etc/cobopt</code>	<code>/opt/microfocus/config/39082/config/</code> <code>cobopt</code>

Source	Destination
\$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

Micro Focus Enterprise Developer Unix Components 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_entdev_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 where 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

- See *Changes in Behavior or Usage* in your product documentation and in the Release Notes for important information about changes in this release that might affect existing applications.
- Check the *Product Documentation* section of the [Micro Focus Customer Support Documentation Web site](#) for any documentation updates.

On Windows

Starting the Product

You are now ready to run Enterprise Developer:

Windows 10 • From your Windows desktop, click **Start > Visual Studio 2022**.

Windows 11 • Click the **Start** button in the Task Bar. Use the search field in the Start menu to find and start **Visual Studio 2022**.

Managing the Microsoft Build Tools and Windows SDK Packages

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

You can use the Microsoft Build Tools and Windows SDK Packages configuration utility - `cb1ms` - to view which versions are in use, and also configure your COBOL environment if you require something other than the standard usage.

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

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

The Microsoft Build Tools and Windows SDK Configuration Utility

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



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

Syntax:

```
cblms <option>
```

Parameters:



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

`<option>` can be one of:

-U

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

-U<ms-pkg>

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

-U<ms-pkg>:<version>

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

-U<ms-pkg>:<path>

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

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

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

-L

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

-L<ms-pkg>

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

-L<ms-pkg>:<path>

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

-Q

Displays the versions currently in use by the COBOL environment.

-Q<ms-pkg>

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

-R

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

-H

Displays the available command line options.

Legend:

<ms-pkg> *<ms-pkg>* can be one of **S** or **SDK** for the Microsoft SDK, or **B** or **BT** for the Microsoft Build Tools.

<path> *<path>* is the path in which to locate packages that are not installed to the default location for their package type.

<version> *<version>* is the package version with which to update when the latest version is not the one required. When specifying *version*, it must be in the form:

- *n.n.n.n* for a Windows SDK
- *n.n.n* for Build Tools
- *n* for list ID - the list ID is displayed using `cblms -L`.

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

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

Viewing the Product Help

Enterprise Developer is configured to display the product help available online on the Micro Focus Customer Care website: <https://www.microfocus.com/support-and-services/documentation/>.

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

Online help (default)



Note:

- Your Visual Studio must be configured to show online help by default. Make sure **Help > Set Help Preferences** in Visual Studio points to **Launch in Browser**.
- Ensure that you have an up-to-date version of your browser.

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

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

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

Local help



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

1. Click **Help > Add and Remove Content** inside Visual Studio.
This starts the Microsoft Help Viewer.
2. Click the **Manage Content** tab and click **Disk**.
3. Click **Remove** next to the line for the Enterprise Developer documentation.
4. Click **Update**.

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

1. Download the local help files:
 - a. Find the download link for local help in your Electronic Product Download email or in the **Product Updates** section on the Micro Focus Customer Care website and save the files on your machine.
 - b. Expand the archive on your machine. Ensure that the `.msha` and the `.cab` files are in the same folder.
2. Ensure that the Visual Studio Help Viewer is installed:
 - a. Click **Help** inside Visual Studio.
If no **View Help** command is available, you need to install the Help Viewer manually. See *Installing missing components of Visual Studio* in *Software Requirements* for instructions on how to install it.
3. Install the help in the Help Viewer:
 - a. Click **Help > Add and Remove Content** inside Visual Studio.
This starts the Microsoft Help Viewer.
 - b. Click the **Manage Content** tab and click **Disk**.
 - c. Click the browse button next to **Disk** and navigate to the folder in which you extracted the local help files.
 - d. Select `helpcontentsetup.msha` and click **Open**.
This loads the Enterprise Developer documentation.
 - e. Click **Add** and then **Update**.
After the installation is complete, the Enterprise Developer product Help appears in the Help Viewer.
4. Configure Visual Studio to use local help:
 - a. Start Visual Studio.
 - b. Ensure that the Visual Studio Help Library is pointing to local help - from the Visual Studio menu click **Help > Set Help Preferences > Launch in Help Viewer**.
 - c. Click **Help > View Help**.



