



# Micro Focus Enterprise Developer 3.0 for Visual Studio

Release Notes

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# Contents

|                                                                             |           |
|-----------------------------------------------------------------------------|-----------|
| <b>Micro Focus Enterprise Developer 3.0 for Visual Studio Release Notes</b> | <b>4</b>  |
| <b>What's New</b>                                                           | <b>5</b>  |
| <b>Significant Changes in Behavior or Usage</b>                             | <b>15</b> |
| <b>Known Issues</b>                                                         | <b>21</b> |
| <b>Resolved Issues</b>                                                      | <b>24</b> |
| <b>Other Issues Resolved in This Release</b>                                | <b>58</b> |
| <b>Unsupported Functionality</b>                                            | <b>60</b> |
| <b>Installation</b>                                                         | <b>61</b> |
| Before Installing                                                           | 61        |
| Downloading the Product                                                     | 61        |
| On Windows                                                                  | 61        |
| On UNIX                                                                     | 65        |
| Basic Installation                                                          | 68        |
| Installing                                                                  | 68        |
| Installing Micro Focus Enterprise Developer Unix Components                 | 69        |
| Advanced Installation Tasks                                                 | 69        |
| On Windows                                                                  | 70        |
| On UNIX                                                                     | 71        |
| After Installing                                                            | 73        |
| On Windows                                                                  | 73        |
| On UNIX                                                                     | 75        |
| <b>Licensing Information</b>                                                | <b>76</b> |
| To start Micro Focus License Administration                                 | 76        |
| Installing licenses                                                         | 76        |
| If you have a license file                                                  | 76        |
| If you have an authorization code                                           | 77        |
| To obtain more licenses                                                     | 78        |
| <b>Updates and SupportLine</b>                                              | <b>79</b> |
| Further Information and Product Support                                     | 79        |
| Information We Need                                                         | 79        |
| Creating Debug Files                                                        | 80        |
| <b>Copyright and Disclaimer</b>                                             | <b>81</b> |

# Micro Focus Enterprise Developer 3.0 for Visual Studio Release Notes

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



## Note:

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

## Product Overview

Enterprise Developer supports IBM COBOL, IBM PL/I, IBM Assembler, IBM CICS, IBM IMS, IBM JCL, IBM DB2, IBM z/OS file formats and common batch utilities, including SORT. This means that you can develop and maintain the core mainframe online and batch applications under Enterprise Developer. You can then deploy these applications back on the mainframe or migrate them onto one of the Micro Focus Linux, UNIX or Windows-based production platforms.

## Upgrading from earlier Micro Focus products

Application executables that were compiled using earlier Micro Focus products must be recompiled from the sources using Enterprise Developer. For more information, read the section *Upgrading to Enterprise Developer* in the product Help.

# What's New

This release provides enhancements in the following areas:

- *Integration with Visual Studio*
- *Application Server JCA support for Enterprise Server*
- *Azure support*
- *Building applications*
- *CICS Web services*
- *COBOL language enhancements*
- *Code analysis*
- *Code coverage*
- *Compiler control*
- *Data File Tools*
- *Database access - HCO for DB2 LUW*
- *Database access - HCOSS*
- *Database access - MySQL*
- *Database access - OpenESQL*
- *Debugging applications*
- *Documentation*
- *Enterprise COBOL 6.1 compatibility*
- *Enterprise Server*
- *Enterprise Server for .NET*
- *Interface Mapping Toolkit*
- *iFileshare*
- *IMS support*
- *Mainframe Access (MFA)*
- *Micro Focus Unit Testing Framework*
- *PL/I support*
- *Rumba terminal emulator*
- *XML processing*

## Integration with Visual Studio

This release provides enhancements in the following areas:

- Integration with Microsoft's Visual Studio 2017, the most recent version of world's most popular integrated development environment (IDE) for the Windows platform, offering significant benefits for developers and businesses developing software for Windows.
- COBOL Editor:
  - Brace completion - a closing quote mark or bracket is automatically inserted when you type the opening quote mark or bracket at the end of a line.
  - Brace matching for IF and EVALUATE statements - clicking on any of the clauses of these statements highlights the opening and closing statements and all clauses. Use **CTRL + ]** to move the cursor to the next clause in the statement.
  - Collapse to definitions - closes all sections, entry points and methods in an open file. Use the **Outlining > Collapse to Definitions** editor context menu command.
  - Colorization is now available for QuickInfo, completion tooltips and signature help.
  - Completion of statements - IF and EVALUATE statements are now automatically aligned and completed.

- Indentation - smart indentation is now available to control how lines indent within IF and PERFORM statements and after continuation statements.
- Locate definition, , on the COBOL toolbar enables you to search for data items and identifiers by specifying any string of characters that might be part of their name. This command replaces **Edit > Go To Location**.
- Outlining - outlining is now available for 01 level for group items (for expanding and collapsing the entire group) and for EXEC blocks
- Quick actions (a feature of Visual Studio versions 2015 and later) - Enterprise Developer now supports Visual Studio's quick actions for setting the CICSECM Compiler directive, rename refactoring, and finding or creating missing copybooks.
- Tooltips are now available for managed COBOL members.
- COBOL toolbar - the commands on the COBOL toolbar have been updated in order to optimize your editing experience. A number of commands (renumber and unnumber) have been removed from the context menu in the editor and are now only available from the toolbar.
- Directives determination - there is now a preview dialog box when the IDE scans your sources for Compiler directives. This enables you to review and approve the directives before they are set.
- Error reporting - you can now sort the errors and warnings **Error List** window by their COBOL error code.
- Import, export and synchronization of the IDE options - you can now export a number of the COBOL and PL/I global options as a Visual Studio .settings file. You can import the file into other instances of Enterprise Developer.

Enterprise Developer for Visual Studio 2015 and later now supports the automatic synchronization of a number of COBOL settings across the copies of Visual Studio installed on different machines. The settings are synchronized through your MSDN account. See the MSDN for more details and for information on any restrictions to the functionality.

- **Project Details** window - provides a number of enhancements, including performance improvement. It is now possible to filter on project or solution, perform a search, and sync with Solution Explorer. Tooltips are available in the Overrides column to show the override directives.
- Net Express import wizard - provides a new option for including copybooks in a project.
- Rename refactoring - this release introduces rename refactoring for COBOL code that can help to improve the readability of COBOL elements or make their purpose clearer. You can rename elements such as variables and identifiers, section and paragraph names, classes, and methods across a program or a solution.
- Support for standalone files - various improvements have been made to how you work with files that are not part of a project:
  - When you first open a standalone file, the editor displays an alert bar with options to browse for a symbols (.idy) file to use to compile the standalone file or to configure the Compiler directives.
  - You can now use the file's properties window to edit the Compiler directives and to specify options for debugging.

In previous versions of Enterprise Developer, standalone files were known as "single files". References to "single files" in the IDE and the product help have been changed to "standalone files".

[Back to Top](#)

### Application Server JCA support for Enterprise Server

In this release, EJBGEN has been updated to generate an EAR file as a part of the COBOL deployment process, which enables you to deploy EJBs to Java Application Server.

[Back to Top](#)

### Azure support

Enterprise Developer now supports the following versions of Microsoft Azure SDK - version 2.9.6 with Visual Studio 2013 and version 3.0 with Visual Studio 2015 and later.

[Back to Top](#)

## Building applications

This release provides the following improvements:

- Support for faster, parallel building on multi-CPU machines - support has been added for multi-processor compilation of the sources in native COBOL projects on multi-CPU machines.

You can specify the maximum number of concurrent compilations from the IDE preferences - **Tools > Options > Micro Focus > Projects**. In Visual Studio, multi-processor compilation must also be enabled in the project's properties.

[Back to Top](#)

## CICS Web Services

In this release, CICS Web services support includes the following additional features:

- CICS JSON Web services for request/response and RESTful JSON. CICS Web Services support has been extended to allow JSON/REST requests to be used in both requestor and provider mode.
- Use of container-based mappings

[Back to Top](#)

## COBOL language enhancements

This release includes the following enhancements to the COBOL syntax:

- The DISPLAY-OF and NATIONAL-OF intrinsic functions are now able to process conversions using any IBM CCSID value.

The following enhancements are available in managed COBOL:

- To avoid an exception being thrown if an explicit conversion fails, use the AS IF syntax, which results in the target object being set to null and no exception thrown.

[Back to Top](#)

## Code analysis

This release provides the following improvements:

- A new group of predefined rule sets for 64-bit readiness is now included in Enterprise Developer.
- Support for importing code analysis reports produced with one of Micro Focus's advanced tools for code analysis, Enterprise Analyzer or COBOL Analyzer.

[Back to Top](#)

## Code coverage

The following improvements are available within the IDE:

- Information about unexecuted programs - the code coverage reports in the **Code Coverage** window now show the unexecuted programs.
- Code coverage support for standalone COBOL files - you can import existing code coverage reports in the **Code Coverage** window and use it to supply code coverage information for standalone files.

If you are using Test Coverage from the command line, you can now use the following features:

- A new Compiler directive, COLLECTION - the directive enables test coverage to gather information about unexecuted programs. In the IDE, this directive is automatically set on a project when you enable code coverage for it.

- A new command line utility, `tcutil` - the utility enables you to convert the test coverage binary results file into XML format.
- It is now possible to integrate test coverage in a Continuous Integration (CI) system. You can use `tcutil` and an XSLT processor to transform test coverage data into a format suitable for including in a CI.

[Back to Top](#)

## Compiler control

The following Compiler directives are new in this release:

- `COLLECTION` - provides a mechanism for code coverage to identify unexecuted programs.
- `ILSTDLIB` - helps you to ensure that your .NET COBOL code compiles with the correct version of the .NET Framework Microsoft Common Object assembly `microsoft.common-obj.dll`. When building from Visual Studio or using MSBuild to compile a COBOL project, the `NOILSTDLIB` directive is set, and an `ILREF` is generated pointing at the version of `microsoft.common-obj.dll` appropriate for the target framework selected in the project's properties.

The following Compiler directives have been updated:

- `ALIGN` - this directive has new parameters (`FIXED` and `OPT`) that can be used in conjunction with the integer taken, which can aid performance. The default is `ALIGN"8 OPT"`; see the Comments section of the `ALIGN` Compiler directive topic for details of its affect on memory boundaries.
- `ARITH` - this directive emulates the IBM mainframe option of the same name. Defines the maximum number of digits for numeric data items.
- `FASTINIT` - this directive is now on by default when setting the MF dialect; it remains not set by default for other dialects.
- `SSRANGE` - this directive now has an additional option (`3`), which permits zero-length reference modified items at run time when bounds checking.
- `XMLPARSE` - includes a change in the way entities are processed when `XMLPARSE(COMPAT)` is set

[Back to Top](#)

## Data File Tools

This release provides the following enhancements to Data File Tools:

- Opening files in shared mode - it is now possible to switch between read-only shared and edit modes. While a file is open in shared mode, others users can only open it in shared mode to ensure data consistency between users.
- Enterprise Server-level of security when accessing files - there is an improved level of security when exchanging data between Data File Tools and the targeted enterprise server instance. Users must now provide a user ID, group and a password when they try to access and view datasets in enterprise server instances. These are used for authentication and authorization checks to provide the same access level as Enterprise Server.
- Opening datasets using SSL - communication to a region is now possible using SSL. To enable the SSL communication, you need to provide a Java trust store which contains either a CA root certificate or a self-signed certificate of the region that it is communicating to. Java and the targeted region SSL configurations need to meet each other's standards in order for the communication to succeed.

This feature enables you to secure the information exchange between Data File Tools and the targeted enterprise server.

- Auditing of access and updates on datasets - Audit Manager now audits the access and updates on datasets via Data File Tools.
- Support for existing `.pro` files - enables you to use your existing editor profiles.
- Support for existing `.str` files - enables you to use your existing COBOL and PL/I structure files.
- Automatic timeout - if no internal operations or external actions (such as a mouse click) have been detected for 30 minutes, Data File Tools now displays a countdown message. If the user does not take any decision within the specified period, Data File Tools closes all opened files.

[Back to Top](#)

### **Database access - HCO for DB2 LUW**

This release provides a new DB2(QUALIFY-CALL) Compiler directive that enables stored procedure invocations to include a schema name.

[Back to Top](#)

### **Database access - HCOSS**

This release provides a new Offline Schema Extract feature – a batch solution that migrates a z/OS DB2 catalog to SQL Server without direct access to z/OS DB2.

[Back to Top](#)

### **Database access - MySQL**

This release provides support for MySQL with ODBC.

[Back to Top](#)

### **Database access - OpenESQL**

This release provides the following new features:

- Statement prefixes for the SQL(CHECK) Compiler directive that enable the creation of temporary tables and other SQL objects at compile time, ensuring full SQL syntax checking during compilation.
- SQL(OPTIMIZECURSORS) Compiler directive that enhances processing for traditional embedded SQL cursors that use WITH HOLD and FOR UPDATE clauses.
- SQL(CLOSE\_ON\_COMMIT) Compiler directive to leave cursors open for further result set processing after a commit.
- SQL(GEN-SQLCA) Compiler directive that generates an SQLCA similar to the z/OS DB2 directive STDSQL(YES).

[Back to Top](#)

### **Debugging applications**

This release provides the following new features:

- A new drop-down option, **Any** on the **Debug** tab in the project's properties of native Mainframe Subsystem application projects, enables you to debug without specifying the type of application.

[Back to Top](#)

### **Documentation**

The following new sections have been added to the product help:

- *Where do I start?* - located on the launch page of the product help, this section provides the information you need in order to get started depending on which aspects of the product you need to get to grips with first.
- *Configuring an SSL Client Connection to a Mainframe* - includes instructions about how to configure client applications to connect to MFA and z/Server mainframe via AT-TLS in a zOS environment.

[Back to Top](#)

### **Enterprise COBOL 6.1 compatibility**

The following features have been added to support Enterprise COBOL 6.1:

- A new statement, JSON GENERATE, which enables you to convert data to JSON format.
- A new special register, JSON-CODE, and its resulting exception codes to support the new statement.
- Two further new statements, ALLOCATE and FREE, to obtain and release dynamic storage.
- A new MF level, MFLEVEL"19", which contains the following new additions to the reserved words list:
  - JSON
  - END-JSON
  - ALLOCATE
  - FREE
  - INITIALIZED (context-sensitive reserved word)



**Note:** These keywords are also in effect under the ENT dialect.

- The SSRANGE Compiler directive has an additional option (3), which permits zero-length reference modified items at run time when bounds checking.
- Support for the INITIALIZE statement under the ENT dialect has been enhanced.

[Back to Top](#)

For more information see [Related Information](#) at the end of this topic.

## Enterprise Server

Improvements are available in the following areas:

### Integration with Visual Studio:

- Exporting an enterprise server definition from the IDE in XML format.
- Importing an enterprise server into the IDE using its definition file.
- In Visual Studio, it is now possible to configure an enterprise server to produce a core dump file directly from the IDE, from the server properties.

### EXEC CICS TRANSFORM:

- Enterprise Server now supports the XMLTODATA and DATATOXML options of this API.

### JCL spool

The JCL spool repository infrastructure has been redesigned to significantly improve its performance. The improvements include:

- A more disk-efficient infrastructure, reducing the space required by the spool files by up to 75% in some cases.
- Improved internal indexing, resulting in quicker generation of messages and sysout records during processing.
- Improved navigation of spool queues: job status **Complete** replaces the **Output**, **Out Hold**, and **Printed** statuses, and completed jobs with any combination of sysout files can be displayed in a single list.
- Increased range of job numbers, from five digits to seven digits.



**Important:** These changes are automatically in place for new enterprise servers that you create. To enable these updates to existing enterprise servers, you must run a conversion utility before any JCL processing is permitted. Follow the **To run the spool conversion utility** process, detailed in *Significant Changes in Behavior*, for each existing JES-enabled enterprise server you have.

### Long user IDs and passwords:

- Enterprise Server now supports user IDs and passwords of up to 100 characters. It is possible to map IDs from long to short (or vice versa) to enable compatibility with programs that do not support long names.

### **Multi-factor sign-on:**

- Multi-factor authentication enables users to sign on to Enterprise Server CICS without entering a username and password. A secure user identifier, such as a certificate, is mapped to a username and is used to generate a passtoken. It is possible to use smartcards, biometrics, or other authentication systems to identify yourself to the system. The username and passtoken can then be used to log on to CICS in an automated way.

The supported sign-on mechanisms are Express Logon Feature (ELF) and Automated Sign-On for Mainframe (ASM). See the product Help for examples of how to configure a region to use the two mechanisms.

### **SHA-256 support in DemoCA:**

- By default, the Demonstration Certificate Authority (CA) now signs certificates with SHA-256. This ensures that the demonstration or evaluation certificates will be accepted by modern browsers and other software that has enhanced security requirements.

### **Syslog auditing:**

- Enterprise Server now supports auditing using syslog events, which can be consumed by a wide range of Security Information and Event Management (SIEM) products. This replaces the Audit Manager auditing solution. Syslog auditing provides a much more efficient auditing mechanism, with significantly less impact on overall speed.

[Back to Top](#)

## **Enterprise Server for .NET**

This release provides enhancements in the following areas:

- Public class library - offers enhanced functionality for applications to interact with a running JES system:
  - Dynamic dataset allocation/deallocation
  - KSDS/ESDS/RRDS file handling support
  - ENQ/DEQ support
- Web User Interface (Technology Preview) - this is a Technology Preview of a web-based UI for the administration of an Enterprise Server for .NET system. The UI enables you to administer an Enterprise Server for .NET system from any device supporting a web browser and without the need to install Enterprise Server for .NET. The following features are available:
  - Starting and stopping of regions
  - The following views - Console, Statistics, Local trace tables, Monitor, Dynamic listener control and the HSF view for CICS.
- Region-specific external file handler (EXTFH) configuration - it is now possible to specify EXTFH configuration on a per-region basis using the MMC UI region start-up file editor. Previously, you had to specify EXTFH configuration on a per-machine basis and it was global to all regions. This could have led to inconsistency in application behavior if one or more machines in a scale-out had different configurations defined.
- HSF performance improvements - various improvements have been made to HSF to reduce the amount of database processing required. This lowers the impact on application performance when HSF is enabled for a region.
- Accepting input from the system console - system console input can now be provided from the MMC UI console view, or using the seesys command-line utility. The input is provided to JES applications using ACCEPT FROM CONSOLE and to CICS applications using EXEC CICS WRITE OPERATOR REPLY.
- JES seven-digit job numbers - you can now configure JES regions to allow up to seven-digit job numbers to be used. This enhancement is also available in the native Enterprise Server product.

The following new features were initially provided as HotFix updates of Enterprise Server for .NET 2.3 Update 2 and are now available in this release:

- Dataset name filtering by the MMC UI Catalog view - it is now possible to filter catalog name entries through the use of wildcards in the MMC UI Catalog view. This helps reduce the time to display dataset names when a catalog contains a great number of entries.
- MMC UI file viewer enhancements:
  - Options for closing all open files, closing all but the currently selected file, and for loading all of the remaining lines of a file.
  - Viewing the contents of SYSOUT files being written by active job steps.
- Improved task recovery - Enterprise Server for .NET now automatically detects when a SEP pool process dies (for example, when you stop debugging, or the machine shuts down), or is no longer responsive, and recovers any running CICS transactions or JES jobs. This provides improved system integrity by ensuring that the responsiveness and work through a running system is maintained following a SEP pool failure.

[Back to Top](#)

### Interface Mapping Toolkit

The Interface Mapping Toolkit (IMTK) contains the following enhancements in this release:

- Cross Origin Resource Sharing (CORS) support for REST Web services, enabling Web service access from a CORS-supported Web browser.

[Back to Top](#)

### iFileshare

iFileshare is no longer considered an Early Adopter Program, and contains the following enhancements in this release:

- An improved failover and recovery process. iFileshare now supports full recovery of nodes in the group. For high availability (HA-VSAM) groups, servers can now rejoin the group without the entire group having to be restarted. In addition:
  - A primary failover now results in a takeover from the most suitable node.
  - If configured, external clients will automatically reconnect to the new primary and will issue a notification if the transaction has been lost.
  - A failed node, when restarted, will rejoin the group, recover its files and request a log update from the current primary. Once this task has completed it will be considered an active hot-standby and will continue to process replication requests as normal.
  - Users will experience a higher level of uptime/availability with their Fileshare configuration and will be able to recover from errors more easily.
- A new exit procedure, `ifsexitproc.cbl`, can be configured to automate some aspects of iFileshare behavior.
- The iFileshare Control page in ESMAC contains details of the current iFileshare high availability group.
- The following new iFileshare-specific environment variables are available:
  - `FSWRKDIR` - enables you to specify the Fileshare working directory, overriding the default, which is the system directory of the region.
  - `FSCHKLFH` - determines if a check is performed when a high availability group is started, to test the consistency of the data files within the group.
- The database reference file (`dbase.ref`) now supports wildcard matching for filenames, allowing you to perform operations on multiple files at once; for example: `fs /d dbase.ref /f data\*` adds the entire contents of the data directory to the database reference file.

[Back to Top](#)

## IMS support

A new MFSGEN Compiler directive, CONTMVS, has been added to enable the compiler to parse MFS continuation lines (those continued without a terminating comma) by treating the line that follows as a comment line, just as is done on the mainframe.

[Back to Top](#)

## Mainframe Access (MFA)

This release provides the following improvements:

- Running MFA client in 64-bit processes - you can now call the MFA client modules from 64-bit applications and take advantage of the wider memory addressing available to those modules.
- MFA client CTF tracing - MFDAS now supports CTF tracing. This provides better diagnostics of issues and helps increase turnaround on issues. CTF is common to a number of Micro Focus modules so cross-component logging can be turned on from a single place.
- Endeavor functions - the following functions are now available to Enterprise Sync and MFDAS: DELETE, DIRX, GENERATE, GETENQI, LIST, MOVE, SIGNIN and TRANSFER.

[Back to Top](#)

## The Micro Focus Unit Testing Framework

The Micro Focus Unit Testing Framework is now available from within the IDE. It includes much of the architecture you would expect of an xUnit framework to create, compile, run and debug unit tests, including the following features:

- A unit test project template.
- A test creation wizard that enables you to generate tests from your source code.
- Code snippets for each element of a test case.
- Support for running tests with Code Coverage enabled.
- The Micro Focus Unit Testing window, where you can manage your test runs and view test output.

There has been a number of enhancements to the command line version of the Micro Focus Unit Testing Framework. Support has been added for:

- Generating NUnit-style reports.
- Running test fixture files using Apache Ant.
- Applying traits to your test cases, then performing a test run based on those traits.
- Applying a high, medium, or low priority to test cases, which affects the order in which they are run.
- Adding coded command line options directly into your test code.
- Using a test run-specific configuration file, in which you can set environment variables.

[Back to Top](#)

## PL/I support

Enhancements are available in the following areas:

### PL/I compiler and run-time system

Support has been added to enable the following:

- The UNSIGNED data type - the PL/I Compiler now supports the UNSIGNED attribute for FIXED BINARY data items. In addition to the basic language support, the SIGNED, UNSIGNED, ISIGNED, and IUNSIGNED new built-in functions have been implemented. These features offer an improved compatibility with other languages such as C or C++.
- New built-in functions - UTF8(), UTF8TOCHAR(), UTF8TOWCHAR(), and SUBTRACT(). These new built-in functions make it easier to modernize migrated PL/I applications.

- The ENTRY LIMITED data attribute - the Open PL/I Compiler now accepts and fully supports the LIMITED attribute on ENTRY declarations. This increases the compatibility of the Micro Focus PL/I Compiler with IBM's PL/I for applications that you are migrating from the mainframe.
- Support for processing of JSON data - a number of new built-in functions are available for processing JSON text. This enables you to modernize your PL/I applications by enabling them to interpret, create and process JSON data.

|                    |                    |               |
|--------------------|--------------------|---------------|
| JSONGETARRAYEND    | JSONPUTARRAYEND    | JSONGETMEMBER |
| JSONGETARRAYSTART  | JSONPUTARRAYSTART  | JSONGETVALUE  |
| JSONGETCOLON       | JSONPUTCOLON       | JSONPUTMEMBER |
| JSONGETCOMMA       | JSONPUTCOMMA       | JSONPUTVALUE  |
| JSONGETOBJECTEND   | JSONPUTOBJECTEND   | JSONVALID     |
| JSONGETOBJECTSTART | JSONPUTOBJECTSTART |               |

### PL/I macro preprocessor

A number of enhancements have been made to improve the compatibility between the PL/I macro preprocessor and IBM's macro preprocessor which helps ease the effort required to migrate PL/I applications to new platforms. Support is available for:

- RESCAN in the ANSWER statement.
- The shorthand "<>" syntax for indicating "Not Equal To".
- Break characters in hex literal constants to improve readability of code.
- A new option, -tagdbg, that annotates macros and %FILE/%ENDFILE statements with line numbers and the source file which injected them.
- The -caseasis option which allows source code to flow through to the mdeck.pp file retaining the case as entered.
- Macros with a null parameter list.
- The LEAVE statement.
- Improved macro preprocessing speed.
- New built-in functions: SYSENDIAN() and MFPHOSTNAME().