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

Repairing

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



Important: 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.

To repair your installation:

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

Uninstalling

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

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

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

If the product directory has not been removed, delete any unwanted files and subdirectories within it using Windows Explorer.



Note: The installer creates separate installations for Micro Focus Enterprise Developer, Enterprise Server for .NET, Micro Focus Analysis Services Integration, and Micro Focus License Administration. Uninstalling only Enterprise Developer does not automatically uninstall Enterprise Server for .NET, the Micro Focus License Administration or any of the prerequisite software.

Enterprise Server for .NET must be uninstalled before you remove Enterprise Developer. To completely remove the product you must uninstall the Micro Focus License Administration as well.

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

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

The following folders might not be removed:

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

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

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

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

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

On UNIX

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_EnterpriseDeveloper9.0.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.
- The latest version of the SafeNet licensing software is required. See the *Software Requirements* section in this document for more details.
- If you are unsure of what your license entitlement is or if you wish to purchase additional licenses, contact your sales representative or [Micro Focus Customer Care](#).



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 start Micro Focus License Administration

To start the GUI Micro Focus License Administration

Windows 10 From your Windows desktop, click **Start > Micro Focus License Manager > License Administration**.

Windows 11 Click the **Start** button in the Task Bar. Use the search field in the Start menu to find and start **License Administration**.

To start the command-line Micro Focus License Administration tool

1. At a command prompt, navigate to:

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

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

Installing licenses

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

If you have a license file

To use the GUI Micro Focus License Administration

1. Start Micro Focus License Administration.
2. Click the **Install** tab.

3. Do one of the following:

- Click **Browse** next to the **License file** field and select the license file (which has an extension of `.mflic` or `.xml`).
- Drag and drop the license file from Windows Explorer to the **License file** field.

4. Click **Install Licenses**.

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

1. Start Enterprise Developer.

If you have not installed a license for Enterprise Developer, trying to use the Micro Focus functionality for the first time after you install the product results in a warning message. Visual Studio displays an information bar with a message that Enterprise Developer does not have a valid license. You can use the **Install license** link in the bar, or close the bar.

2. Click **Help > Micro Focus Product Help > Product Licensing** to open the **Product Licensing** dialog box.

3. Click **Browse** next to the **License file** field.

4. Select the license file (which has an extension of either `.mflic` or `.xml`), and then click **Open**.

5. Click **Authorize** to install the license.

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

To use the command-line Micro Focus License Administration tool

1. Start the command-line Micro Focus License Administration tool.

2. Select the **Manual License Installation** option by entering 4.

3. Enter the name and location of the license file.

If you have an authorization code



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

Authorizing your product when you have an Internet connection



Note:

- This topic only applies if you have an authorization code. Authorization codes are only available with Sentinel RMS licensing.
- It is not possible to install licenses remotely. You must be logged into the machine on which you are installing the licenses.

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

To use the GUI Micro Focus License Administration

1. Start Micro Focus License Administration.

2. Click the **Install** tab.

3. Type the authorization code in the **Enter authorization code** field.

4. Click **Authorize**.

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

To use the command-line Micro Focus License Administration tool

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

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



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

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

To use the GUI Micro Focus License Administration

1. Start Micro Focus License Administration.
2. On the **Install** tab, click **Manual Authorization**.
3. Make a note of the contents of the **Machine ID** field. You will need this later.
4. Do one of the following:
 - If your machine has an Internet connection, click the Customer Care Web link in the Manual Authorization Information window.
 - If your machine does not have an Internet connection, make a note of the Web address and type it into a Web browser on a machine that has an Internet connection.

The Micro Focus Customer Care Manual product authorization Web page is displayed.

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

To use the command-line Micro Focus License Administration tool

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

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

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

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

7. Enter the name and location of the license file.

To obtain more licenses

If you are unsure of what your license entitlement is or if you wish to purchase additional licenses for Enterprise Developer, 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 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 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 for Micro Focus products, <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 Micro Focus 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.

See the *Preparing to Raise a Support Case* topic on the Product Documentation pages on Customer Care, in the product help for Enterprise Developer for Visual Studio 2022 ([click here](#)).

Creating Debug Files

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

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