[Back to Top](#)

### Rumba terminal emulator

Enterprise Developer now ships with Micro Focus Rumba 9.5.

[Back to Top](#)

### XML processing

XML PARSE now works in a purely managed COBOL environment. It is now supported in JVM COBOL and, in both .NET and JVM COBOL, it has a fully managed implementation. XML PARSE working without calling out to native code ensures it can be used in restricted rights environments.

[Back to Top](#)

# Significant Changes in Behavior or Usage

This section describes significant changes in behavior or usage. These changes could potentially affect the behavior of existing applications or impact the way the tools are used.

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

- [CICS Support](#)
- [Compatibility AddPack](#)
- [Compiler](#)
- [Documentation](#)
- [Enterprise Server](#)
- [Enterprise Server for .NET](#)
- [File Handling](#)
- [IDE](#)
- [IMS Support](#)
- [JCL Support](#)
- [JES-enabled Enterprise Server Regions](#)
- [Micro Focus Batch Scheduler Integration](#)
- [Micro Focus Directory Server](#)
- [OpenESQL](#)
- [PL/I Support](#)
- [Reserved words](#)
- [SQL: HCO for SQL Server](#)
- [HCO for DB2 LUW](#)

## CICS Support

[Back to the list](#)

- The value specified in the LENGTH field of the SEND TEXT command is now honored when the target terminal has its SOSI or PS attributes switched on. This means that trailing spaces will no longer be removed for SOSI/PS terminals.

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## Compatibility AddPack for Visual COBOL

[Back to the list](#)

Compatibility AddPack for Visual COBOL is now deprecated and will not be available with release 3.0 and later.

The Dialog System GUI and run-time components and Dialog System Character Mode (on Windows and UNIX) which were part of the AddPack are now installed as part of Enterprise Developer for Visual Studio. The run-time components are installed as part of Enterprise Server. These are only included for backward compatibility and Micro Focus does not recommend that you use them for new development.

The other components which were part of the AddPack, the Character-Based Data File Editor, CSBIND and Screens, will be available upon request from Micro Focus SupportLine.

## Compiler

[Back to the list](#)

- Replacing a partial token no longer causes the second part of the token to appear on a new line. This could happen if the new text was larger than the text being replaced.

2869185 (1105763)

## Documentation

[Back to the list](#)

- There have been a number of new reserved words added to the language in this release; these are all in effect under MFLEVEL "19", which is the default level when running under the MF dialect. Any of the following words are now not allowed under default conditions, and you will need to remove/rename them, or specifically configure your environment to allow them: ALLOCATE FREE JSON END-JSON

## Enterprise Server

[Back to the list](#)

- WEB CONVERSE now supports a value of 0 for the USERLEN and PASSWORDLEN options which matches the behavior on the mainframe. There is no change to the behavior of WEB SEND (client) which is to return LENGERR 139/140 when USERLEN or PASSWORDLEN are 0.

2989188 (1108602)

## Enterprise Server for .NET

[Back to the list](#)

- A problem that caused an RTS 173 error while executing a batch job step that performed a COBOL sort (as opposed to EXEC PGM=SORT) when the program terminated using STOP RUN instead of GOBACK has been fixed.

3105738 (1109359)

## IDE

[Back to the list](#)

- Disabling CICS support from the properties of a file in your project within the IDE now correctly sets the NOCICSECM Compiler directive on that file.

## File Handling

[Back to the list](#)

- A problem that generated a 39 error when attempting to access a VSAM file via an alternate index PATH element has been fixed.

2874622 (1106562)

- Under Mainframe emulation, when an empty virgin VSAM file is opened for input or for input/output, a file status of 35 is returned, regardless of the access mode specified.

2692826 (1093604)

- New PARM option SIGN-EBCDIC documented for MFJSORT.

2880037 (1107256)

- The MFJSORT ICETOOL emulation now supports the USING parameter in the SELECT operator.

2821176 (1099529)

- An empty, space-filler record is no longer produced at the end of an ICETOOL listing file.

(622789)

## IMS Support

[Back to the list](#)

- Inconsistent results returned to a GET call issued from a PROCOPT=GO application when segments within the same database record were updated and locked by another session. Symptoms included an invalid (GE) status code or the wrong segment returned to a GN call. This has been fixed.  
2862879 (1104899)
- The IMS control page is now secured according to the IMS\* entity in MFESMAC.  
2877405 (1107099)

## JCL Support

[Back to the list](#)

- An emulation of the LE run-time option CBLQDA has been implemented in the form of the environment variable MF\_CBLQDA. The default is OFF, but when set ON, QSAM files can be dynamically created.  
3104665 (1109251)
- A new event call to the JCL user exit (MFJUXIT) has been included. The event 'job-queued' (event code 27) occurs when a JCL job has been parsed and put on either the Input Ready queue or the Input Hold queue.  
2990395 (1108734)
- When reading commands, MFFTP now checks the charset (EBCDIC or ASCII) of each concatenated INPUT dataset to determine if it should be translated. The output is written in the charset which appropriate for the dataset.  
2876407 (1106795)
- The PHYFILE security setting will now be checked when a dataset entry is inserted into the catalog, or when a dynamic PDS member is created.  
2857819 (1104844)

## JES-enabled Enterprise Server Regions

[Back to the list](#)

 **Important:** Existing JES-enabled Enterprise Server regions must perform this upgrade to continue using JES functionality. If you start a region without upgrading, the following message is displayed in the console log, and JES functionality is disabled:

```
JES000058E JES validation - Product requires new spool control files. Run  
spool conversion utility, splconv, to create them.
```

In this release, the infrastructure of the JES spool repository has been upgraded in order to improve performance (see the *Enterprise Server* section of *What's New* for more details). For each JES-enabled region, before you can submit any jobs to JES, you must run the spool conversion utility; any newly created regions will automatically be configured to use the new spool files.

The conversion process converts the information in the existing spool files to a set of new files required under the new system. There should be no loss of data in moving to the new system.

 **Important:** After converting to the new JES spool infrastructure, we recommend that you do not employ the increased range of job numbers until you have thoroughly tested the new infrastructure. Reverting back to the previous JES spool files is possible, but requires that you remove all job entries using more than 5 digits, for which there is no easy process.

### To run the spool conversion utility

1. At the Enterprise Developer command prompt, set the following environment variables, as required:

| Variable      | Description                                                                                                                                                                                                                                                                                                                      |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MFSYSCAT      | The location and name of the current JES catalog. This is mandatory.<br><br>If multiple catalog files are being used (that is, one or more user catalogs are defined), this environment variable should point to the catalog where JES spool datasets are cataloged.                                                             |
| MVSSPOOLDIR   | The location of the current JES spool files. This is only mandatory if the location is different to the location of the JES catalog.                                                                                                                                                                                             |
| NEWSPOOLDIR   | The location for the resulting JES spool files (that is, the SPL* files if running the conversion, or the old-style spool files if running the regression). This is only mandatory if the location is to be different to the location of the existing spool files.                                                               |
| MFSYSCAT_ERRS | The number of catalog errors that will be tolerated during the conversion process before the conversion is terminated. This is optional, and defaults to 100.<br><br>If the process is terminated, the following error is produced:<br><br>MVSCATIO Error limit exceeded = <i>nnnn</i><br>(where <i>nnnn</i> is the error count) |

2. Type `splconv`, then press **Enter**.

The conversion process runs, and details of the files and records converted are displayed to screen.

3. If `MVSSPOOLDIR` and `NEWSPOOLDIR` were set to different locations prior to running the conversion, you must now set `MVSSPOOLDIR` to the value of `NEWSPOOLDIR`.



**Note:** If you do not perform this step, you will receive the following error when you start your region, and JES fails to initialize:

JES000058E JES validation - Product requires new spool control files. Run spool conversion utility, `splconv`, to create them.

4. You can now start the region identified by the variables, and begin to submit jobs.

### Reverting to the previous JES spool repository

If you plan to downgrade to an older version of your current product, any enterprise server region that has been converted or created with the current product will not be compatible. Before you can use them, they must be reverted to using the old JES spool repository.

Use this process if you are wanting to use a JES-enabled region in a previous version of the product:

1. At the Enterprise Developer command prompt, set the environment variables listed in the *To run the spool conversion utility* process, as required.
2. Set an additional variable, `SPLREGR_TARGET`, to `PRE30`.
3. If the region has started to use 6- or 7-digit job numbers (an enhancement new to version 3.0 of the product), then before you run the regression, you must remove the jobs that are using these numbers, and ensure that the `MF_MVSJOB` environment variable (or the `SPLJNO.dat` file if the variable is not used) does not specify an upper limit greater than 5 digits.



**Note:** If using the `MF_MVSJOB` environment variable, to revert to 5-digit job number support, set `MF_MVSJOB=<low number>+<high number>`, where *high number* is less than 0099999, and ensuring that the + sign is used to separate the low and high values.

4. Type `splregr`, then press **Enter**.

The regression process runs, and details of the files and records converted are displayed to screen.

You can now use the region identified by the variables in previous versions of Enterprise Developer.

### Exporting the spool files to Enterprise Server for .NET

If you plan to export a region to Enterprise Server for .NET, any enterprise server region that has been converted or created with the current product will not be compatible. Before you can use them, they must be reverted to using the old JES spool repository.

Use this process if you are exporting a JES-enabled region to Enterprise Server for .NET:

1. At the Enterprise Developer command prompt, set the environment variables listed in the *To run the spool conversion utility* process, as required.
2. Set an additional variable, SPLREGR\_TARGET, to the appropriate value:

#### **DOTNET5**

Create spool files for use on Enterprise Server for .NET, using a maximum of 5 digits for job numbers.

#### **DOTNET7**

Create spool files for use on Enterprise Server for .NET, using a maximum of 7 digits for job numbers.

3. Type `splregr`, then press **Enter**.

The regression process runs, and details of the files and records converted are displayed to screen.

You can now use the region identified by the variables in Enterprise Server for .NET.

### Micro Focus Batch Scheduler Integration

[Back to the list](#)

- MFBSI no more requires that the name of the last folder specified in the path in MFBSI\_DIR matches the name of the target Enterprise Server region. It is now possible to specify any directory path in MFBSI\_DIR. You must use the same value for MFBSI\_DIR in both the Enterprise Server configuration and for MFBSIJCL execution. When the name of the last folder specified in the path in MFBSI\_DIR does not match the name of the target Enterprise Server region, you need to specify the region name in one of the following ways: 1. From the `mfbsijcl` command line, using the parameter `REGION=ESRegionName`. 2. In an MFBSI configuration file, in a line containing `REGION=ESRegionName`. You can specify this either in the default configuration file, `mfbsi.cfg` located using the path specified by MFBSI\_DIR, or using a custom location or configuration file and the following parameter: `CFG=[path]/name[.ext]` See your product help for more details.

2869805 (1105939)

### Micro Focus Directory Server

[Back to the list](#)

- In the Enterprise Server Administration HTML GUI, the "Scripts" page functionality is only available if administration access is restricted and the logged on user has sufficient authority.

3101625 (1109025)

- Some additional CSRF security measures have been added to the Enterprise Server Administration HTML GUI.

3101205 (1108916)

### OpenESQL

[Back to the list](#)

The new OpenESQL OPTIMIZECURSORS SQL compiler directive option is turned on by default for both ADO.NET (DBMAN=ADO) and ODBC (DBMAN=ODBC). For ADO.NET, this reduces cursor memory consumption thereby providing optimal performance. This also ensures that, for ODBC, embedded SQL

cursors that use WITH HOLD and FOR UPDATE clauses have the same data integrity across all databases.

If your applications require the OpenESQL preprocessor to use the behavior provided in an earlier release, compile them using OPTIMIZECURSORS=NO.

## PL/I Support

[Back to the list](#)

- PUT output-items of type POINTER are now output as a hexadecimal string rather than a fixed bin integer value.  
(623184)
- Enterprise Developer 3.0 includes some changes that result in a significant performance improvement when assigning a null character string " to arithmetic data items, pointers, and structures. In versions of the product earlier than 3.0, pointer = "; assigned the value sysnull(). This has been fixed and null() is now assigned. See the product help for details about the -setnull compiler option.  
(627517)
- Previously, if writing output to a CTLASA (PRINT) file with the optional LINE(x) parameter having a value of x that was less than the current line, PL/I did not generate ASA Control characters to end of page and emit the output on the first line of the new page. This no longer occurs.  
2871278 (1106114)

## Reserved words

[Back to the list](#)

- There have been a number of new reserved words added to the COBOL language; these are all in effect under MFLEVEL"19", which is the default level when running under the MF dialect. Any of the following words are now not allowed under default conditions, and you will need to remove/rename them, or specifically configure your environment to allow them:

ALLOCATE  
FREE  
JSON  
END-JSON

## SQL: HCO for SQL Server

[Back to the list](#)

- The HCOSS Assess Application Migration tool now enables you to view the original DB2 SQL and the converted TSQL together in both the HCOSS tool itself and in any exported CSV files.

## HCO for DB2 LUW

[Back to the list](#)

- Help buttons previously available on the XDB Server Configuration Utility, XDB Service Controller, Options Dialog, Bind Utility, and Linker Config (Link Profile) UIs have been removed with the exception of error messages in the SQLWizard, Migrate, and Declaration Generator.

# Known Issues

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

In addition, note the following:

- [Azure support](#)
- [Debugging](#)
- [Enterprise Server](#)
- [Micro Focus Rumba](#)
- [Resource Adapters](#)
- [REST/JSON IMTK implementation and the same-origin policy \(SOP\)](#)
- [Visual Studio](#)

## Azure support

- When compiling COBOL Azure Role projects in Enterprise Developer for Visual Studio 2013 you receive warnings at build time and the code fails to execute when deployed to Azure.

To work around this issue, you need to manually add the code below to the configuration section of the `web.config` file in your project for Web Roles or in the `app.config` file for Worker Roles:

```
<runtime>
  <assemblyBinding xmlns="urn:schemas-microsoft-com:asm.v1">
    <dependentAssembly>
      <assemblyIdentity name="Microsoft.Data.Services.Client"
publicKeyToken="31bf3856ad364e35" culture="neutral" />
      <bindingRedirect oldVersion="0.0.0.0-5.7.0.0"
newVersion="5.7.0.0" />
    </dependentAssembly>
    <dependentAssembly>
      <assemblyIdentity name="Microsoft.Data.OData"
publicKeyToken="31bf3856ad364e35" culture="neutral" />
      <bindingRedirect oldVersion="0.0.0.0-5.7.0.0"
newVersion="5.7.0.0" />
    </dependentAssembly>
    <dependentAssembly>
      <assemblyIdentity name="Microsoft.Data.Edm"
publicKeyToken="31bf3856ad364e35" culture="neutral" />
      <bindingRedirect oldVersion="0.0.0.0-5.7.0.0"
newVersion="5.7.0.0" />
    </dependentAssembly>
    <dependentAssembly>
      <assemblyIdentity name="Newtonsoft.Json"
publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" />
      <bindingRedirect oldVersion="0.0.0.0-8.0.0.0"
newVersion="8.0.0.0" />
    </dependentAssembly>
  </assemblyBinding>
</runtime>
```

This information is added automatically when you create COBOL Azure projects in Visual Studio 2015 or later.

## Debugging

- When debugging `.gnt` code on early builds of Windows 10 and Windows Server 2016, execution fails to stop at COBOL breakpoints. To resolve this, you should install the most recent Windows updates for your operating system, as this problem is only known to be present with the earlier versions.

## Enterprise Server

- On Windows 10, if you are using Microsoft's EDGE browser to access the Enterprise Server Administration GUI, issues with EDGE can cause the automatic refresh feature to display a dialog asking whether you want to resubmit a form. To work around this issue, cancel the resubmit request and then refresh the server list page or the Home page of Enterprise Server Administration. You can also turn off the automatic refresh by setting the **Auto-refresh interval** setting on the Home page of Enterprise Server Administration to 0.

## Micro Focus Rumba

- On versions of Windows Vista and later, Enterprise Server listens only on the IPv4 loopback address (127.0.0.1). As a result, an attempt to connect to localhost with a TN3270 emulator such as Micro Focus Rumba may fail. To work around this issue, in your emulator's configuration use 127.0.0.1 in preference to localhost or your host machine's name.
- The embedded Rumba display is only available if you are using:
  - Enterprise Developer for Visual Studio 2012 with Rumba 9.4 or earlier. If a newer version of Rumba is installed, you need to use Rumba Desktop instead.
  - Enterprise Developer for Visual Studio 2013, Visual Studio 2015 or Visual Studio 2017 with Rumba 9.5 or later. If an earlier version of Rumba is installed, you need to use Rumba Desktop instead.

## Resource Adapters

- Trying to deploy the local resource adaptor `mfcobol-localtx.rar` to WebLogic may fail with a `ClassCastException`. To work around this issue, you need to deploy `mfcobol-xa.rar` first, then need to undeploy this file and deploy the local one, `mfcobol-localtx.rar`. If there are issues deploying using the WebLogic GUI, you can use the command line. If there are issues with this as well, try reducing the length of the command (for example, by moving the file to a location with a shorter path).

## REST/JSON IMTK implementation and the same-origin policy (SOP)

- HTTP requests sent from scripts within a web browser to REST services deployed on an enterprise server might fail due to the same-origin policy (SOP). Some browsers might implement (or support plugins that implement) techniques for relaxing SOP such as cross-origin resource sharing (CORS) that enable sending cross-origin requests successfully. For REST services, Enterprise Server does not implement a method for relaxing SOP. This means that browsers that implement CORS (or any other SOP relaxation technique) might still forbid requests made from scripts due to Enterprise Server not implementing the equivalent technique on the server side.

## Visual Studio

- The Visual Studio 2017 option **Lightweight Solution Load** is not supported for COBOL. It must not be used with solutions that contain COBOL projects as it could result in problems with building the projects properly.
- In certain installation scenarios, after you install Enterprise Developer for Visual Studio 2015, the COBOL language service can be uninstalled. This results in the following features missing from the COBOL editor: colorization, IntelliSense for COBOL and any other COBOL language support. This is an issue with Visual Studio's MEF component cache becoming corrupted.

To resolve this issue and restore COBOL language support in the editor:

1. From a command prompt, navigate to C:\Program Files (x86)\Microsoft Visual Studio 14.0\Common7\IDE.

2. Execute the following commands:

```
devenv /updateconfiguration
```

And then:

```
devenv /clearcache
```

# Resolved Issues

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

- [Adis](#)
- [Assembler Support](#)
- [CICS Support](#)
- [COBOL to XML Schema generation](#)
- [Codeset Support](#)
- [Common Communications Interface](#)
- [Communications Server](#)
- [Compiler](#)
- [Data Tools](#)
- [Debugger](#)
- [Designer](#)
- [Documentation](#)
- [Editor Writing Assistance](#)
- [Embedded HTML Pre-Processor](#)
- [Enterprise Server](#)
- [Enterprise Server for .NET](#)
- [File Handling](#)
- [HCO for DB2 LUW](#)
- [HCO for SQL Server](#)
- [IBM Language Environment for OS/390 & VM Support](#)
- [IDE](#)
- [IMS Support](#)
- [Interface Mapping Toolkit](#)
- [JCL Support](#)
- [Mainframe Access](#)
- [Micro Focus Batch Scheduler Integration](#)
- [Micro Focus Directory Server](#)
- [Monitoring and Management](#)
- [OLE Class Library](#)
- [OpenSSL](#)
- [PL/I Support](#)
- [REX Support](#)
- [RM/COBOL](#)
- [Run-Time System](#)
- [SQL: COBSQL](#)
- [SQL: OpenESQL](#)
- [SQL Option for DB2](#)
- [XML Support](#)

## **Adis**

[Back to the list](#)

- PIC N items are now filled with double-byte space when required by ADISCTRL options 15 and 16.

2913183 (1108448)

## Assembler Support

[Back to the list](#)

- To provide EBCDIC to ASCII conversion, the Assembler directive ASCII has been added to generate all character literals in ASCII instead of the default EBCDIC. For example: DC C'1' generates a hex 31 value instead of hex F1 when the ASCII directive is used.

2913358 (1108467)

- The copying of PDS files in Assembler is now supported. The assembler file handler now emulates mainframe behaviour for opening/reading/writing/closing PDSs. This allows assembler programs to open a PDS with these DCB settings: DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=0) for both input and output and copy a PDS with a simple read/write loop as on the mainframe.

2881923 (1108596)

- SVC 8 (LOAD) now sets the high order bit of the loaded module address as per the AMODE of the loaded assembler module. If the module loaded has been linked AMODE(31) then the high order bit is set in the returned address so it matches IBM mainframe behaviour.

2880278 (1107639)

## CICS Support

[Back to the list](#)

- An issue causing a Communications Server failure during Cluster SEP recovery processing has been fixed.

2883390 (1107785)

- A timeout on a global lock request for a CICS dataset, caused by the GLM not responding, could generate an RTS 114 on dfh0msg in the requesting Cluster Slave.

2880992 (1107401)

- An issue with the \_NOCONVERT option of CICS SEND FROM statements when a LU1 printer is used as an output has been resolved. The control characters of the 3270 data stream are not meaningful to a LU1 printer, and are no longer sent in such scenarios.

2877807 (1106961)

- Support has been added for the extended form of RECEIVE\_ALLOCATE, "RECEIVE\_ALLOCATE\_EX", to specify the alias of the local LU from which the TP will accept incoming attaches (IBM Communication Manager only).

2877178 (1106980)

- A 64 bit CRTE or transaction routing request from IBM CICS mainframe to Micro Focus Enterprise Server CICS now correctly returns the expected data.

2876499 (1106860)

- Programs that contain non-unique variables on a CICS command now produce a more specific error message (COBEC1125 : Operand {operandName} is not unique) when compiled in an IDE.

2865273 (1105126)

- Terminating a SEP that is being waited on by another SEP no longer causes a corruption in the JCP/TD return chain in the shared memory.

3107347 (1109532)

- An problem that caused a TASKIDERR to be returned on EXEC CICS INQUIRE TASK when the task was greater than 9999999 has now been fixed.

3101286 (1109036)

- A problem has been fixed that caused INQUIRE Terminal to return TERMIDERR when the terminal had been installed from a resource definition and the terminal did not have a termtype.  
2912829 (1108576)
- A problem with the CASTSC system module crashing when a START with data was executed during region initialization has been resolved.  
2886905 (1108257)
- An ASSIGN INVOKINGPROG in an XCTLed program now shows the correct program name.  
2885264 (1108071)
- A problem that caused EXEC CICS SET FILE CLOSE statements to return an invalid request error when the file was modified in the current task has been fixed.  
2870461 (1106061)
- A problem with ESMAC display fields that enabled Authorization bypass and caused XSS-related issues has been fixed.  
3101205 (1108918)
- A problem in ESMAC that prevented TERM from accessing the related SYSC and SYS6 pages has been fixed.  
2881359 (1108307)
- The ESMAC > Clients page has been updated with a new Stop button that enables you to stop active printers. In addition, you can now modify predefined printer terminal attributes and reinstall a printer terminal.  
2874807 (1106608)
- The Users button was sometimes unavailable in ESMAC. This has been fixed.  
2860762 (1104487)
- CICS support has been updated to support the MQSUB API.  
2878763 (1107270)

## COBOL to XML Schema generation

[Back to the list](#)

- CBL2XML now handles namespace correctly.  
2861655 (1104748)
- CBL2XML now correctly handles non-default type within <restriction>.  
2826345 (1100279)

## Codeset Support

[Back to the list](#)

- The Codeset DBCS tables MFTR0886.A2E MFTR0886.E2A have been updated to match the latest IBM Traditional Chinese conversion tables below: Description of 9027: T-Ch Host Double-Byte including 6204 UDC including euro. Description of 21427: T-Ch DBCS-PC (IBM BIG-5) including 13493 CNS, 566 IBM selected, 6204 UDC & euro.  
3104948 (1109314)

## Common Communications Interface

[Back to the list](#)

- Using CCI shared memory and receiving data with a max receive length less than the total amount of data received resulted in the data being received incorrectly on the final receive. This has now been fixed.
- After a communications failure, Enterprise Server shared-memory listeners would sometimes stop accepting new connections. This has now been fixed.

## Communications Server

[Back to the list](#)

- A path-traversal vulnerability has been fixed in the mfcs-esfadmin optional component of Enterprise Server. This vulnerability could allow a user with network access to a suitably-configured Enterprise Server region to download unauthorized files from the target system.  
3101205 (1108925)
- In Enterprise Server, chunked HTTP requests now work with CICS Web Interface and CICS Web Services servers.  
3100279 (1108857)
- Persistent J2EE sessions to Enterprise Server could hang under heavy load, resulting in accumulating idle transient SEP processes. This has been fixed.  
2884386 (1108206)
- Enterprise Server's communications server (MFCS) no longer crashes in certain error-handling situations, such as when sufficient memory cannot be allocated to handle an extremely large HTTP response message.  
2881711 (1107546)
- Enterprise Server now correctly enforces the order of responses to each client.  
2874420 (1107167)
- An issue causing intermittent MFCS crashes at start-up due to heap corruption has been fixed.  
2866204 (1105983)
- TN3270 conversations no longer hang, looping in the MFCS process, if the client sends a malformed TN3270E header. A message will now be written to the MFCS log and the input record will be discarded.
- An error handling bug in the MFCS Fileshare connector, which could cause a thread-termination error, has been fixed.
- In some cases, MFCS could hang or crash some time after multiple threads abended within a 60-second period. This has been corrected.
- HTTP path-traversal vulnerabilities, which could lead to information exposure, have been corrected in Enterprise Server's MFCS component.

## Compiler

[Back to the list](#)

- Level-88 VALUE clauses that inadvertently contain fixed point numeric literals, which cannot be matched with the associated numeric type, are now flagged with an E-level message.  
3106909 (1109479)
- A new ARITH"COMPAT|EXTEND" Compiler directive is now supported to emulate the IBM mainframe option of the same name. This option defines the maximum number of digits for numeric data items.  
3105597 (1109340)
- An extended ACCEPT of a PIC N data item now compiles successfully, as expected.  
3101615 (1108944)

- The reference to an ASSIGN name in the SELECT clause is now included in the IDE's 'Find All References' list irrespective of whether the ASSIGN name is explicitly declared later in the source or not.  
3100084 (1108817)
- When an intrinsic function is used as a parameter to an inline method invoke, which is also a parameter to another inline method invoke, the Compiler would produce invalid code, leading to a COBRT200 error. This is now fixed.  
2991106 (1108786)
- Prototype checking for OMITTED parameters in inline method invokes is now working as expected.  
2991031 (1108800)
- An error when an OBJECT PROPERTY is used in subscript calculation, or reference modification index or length calculation, has been fixed.  
2990388 (1108738)
- A directives file with an explicit end of file character is now processed correctly.  
2913115 (1108474)
- A DISPLAY of ADDRESS OF <data item> now executes as expected.  
2913005 (1108635)
- Prototype checking for nested inline method invokes is now working as expected.  
2912463 (1108437)
- A bug where compilation of very large managed projects could fail with error "COBCH1500: memory allocation failure – module 'allocmem'" has been fixed.  
2886156 (1108156)
- Using COBSQL with CP for a program with complex multi-line COPY REPLACING no longer results in spurious errors.  
2884493 (1107939)
- A move from a group to a reference modified PIC N field now executes as expected.  
2884093 (1107883)
- Sign-included numeric usage DISPLAY items now display as expected under a mainframe dialect; that is, they display with the included sign shown exactly as stored, without conversion for readability.  
2879364 (1107340)
- The use of N" national literals in STRING statements no longer produces incorrect results.  
2878504 (1107053)
- A bug where COBDATA was set prior to starting the Visual Studio IDE, and was then blank when applications were executed, has been fixed.  
2878431 (1107160)
- A user class condition where the subject has the potential to be zero length now compiles and executes as expected when compiled with a mainframe dialect (which sets the ZEROLENGTHFALSE directive).  
2878426 (1107044)
- The same names used for data items in both method local and object storage could sometimes result in wrong execution results when the wrong duplicated name was used.  
2878370 (1107207)
- Class conditions defined in the SPECIAL-NAMES paragraph now work when SELECT statements are defined before the SPECIAL-NAMES paragraph.  
2876808 (1106853)
- Under CHARSET(EBCDIC), a MOVE of PIC G/N data items to PIC N/G data items now pad with x"4040" (an EBCDIC DBCS space). Comparisons of such data items will now also work correctly.  
2876109 (1106752)

- VALUE clauses with hex literals now pad correctly with x"40" under CHARSET(EBCDIC).  
2875748 (1106704)
- Statements involving properties and 'OCCURS DEPENDING ON' tables now compile and execute as expected.  
2875074 (1106626)
- Concatenation of alphanumeric literals in a VALUE clause for a national item is now treated as intended.  
2873871 (1106451)
- Queries of reference modified national data items now work as expected.  
2873639 (1106443)
- Using INSPECT <national-data-item> with the BY SPACE clause now works as expected. When dealing with national data items, SPACE is now treated as a national space - NX"0020£.  
2873388 (1106390)
- A user class condition test, where the item being tested is a reference modified item with a length that is an expression, and when the directive ARITHMETIC(OSVS) is set, no longer causes an internal error on compilation.  
2873219 (1106409)
- Nested inline method invokes now work as expected.  
2872741 (1106315)
- A MOVE statement referencing a property name now compiles and executes as expected.  
2872488 (1106304)
- A program containing DBCS characters in the sequence area of an otherwise blank line now compiles correctly and without error.  
2868802 (1105699)
- An issue with using DECLARATIVES without a USE statement has been fixed.  
2867168 (1105446)
- If more than one report shared the same FD, for example: REPORTS ARE REPORT-1 REPORT-2. then under HOSTRW, the record length was wrong. This has been corrected.  
2865849 (1105553)
- The use of the HOSTRW and CURRENT-DATE directives no longer causes an excessive number of lines in a report produced from the Report Writer.  
2853789 (1105472)
- A USE FOR DEBUGGING statement that references a table item and is triggered by a condition where the table item is referenced but not evaluated (due to short-circuit evaluation) now executes as expected.  
2433731 (1073167)
- A bug in the Compiler, when REPLACE is used and the final line in the main source file is a copy statement containing a separate program, has been fixed.
- An error reporting the size of return-code by the Eclipse IDE has been fixed.
- A bug has been fixed in programs compiled with CHECKDIV"OSVS" that contain a statement of the form: COMPUTE r = a / (b - b)  
3105637 (1109410)
- A bug in ON SIZE ERROR for arithmetic statements using floating point variables has been fixed.  
2886077 (1108151)
- A bug has been fixed in generated code on Linux/390 for statements of the form: compute rounded a = b / constant where a and b are both comp-3 variables, and constant is an integral power of 10 (e.g. 10, 100, 1000).

- 2874143 (1106479)
- A COBRT114 error that was occurring at run time in generated code has been fixed.
- 2871410 (1106100)
- An error in debugging on Intel 32-bit platforms, such that a breakpoint set on an "exit method" statement is ignored if it immediately follows a statement such as "end-perform", "end-if" or "end-evaluate", has been fixed.
- 2861424 (1104587)
- A bug in generated code with the opt(3) directive, on Intel x86 64 bit (Linux and Windows) and Linux/390 has been fixed.
  - A spurious warning 'Reference to undeclared extern assembly' is no longer generated for programs using the PREXML preprocessor, when built in Visual Studio.
- 3106908 (1109475)
- Icons consisting of PNG images are now being loaded successfully into applications using the ILICON directive, and no longer causing compile-time errors. (The ILICON directive is generated implicitly in Visual Studio when an icon is selected in the 'Icon and manifest' drop-down in Project Properties.)
- 2988305 (1108523)
- In some cases, use of the PROFILE directive could generate invalid code; those cases have been fixed.
- 2882325 (1107625)
- If the level 66 RENAMES phrase refers to two items in different 01 level records (which is non-standard and not recommended), the offset of the resulting item is no longer calculated wrongly; previously it was, leading to incorrect behavior at run time.
- 2882119 (1107568)
- If the first procedure in a PERFORM...THROUGH statement terminated (e.g. with GOBACK or STOP RUN), then the PERFORM itself terminated, and control did not trickle through beyond the PERFORM statement. The compiler has now been modified to recognize this condition, which means that the procedure division can be broken down into disjoint methods, avoiding stack overflow during program execution.
- 2880315 (1107465)
- An arithmetic expression involving an intrinsic function and a non-integer COBOL numeric item (e.g. PIC 9V9) no longer produces a result with incorrect decimal alignment.
- 2878918 (1107116)
- A load failure, which was the result of bad code caused by a constructor containing a GO TO statement that referenced a label (either a section or a paragraph) at the start of the procedure division, no longer occurs.
- 2878817 (1107114)
- The use of report-writer syntax in a class program no longer leads to bad code generation. Previously, it could result in 'field not found' errors when the class was loaded.
- 2878260 (1107158)
- When a PIC X data definition is used as a parameter to a method expecting an IEnumerable<char>, or when used as the object for an extension method on IEnumerable<char> (e.g. System.Linq.Enumerable.ToArray<char>), bad code is no longer generated.
- 2877859 (1106974)
- Use of the DIALECT"ENTCOBOL" directive no longer causes incorrect behavior when dealing with EXTERNAL files.
- 2875493 (1106685)
- When compiling for managed code, specifying an object reference in the file section will now produce an appropriate error message. Previously, the Compiler was allowing the use of object references in the file section, which was causing the generation of bad code, and inappropriate system error messages.

2872605 (1106287)

- Report Writer syntax directly under class-id (that is, not within static/end static or object/end object) no longer causes the generation of invalid code, which was leading to errors at run time.

2872555 (1106283)

- In managed COBOL, a large amount of CONTROL clauses no longer causes the SCREEN SECTION to produce a buffer overflow.

2870942 (1106053)

- When ILSMARTLINKAGE was specified for a program compiled with the directive ODOSLIDE (which is set automatically when a mainframe dialect is used), and when the program contained a linkage section record with multiple OCCURS DEPENDING ON items, then illegal code was being produced with multiple error messages. This is now fixed.

2870166 (1105899)

## Data Tools

[Back to the list](#)

- Vision and RM files that contain a null (0x00) byte in the key now function correctly in the Data File Editor.

2882159 (1107598)

- The following minor enhancements have been made to the Data File Editor: - Previous filter conditions are now remembered for each file when the dialog is loaded. - The default filter operator now defaults to 'Contains'. - Field attributes for reference conditions now default to 1:max-rec-length, instead of 1:1.

2878521 (1107104)

## Debugger

[Back to the list](#)

- Querying DBCS items in Character Animator now works as expected.

3107408 (1109521)

- The debugger no longer hangs when debugging remote Enterprise Server regions.

2882367 (1107659)

- Examining the value of large data items in 64-bit applications or when debugging remote applications no longer causes the debugger to exit.

2872732 (1106322)

- When debugging .gnt code, execution fails to stop at COBOL breakpoints. To resolve this, you should install the most recent Windows updates for your operating system, as this problem is only known to be present with early Windows builds of both Windows 10 and Windows Server 2016.

## Designer

[Back to the list](#)

- File Handler no longer goes into a loop when trying to read an empty mainframe file.

2877027 (1107020)

## Documentation

[Back to the list](#)

- The product documentation has been updated to include information and syntax for secure access to MFDS (mfds /b).

2854625 (1103606)

- Documentation for environment variables has been improved.
- The product documentation has been updated to include the MFA\_INDEX\_FORMAT environment variable used in configuring the Enterprise Server.

2278928 (1066511)

- The casstart /w parameter prevents the casstart process from exiting until the region has either started or failed to start correctly.

2868898 (1105712)

- A "redundant" or "high-availability" mode is now available in the Enterprise Server External Security Facility. It enables you to configure multiple equivalent Security Managers and let processing continue as long as at least one Security Manager is available. To enable this feature, add the following to the configuration text area for the security configuration (either in the default Enterprise Server Security, the MFDS Security, or on the Security tab for a specific enterprise server): [Operation] redundant=yes

2989911 (1108665)

- The Enterprise Server documentation no longer includes the PL/I programming guide as it includes information about editing, compiling and debugging PL/I programs which are not under in Enterprise Server.

2877789 (1107019)

- Additional information on the Web Services and J2EE conversation type has been added to the "Configuring Listener Conversation Types" chapter in the product documentation.

2877270 (1106896)

- The product documentation has been updated to include information on converting the input file used by casrdtup from EBCDIC to ASCII.

2863611 (1104940)

- The documentation for bit zero of the 'thread-state' parameter of CBL\_THREAD\_LIST\_START and CBL\_THREAD\_LIST\_NEXT has been corrected.
- Documentation of CBL\_LOCATE\_FILE parameter corrected.

- The installation instructions included incorrect information about users having to stop and uninstall an existing Micro Focus Directory Server (MFDS) or CCITCP2 Windows service (on Windows) or a process (on UNIX) from an existing product. This has been removed from the product help.

2877431 (1106934)

## **Editor Writing Assistance**

[Back to the list](#)

- IntelliSense and Content Assist now provide the appropriate suggestions after a CONTAINS expression.

## **Enterprise Server**

[Back to the list](#)

- An issue where SOAP elements were not mapped to COBOL code has been resolved.

3106199 (1109416)

- When SOAP headers were part of the SOAP request, you no longer receive a "SOAP header malformed" response.

3105803 (1109367)

- An issue where a handler program in the pipeline caused issues with JSON GET/DELETE/HEAD requests has been fixed.

3104977 (1109274)

- An UNDEFINED\_ELEMENT error message occurred when a JSON message (under CICS WEB SERVICES) did not include an object that was present as a "record 1" item in the wsbind or the jsbind files.  
3102943 (1109085)
- When a CICS Web Service was invoked with no port in the URI, the default port for the scheme was not set up.  
3100280 (1108870)
- EXEC CICS SEND and CONVERSE commands now send all user-written headers (EXEC CICS WRITE HTTPHEADER) even if the user provided values that contain null bytes. When browsing headers with EXEC CICS WEB READNEXT HTTPHEADER, CICS will now initialize the buffers that were supplied for the header name and value.  
2990561 (1108733)
- A problem where a system process (CASTRC) was unable to allocate any local storage and, as a result, became unresponsive, has been resolved.  
2886741 (1108236)
- Casout commands running in a loop from the same process used to exhausting resources. This was caused by an invalid path concatenation.  
2886407 (1108426)
- An issue resulting in a Run-Time System error 205 "Invalid mainframe pointer" has been fixed.  
2885280 (1108041)
- TRANSFORM was failing in situations where an XMLTODATA TRANSFORM contained an XML declaration with EBCDIC encoding.  
2885262 (1108040)
- The EZASOKET traces are now controlled by a COMMS trace flag.  
2884491 (1108174)
- Caching has been added for TS queues security checks.  
2884070 (1108789)
- Commarea overrides are now honored for non-facility transactions.  
2884049 (1107879)
- Usernamelen and passwordlen options are not mandatory on exec cics web converse and web send (client).  
2880669 (1107365)
- Previously, using multiple CICS LINK statements (linking A to B to C and so on) could result in an RTS error 114 in the CAS system modules.  
2880542 (1107372)
- The spool active job queue will now display any jobs that were started prior to resetting the time for DST but that have not completed yet.  
2879116 (1107204)
- The debug file name generated when using CICS Web Services now includes the process ID and the task number. For example - inquireCatalogClient-19556(00028)-CWS-REQUESTER.TXT.  
2878485 (1107077)
- The SOAP to COBOL mapping under CICS Web services was incorrect when an optional element had no child elements (where the schema defined a minimum of one such child element and these child elements have been mapped to a container). In such cases, the number of instances of the child element would have an incorrect value of 1 where it should be 0.  
2877043 (1106879)
- If you used XA with more than 7281 transactions or had a number of JCL jobs that used XA, a record could be split across multiple blocks. After restarting the enterprise server, a large number of

CASXO0029I errors were reported in the console log file. A block that can hold up to 7282 records is now used.

2874024 (1106469)

- When casout is used to release a job, casmgr now attempts to dispatch the job immediately rather than waiting for its next dispatch cycle which previously could take 20 seconds.

2873224 (1106621)

- If there were more than 20 TRANCLASS instances specified in the startup list, this could cause memory corruption.

2868129 (1105682)

- The ESFCA0401I Cache Termination message is now available for JES, IMS DB, IMS TM, MQ, and iFileshare processes.

2866750 (1105376)

- A duplicate security check about whether the user has enough permissions to run a JCL job has been removed.

2866526 (1105336)

- When eci-tpn is used on a call to ECI for CTG or the Micro Focus implementation of ECI, Enterprise Server now verifies the transaction exist and is enabled. If the transaction is disabled, an abend AZI6 is returned. This is mainframe-compatible behavior.

2863500 (1105165)

- An EXEC CICS LINK to a non-CICS module now handles the data context correctly and you no longer receive CDCD abends on any further LINKs.

2858747 (1104275)

- CASxx5006I messages now display a return code.

2853609 (1103516)

- All ESMAC pages are now secured. Users who are not authorized now receive an error message when trying to access any of these pages in their browser.

2843901 (1102247)

- The CICS WEB services now support SOAP 1.2.

2822822 (1099723)

- An issue that could cause an RTS error 119 on a casout command when starting a batch initiator has been fixed.

- An issue with certain length DNs that could cause DNs to become truncated has now been fixed.

3103303 (1109366)

- If nested groups (user groups containing other groups) were used with LDAP-based security for Enterprise Server, it could result in Enterprise Server hanging at region startup, or users might not be assigned all of their groups. This has now been fixed.

2988205 (1108935)

- The "check TLQ first" option has been added to the MLDAP ESM. The option can change the Rule processing algorithm. This option might improve performance when there are large numbers of resources in a class.

2875051 (1106874)

- Enterprise Server no longer crashes on startup if LDAP-based external security with the "all-groups" and "redundant" options are both specified, but the "federated groups" option is not.

2874010 (1106529)

- If the esfupdate utility is used to request an update of security information for a user, and that user was originally signed onto the system using a lowercase representation of their user ID, the update now correctly identifies and updates the user.

2871297 (1106164)

- If the MFDS Security Configuration specifies that verify requests should be cached and the cache TTL and limit values are non-zero, for example, the MF Directory Server Security configuration page Security Facility configuration text contains: [Cache] requests=verify If a new password was specified in a Web interface logon request, then previously it was being ignored. Previously, if the user was logging on with an expired password and attempting to change the password the request would also be ignored and an expired password error would be returned.

2868342 (1105626)

- An RTS 205 error during the execution of an AMODE application could occur when Assembler address 0 was erroneously de-registered. This is now fixed.

3104561 (1109229)

- Under heavy loads, the ESFCA04011 log messages were not appearing at the correct intervals.

2863222 (1104948)

- Enterprise Server listeners that are configured for TLS (also known as SSL) no longer hang if a client connects to them without sending any data.

2873177 (1106408)

- In some HotFix releases of earlier versions of Enterprise Developer and Enterprise Server, SSL or TLS connections to an Enterprise Server could hang if client certificates were used and there was a delay of at least several seconds before the certificate was sent.

## Enterprise Server for .NET

[Back to the list](#)

- A rare intermittent exception could occur during region shutdown due to old listener information.
- Under Enterprise Server for .NET, a NullReferenceException occurred when attempting to use CFCR to create a file that already exists, but had not previously been accessed by the SEP.
- Enterprise Server for .NET region shutdown no longer fails if one or more registered listeners cannot be contacted. Any WCF exceptions that occur while attempting to contact the listeners are still logged to the Windows event log.
- A problem that caused region database access exceptions when using VSAM share options for a CICS region running under Enterprise Server for .NET with user impersonation security enabled has been fixed.

- A problem that caused JCL job submissions to fail under Enterprise Server for .NET due to region database timeouts has been fixed.

3102219 (1109110)

- A problem that caused a performance degradation on running jobs or job submissions when Enterprise Server for .NET's Spool View containing a large number of spool entries was refreshed from the MMC UI has been fixed.

3102219 (1109280)

- A problem that caused an application invoked via IKJEFT01 to loop when the output line limit had been reached has been fixed.

3101438 (1108934)

- A problem that prevented Force Stop on a JES region from cancelling active jobs has been fixed.

3100999 (1108890)

- A dataset name filter entered in the Enterprise Server for .NET MMC UI Catalog view sometimes caused incorrect dataset names to display. This has been fixed.

2990872 (1108763)

- When using the Region Startup File Editor in Enterprise Server for .NET, the description for the "Maximum lines" property of a JES region startup file did not make it clear that the units are in 1000s. This has been fixed.  
2990413 (1108717)
- The Enterprise Server for .NET MMC UI Catalog view has been updated to improve the performance of refreshing very large numbers of catalog entries.  
2989721 (1108650)
- The Enterprise Server for .NET public class library has been enhanced with new overloaded ReadRecString and ReadRecBytes methods for the JesFile class. These new overloaded methods take a JesFileReadOptions enum as a parameter to specify whether trailing spaces and nulls should be trimmed from the returned record.  
2988999 (1108626)
- A problem in the Catalog view of the Enterprise Server for .NET MMC UI when allocating a dynamic PDS caused the "OK" button to be enabled before the PDS allocation folder and at least one JCL extension had been specified. This has been fixed.  
2988432 (1108546)
- The Catalog view in the Enterprise Server for .NET MMC UI can now be configured to restrict the number of entries displayed.  
2912396 (1108403)
- Batch SQL applications invoked by IKJEFT01 running under Enterprise Server for .NET could be repeatedly invoked if the database connection was lost.  
2887793 (1108359)
- In the Enterprise Server for .NET MMC-hosted administration console, the "Sign On" button for JES spool and other functions was working incorrectly if the region file was kept in the cross-region database. This has been fixed. Also, in a case where the region file cannot be processed, clicking the "Sign On" button now returns a message box describing the error instead of returning the "Sign On" dialog box. Note: Regions that are correctly configured with no security continue to display the "Sign On" dialog box, and any valid user name and password combination is accepted.  
2887759 (1108468)
- A problem with the Enterprise Server for .NET LogonEsm security module causing a null reference exception when running under the MMC Administration UI has been fixed.  
2887759 (1108469)
- A problem that prevented Enterprise Server for .NET from recovering tasks that were running on a machine that died or was powered down has been fixed.  
2887661 (1108354)
- The Enterprise Server for .NET MMC UI's Spool View now allows sysout records being written to by a running job step to be displayed.  
2887657 (1108364)
- Repeated clicking on the "Read to end of file" button in the file viewer of Enterprise Server for .NET's MMC UI could sometimes result in corrupt output.  
2882134 (1107676)
- The Enterprise Server for .NET public API documentation has been updated to include code samples for the JesFile class.  
2882073 (1107569)
- The Enterprise Server for .NET documentation has been updated to included information about how to configure an event monitor's dispatcher endpoint, and what database permissions are required for a user when debugging.  
2878273 (1107018)

- Under Enterprise Server for .NET, attempting to kill an active job in a SEP process that had died resulted in the event monitor process unexpectedly terminating.  
2873643 (1106419)
- When a SEP pool process in Enterprise Server for .NET dies (for example, when debugging stops or a StackOverflowException is received), any orphaned running tasks from that process will now have any associated resources released (such as ENQ locks, initiators, or printers).  
2873623 (1106417)
- The Catalog view in Enterprise Server for .NET's MMC UI was sometimes truncating the list of datasets displayed if one or more of the datasets in the catalog were dynamic PDSs.  
2873448 (1106412)
- When allocating a dynamic PDS, the Enterprise Server for .NET MMC UI now mandates the entry of both the folder path and one or more extensions. Previously, an invalid catalog record was created if an extension was not specified. This resulted in "An unknown error occurred" message being displayed by the Catalog view when it attempted to retrieve it.  
2873448 (1106410)
- Under Enterprise Server for .NET, dependent assemblies of user programs could fail to load if they were not loaded in the same task as their parent assemblies.  
2872498 (1106291)
- The Enterprise Server for .NET public JesSpoolRecSysout class now exposes the RECFM of the sysout dataset as a property.
- In Enterprise Server for .NET, a JES region configured to use LDAP-based security now correctly processes jobs that are submitted with a user ID and password.
- A problem that caused an InvalidCastException when browsing a database-hosted extended ESDS file using Enterprise Server for .NET has been fixed.
- The Enterprise Server for .NET MMC UI did not report any error if you ran it as a user with insufficient database permissions to allow the reading of a region's console messages. The topic "To Configure Process Logon Credentials" in the product help now includes details of which database permissions need to be assigned for which operations if the MMC UI user cannot be assigned database sysadmin privileges.  
2876165 (623134)

### **Embedded HTML Pre-Processor**

[Back to the list](#)

- The XML run-time system did not handle data items with the OCCURS clause correctly.  
3107418 (1109566)

### **File Handling**

[Back to the list](#)

- The ESF LDAP Security Administration Web Interface now has a logoff button.  
2871551 (1106117)
- CICS SYSOUT output now displaying correctly in the Classic Data Tools editor. Some recent changes to determine whether or not in-stream data needed to be converted to/from EBCDIC were causing the problem.  
2883885 (1107847)
- If data compression is specified when trying to open a fixed block file, when running under a mainframe dialect, the File Handler now checks to see if it is trying to open a VB file. If it isn't, compression will be turned off and the file will be opened as normal.  
2870022 (1105956)

- An internal field used to store the current file status was being overwritten by the allocation of a buffer. Now we store it off beforehand so its value can be restored, and an accurate file status returned.  
2868664 (1105707)
- When certain in-flight rewritten records were rolled back at the end of a transaction, the File Handler was setting incorrect values for the length field in some records and various warning messages were displayed during index file validation.  
2864802 (1106106)
- A CBL\_FREE\_MEM statement in Fileshare was missing a 'by value' clause, which was causing a runtime error. This is now fixed.  
2883421 (1107767)
- When running under Fileshare, a delete on a locked record no longer results in a record locked status if the same user had previously obtained a read lock on the file.  
2832909 (1108287)
- When REBUILDing from SEQ into IND with duplicate key, you will no longer get a corrupted file if you do not specify the target flag /t.  
2880311 (1107302)
- CSF to ZD negative sign conversion is now handled correctly during a sort operation.  
3103118 (1109125)
- JCL SORT no longer abends if no record is rewritten to a DUMMY data set.  
3102468 (1109052)
- Sorting ESDS files to RRDS files no longer truncates the first 4 bytes of each record.  
3101385 (1109112)
- Variable length SORT OUTFIL files are now created correctly when more than one data set is specified in the targeted OUTFIL.  
2881629 (1107551)
- MFSORT INCLUDE will no longer include the first record in the concatenated file if, according to the parameters, that record should be excluded; previously, the first record was included regardless of the parameters.  
2876259 (1106785)
- For an MFJSORT, a combination of numeric tests and logical comparisons now returns the correct records.  
2870986 (1106216)
- When copying concatenated files in MFJSORT, for sequential fixed block, the correct number of record is now used.  
2870506 (1106057)
- MFJSort now produces the correct number of records regardless of the value of the SORTSPACE setting.  
2867668 (1105534)
- An error when writing the ICETOOL listing from an empty input file has been corrected.  
2866176 (1106459)

## HCO for DB2 LUW

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

- The HCO DCLGEN tool has been updated to generate PL/I copybooks with valid definitions for graphic and decimal data types and to compile cleanly with the PL/I -mvs option.

3105260 (1109306)

- A problem that sometimes occurred when using the DB2(NOHCO) compiler directive option caused the return of incorrect codes at completion of program execution. This has been fixed.

3100172 (1108872)

- The DB2 preprocessor has been updated with a new DB2 compiler directive option, QUALIFY-CALL, that works with the QUALIFIER compiler directive option to qualify DB2 EXEC SQL CALL statements with the schema name specified by the DB2 QUALIFIER directive.

2884948 (1108032)

- The DB2 ECM has been updated to prevent an undefined ECM error when indicator variable arrays are used in SELECT SQL statements.

2884605 (1107947)

- The DB2 ECM preprocessor has been updated to support host variables defined as SQL TYPE IS XML AS BLOB-FILE/CLOB-FILE/DBCLOB-FILE.

2839654 (1101707)

## HCO for SQL Server

[Back to the list](#)

- HCOSS handling of the DB2 CHAR scalar function has been enhanced for date and time conversions.

3103159 (1109143)

- The OpenESQL preprocessor has been updated to reorder certain SQL compiler directive options to prevent the generation of a COBES0121S error.

2883191 (1107806)

## IBM Language Environment for OS/390 & VM Support

[Back to the list](#)

- The Language Environment (LE) utilities are now available for managed COBOL applications in both ILGEN and ILVERIFY formats.

2843311 (1102161)

## IDE

[Back to the list](#)

- Attempting to evaluate a class condition when debugging .NET COBOL code could cause the debugger to crash.

2887005 (1108289)

- Previously, you could only use the environment variables specified using the "Environment" button on the Application tab in the project's properties when running the project. There is now a new option, "Use variables when building the project", which enables you to apply these variables when the project is compiled.

2881792 (1107641)

- Restarting debugging of native projects is now successful.

2878077 (1107005)

- Native COBOL projects that contain an Application.config file now build cleanly when this file is read-only.

2875625 (1106694)

- The Web Publish option now works correctly for COBOL ASP.NET applications.

2875454 (622986)

- The COBOL margins are now displayed correctly when stepping into an assembly that is not part of the solution being debugged.  
2874876 (1106604)
- The performance while stepping through a Mainframe Subsystem application running on a remote machine has been improved.  
2871769 (1108698)
- It is now possible to create projects in folders that contain accented characters.  
2858012 (1104133)
- By default, Visual Studio is now configured to insert spaces in the COBOL code when the tab key is pressed in the editor. If you are upgrading from an earlier version of this product, and have changed your tab settings, they will be reset to the default IDE settings as part of the upgrade. For Enterprise Developer, this change also applies to Assembler, BMS, IMS, JCL and PL/I programming code.

## IMS Support

[Back to the list](#)

- Erroneous file status 46 messages appearing on the Enterprise Server system console have now been fixed.  
2886926 (1108578)
- An IMS syncpoint failure that intermittently occurred at job termination, depending on the timing of events, has now been fixed.  
2877595 (1107134)
- This RPI described the situation where a "GU" call using a pcb with the PROCSEQ option on a secondary index was incorrectly returning the primary key, not the secondary index, in the pcb key feedback area. This fix returns the secondary key or index in the key feedback area.  
2877248 (1106941)
- A new warning message has been added to indicate when a checkpoint call is delayed due to a duplicate checkpoint ID. In addition, the ES\_IMS\_BASIC\_CHKP\_OPT environment variable has been added to provide additional checkpoint optimization that enables a basic checkpoint call to process as if a SYNC call had been issued.  
2875685 (1107227)
- IMSLOGR file access errors that sometimes occurred on the IMSLOGR.DAT checkpoint log file when two or more IMS BMP applications shared the file have been fixed.  
2872783 (1106751)
- A batch IMS program that terminates abnormally now flushes subsequent job steps in the JCL.  
2864940 (1105315)
- An RTS114 message was sometimes issued during the CASDBC process on a system running under a heavy IMS DB load. This has been fixed.  
2860205 (1106684)
- The Start and Stop DB commands failed to reject non-existent DBs.  
2857756 (1104092)
- A problem with the behavior of an EXEC DLI application accessing a USERDB exit has been fixed.  
2849576 (1102989)
- A problem that prevented IMS from making the connection to the DB2 subsystem via DSNALI when JCL is running the DNSMTV01 program, in batch mode has been fixed.  
2846683 (1102634)

- The MFS generator has been updated to issue an error message when adjacent output screen fields are not separated by a space. To correct the problem, edit the MFS source to include a space between the fields.  
3101284 (1109215)
- A new MFS compiler directive, CONTMVS, has been added to enable the compiler to parse imperfect MFS continuation lines just as on the mainframe, meaning that when it encounters a line in the MFS source that is continued without a terminating comma, it treats the line that follows as a comment line. When CONTMVS is not specified, terminating commas are assumed, and the next line is treated as a continuation of that line.  
3101284 (1108961)
- The MFS generator has been updated to generate the extended color attribute only when specified in the MFS source, enabling the default colors in the PCOMM 3270 emulator to take precedence. Regenerate MFS source after adding the extended color attribute.  
2887354 (1108314)
- The SYSMSG field was right-justified and this was causing a problem with displaying the output format. The output format is now displayed correctly.  
2885315 (1108134)
- The printed report page is now padded with blank lines if the number of lines is less than the number of lines per page specified in the MFS source. This only applies if the PAGE parameter is PAGE=(n,SPACES).  
2885281 (1108042)
- An error message is now sent to the terminal if the input consists of null segments.  
2882071 (1107587)
- High-value (x'FF') bytes are no longer incorrectly removed from inbound TN3270 client data.  
2880275 (1107581)
- The trancode was being stored in a screen device field with non-modifiable extended attributes. When resending the output screen (write command), the MDT was not being set. Input of the trancode was not being transmitted, resulting in a DEST NOT FOUND message. To implement the fix, you must regenerate the MFS.  
2876099 (1106859)
- The IMS preprocessor has been updated to determine whether a job is a normal start or a restart by looking only at the first five bytes of the checkpoint ID, as is done on the mainframe, ignoring additional bytes if the first five are spaces. In addition, when a checkpoint ID is determined to be invalid, the EBCDIC value of the ID is converted to ASCII before writing it to the job log.  
3107216 (1109583)
- An RTS 173 occurred at end of a job when an MQ entry point call at the end of step to clean up was unloaded by canceling the MQ modules. This has now been fixed.  
2872962 (1106368)
- DLI status codes FD (deadlock loser) and BD (lock timeout) returned to a CICS application did not ABEND as they should have. These status codes now properly trigger an ADCD transaction ABEND.  
2864939 (1105080)
- The IMS-TM "Trailing space" property was ineffective for EBCDIC transactions. This has been fixed.  
2880919 (1107479)
- A problem when connecting to an IMS printer that caused all pending print jobs to fail has been fixed.  
2879885 (1107242)
- When the last DLI call was a CHKP call, IMS incorrectly issued a COMMIT rather than a ROLLBACK sync point during an ABEND of an IMS BMP. This has been fixed.  
2877795 (1107323)

- A problem that caused an External Security Manager to indiscriminately authorize an unprotected IMS resource without regard to its "allow unknown resources" configuration setting has been fixed.  
2877057 (1106882)
- A problem with incorrectly formatted output data appearing on IMS screens when default literals or system literals were assigned to output message fields has been fixed.  
2825068 (1100049)

### Interface Mapping Toolkit

[Back to the list](#)

- A problem with Enterprise Server that caused an alphanumeric data item mapped to a SOAP Boolean to give results that were incompatible with the mainframe for invalid data values has been fixed.  
2887795 (1108360)
- The performance of a COBOL Web client has been improved when processing services with interface parameters containing unbounded arrays.  
2884760 (1108026)
- When a path specified as part of an Is2ws parameter contained at least one space, Is2ws would fail. This has been fixed.  
(622294)
- EJB generation/deployment has been enhanced to produce an EAR file. Unlike the EAR file produced during client generation, this deploy-time EAR does not contain a WAR file and thus does not contain any JSP files.

### JCL Support

[Back to the list](#)

- Spool files with a status of 'Printing' are now correctly removed from ESMAC when housekeeping is run.  
3108694 (1109666)
- An issue with the Catalog having an incorrect GDG current bias has been fixed.  
3106790 (1109468)
- Specifying DD Dummy in front of the DSN now results in the same behavior as on the mainframe.  
3106305 (1109425)
- A catalog listing of a dynamic PDS, where the PO is defined in a user catalog, will now return the correct list of members.  
3106260 (1109433)
- Specifying DD Dummy in front of the DSN now results in the same behavior as it does on the Mainframe.  
3104175 (1109272)
- JCL HSF - if a job step abends because a data set was not found, the resp field of the previous record will no longer be corrupted.  
3103184 (1109101)
- A new environment variable has been introduced. Set ES\_JES\_PARM\_INIT\_LOW=Y to initialize the parameter string passed to a program executed by JCL to low-values. The default behavior (ES\_JES\_PARM\_INIT=N) is to initialize the string to spaces.  
3100700 (1109519)
- A deadlock situation, when multiple dispositions were used for the same file, has been fixed.  
3100475 (1109067)

- MFJPTPCH now returns a condition code of 4 when it is run against an empty file.  
2991029 (1108802)
- A fault in the final disposition processing of a MOD,PASS dataset has been corrected.  
2990557 (1108750)
- An issue with the Catalog having the incorrect GDG current bias when concurrent jobs access the same GDG, has been fixed.  
2990054 (1108690)
- An issue where duplicate job numbers were assigned if MF\_MVSJOB had a reset value of '+' has been fixed.  
2988755 (1108562)
- An enhancement to the loading of a JCL program means that, if there is a problem loading it, the run-time system error code will be reported. The JCLCM0193U message, PROGRAM NOT FOUND - <program name>' has been changed to 'PROGRAM NOT LOADED - <program name>. RTS CODE: <rts code>'.  
2988302 (1108519)
- MVSSPLHK now correctly removes the JESYSMSG for the last job in casspool.dat.  
2886034 (1108308)
- A new option (CLEAN-DS-FROM-ACTIVE) has been introduced to the MVSSPLHK spool housekeeping process, which prevents removal of time-expired datasets from an active job.  
2885734 (1108144)
- MFFTP now correctly updates the sftp.cfg file with the port number specified in the JCL PARM.  
2885618 (1108295)
- The detection of the charset of command files used by MFFTP has been improved.  
2885559 (1108081)
- The failure of MFFTP to transfer an empty ESDS file from a user defined file has been corrected.  
2883862 (1107878)
- The delete sweep processing of GDG has been corrected so that a new GDG dataset created in a step is not reported as 'dataset not found' in successive steps when its older generations are deleted via DISP=(OLD,DELETE).  
2883681 (1107850)
- When using IDCAMS ALTER NEWNAME for a GDG bias, a check is performed to ensure the GDG is defined in the catalog, and if it isn't, an error message (JCLAM0241E) is generated.  
2881259 (1107477)
- The ASC2EBC and EBC2ASC modules are now included in the MFFTP module.  
2880401 (1107321)
- A file not found error resulted when using a PDSM for SYSUT1 in an MFJPTPCH step. This has now been fixed.  
2879536 (1107203)
- An RTS114 error in IDAMJRM, when using MFFTP, has been corrected.  
2879453 (1107607)
- An issue where duplicate job numbers were assigned if MF\_MVSJOB had a reset value of '+' has been fixed.  
2875286 (1106770)
- Adding a new dataset no longer results an error in the ESMAC catalog listing (error code 9904).  
2874557 (1106582)

- When a JCL process was forcibly killed, an ENQ on SYSZJOB could be left preventing other jobs of the same name from running.  
2872077 (1106506)
- Previously, setting a BLKSIZE of zero resulted in a catalog entry with a BLKSIZE set to 65535.  
2871795 (1106303)
- An issue when using MFFTP to transfer a file that has consecutive CRLFs has been corrected.  
2870653 (1106015)
- You no longer receive a U4038 abend when calling MFJZLPSA with a JCL that uses DFSRRC00 and BMP.  
2869477 (1105804)
- An RTS114 error in IDAMJRM, when renaming a dynamically allocated GDG bias using MFJCTLBP, has been corrected.  
2868312 (1105647)
- An issue with tracing messages from MVSSPLHK could result in receiving an RTS 114 error message.  
2867854 (1106300)
- A problem that sometimes caused IEBCOMPR\MFJMATCH results to be truncated has been fixed.  
2867057 (1105644)
- The catalog xml utility, mfcxml, now supports the export and import of VSAM-SHARE-OPTS using the GDG-EMPTY-COUNT field.  
2866823 (1105394)
- Under VSE, when the environment variable ES\_SAM\_ESDS is set to Y, an open OUTPUT of a reusable ESDS file resets the file in situations when the DISP is not specified in the DLBL statement.  
2865599 (1105186)
- The catalog list function now returns correct results when user catalogs exist.  
2865225 (1105120)
- When using the JOB KEEP option of MVSSPLHK without a duration parameter, the job was removed.  
2864643 (1105034)
- The JES000915E error message now shows the correct userid.  
2856571 (1103927)
- Some issues with the performance of MFJAMS LISTCAT processing have been fixed.  
2809335 (1105962)
- The number of supported user catalog nodes, MFUSERCAT\_NODE and MFUSERCAT\_LOC, has been increased to 64.  
2805554 (1106346)
- If you have enabled 7-digit job number support via MF\_MVSJOB, to revert to 5-digit support, set MF\_MVSJOB=<low number>+<high number> where high number is less than 0099999, and ensure that the '+' sign is used to separate the low and high values.
- You can now make catalog searching and filtering more consistent with the results produced on the mainframe by setting ES\_CATLG\_DISABLE\_ADDITIONAL\_QUAL=Y. Setting this variable to Y emulates the effect of disabling the 'Include Additional Qualifiers' option on the mainframe. The default setting for ES\_CATLG\_DISABLE\_ADDITIONAL\_QUAL is N.  
2883777 (1107870)
- Trying to delete a job record no longer fails with a Run-Time System error 173.  
2876102 (1106778)
- ES\_ESM\_IGNORE\_PDSM\_RULE must be set to 'Y' to ensure that the access to PDS members in ESMAC is controlled by the access privileges to the PDS itself.

- 2869207 (1105872)
- The support for catalog listings using wildcards has been improved.
- 2860297 (1104531)
- Using the JOB field (and then Delete) to delete all SYSOUTs of a job now works as expected.
- 2857238 (1104017)
- Conditional execution of the MFPAUSE user exit is enabled if the PAUSE statement follows an IF statement.
- 2869354 (1105809)
- DLBLs in the VSE configuration file are now allocated correctly when the JCL contains a PAUSE statement.
- 2867871 (1105749)
- A problem with MFFTP that prevented the FTP of an empty ESDS file has been fixed.
- 2867363 (1106130)
- To prevent interference with MFFTP execution when running under VSE, edit the VSE configuration file USE-SYSIN section for MFFTP and assign the permanent instream DD name to SYSIPT (IPTSYS).
- 2864865 (1105434)
- Jobname information is no longer carried forward from one VSE job to the successive jobs.
- 2864594 (1105072)

## Mainframe Access

[Back to the list](#)

- The "\$" and other national characters are now included in Endeavor member filters.
- 3103132 (1109163)
- A z9 compatible version of MFA is available on request from your Support Engineer or Account Manager.
- 2885220 (1108073)
- You no longer need to use the MFA4ENDV LRECL override table when using Endeavor types with a source length greater than 80.
- 2878450 (1107406)
- After an MFDAS IMPORT failed with an open error on a data set the associated file handle was not freed. This could potentially lead to the depletion of all MFA file handles.
- 2878272 (1107023)
- Line sequential output is now correctly handled by the MFA file handler (Data Connect).
- 2878168 (1107430)
- Mainframe Access server provides a new command, UNLOCK, with the following syntax: F MFA,UNLOCK,DSN=aaa.bbb[,MEM=mmmmmmmm] You can use this command in situations where a user has terminated an AWM edit session which left the member lock active. To display MFA ENQs, use IBM's TASID (option 3) application from ISPF. This application provides a much better display than the console display.
- 2860316 (1104416)
- Customers using non-US code pages no longer receive errors when doing bulk member import with mfmonmx2.
- 2881013 (1107577)
- The mfmon2 utility now only performs an initial download if the Micro Focus PDS does not have any ISPF statistics.
- 2872024 (1106302)

- Previously, for catalog filters specified in "mfdas cat ..." commands, the character '#' was translated to '%', which is interpreted as match any character. Since '#' is actually a valid alphabetic character in US EBCDIC and can be used in data set names, this behavior caused unexpected problems with catalog services. This feature has now been deprecated.

2877352 (1107173)

## Micro Focus Batch Scheduler Integration

[Back to the list](#)

- MFBSIJCL now returns the return-code 219 when the batch SEP is killed.  
2881528 (1107507)
- MFBSI now writes back the Control-M %%INCLIB statement in the submitted JCL. This is to help identify the origin of JCL statements.  
2868077 (1105595)
- The MFBSI Control-M AutoEdit emulation is now ignoring the IF/ELSE statements block when the condition is false.  
2863481 (1104860)
- The default delays used by MFBSIJCL to check for a job state in Enterprise Server are as follows - two seconds before each check for "Job Started" and ten seconds before each check for "Job Concluded". It is now possible to configure these delays in the MFBSI configuration file, mfbsi.cfg, with the following two new parameters - JOBSTART-LOOKUP-FREQ and JOBEND-LOOKUP-FREQ. Both parameters accept values between 1 and 60 (in seconds), and AUTO. When AUTO is used, MFBSIJCL uses an initial frequency of one second for three minutes after which the default values are restored. Using these parameters will significantly reduce the overhead elapsed time in MFBSIJCL when compared to the Enterprise Server JCL reported execution time of a job. This has an effect mainly in scenarios when you have short-running jobs that are frequently executed.  
2857416 (1105116)
- MFBSI now resolves the Control-M statements %%INCLIB and %%LIBSYM using the DSN located in a user-defined Catalog.

## Micro Focus Directory Server

[Back to the list](#)

- Fixed a memory leak in the MFDS process.  
2876419 (1106799)
- A memory leak in the MFDS process occurred if non-SSL-enabled connection attempts were made against an SSL-enabled MFDS. This has now been fixed.  
2869493 (1106567)
- The MFDS -g command-line option now correctly handles the import of multiple region definitions from a single XML file.  
2840162 (1101798)
- An issue that could potentially cause heap corruption in MFDS if the configuration data for an individual object was greater than 1K has been fixed.
- The "Renew" option available in the Enterprise Server Administration Web interface now works if SSL is enabled.

## Monitoring and Management

[Back to the list](#)

- JCL jobs that generate STEPBYPASSED events no longer cause incorrect values in JCL HSF records.  
2886646 (1108200)

- Spurious STEP BYPASSED events for dummy steps were being passed to the user exit and the HSF exit.  
2873504 (1106446)
- An issue where duplicate HSF records could be created has been fixed.  
2856941 (1103977)

### **OLE Class Library**

[Back to the list](#)

- A problem with accelerator keys being handled by an ActiveX control has been fixed.  
2990224 (1108719)

### **OpenSSL**

[Back to the list](#)

- The version of OpenSSL included in this product has been updated to version 1.0.2j.

### **PL/I Support**

[Back to the list](#)

- MOD function now works correctly with char string arguments.  
2880086 (1107327)
- Using RETURN inside a SELECT now works correctly.  
2877979 (1107006)
- A problem when using SUBSTR as an argument to UPPERCASE has been fixed.  
2863064 (1104802)
- A problem invoking a function call using an entry variable with the unaligned attribute (or compiled -zp1) has been fixed.  
3107510 (1109544)
- Diagnostic message 2012 has been changed as follows: Internal IL overflow. Unable to continue processing. Try breaking the compilation unit apart into smaller modules if possible, or reducing the number of executable statements. If this message persists, contact Micro Focus SupportLine.  
3106231 (1109494)
- mfplx32 and mfplx64 will now always compile in correct mode.  
3105182 (1109296)
- A problem calling a function with no arguments and a fixed decimal return type with non-zero scale has been fixed. This problem was limited to calling the function without (), e.g., call func;  
3104790 (1109255)
- A problem with restricted expression evaluation of initializers when the GLOBALDEF attribute is specified has been fixed.  
3104276 (1109288)
- A problem when passing structure arguments to structure parameter descriptors that was not of the same shape is now properly diagnosed.  
2991300 (1108810)
- Passing duplicate string literals as function parameters now works correctly when compiled using -opt.  
2991006 (1108785)
- A problem when using both the compiler options -graphic and -fdmaxp has been fixed.

- 2990363 (1108706)
  - A problem with an assignment of a non-array structure to array of structure has been fixed.
- 2912429 (1108422)
  - A problem diagnosing an expression used as data-list item has been corrected.
- 2883992 (1107886)
  - Using TRIM as a parameter to another built-in function now works correctly.
- 2882983 (1107722)
  - A problem with array structure assignment requiring conversion has been fixed.
- 2882731 (1107654)
  - Assigning "G to a graphic variable now works correctly.
- 2881762 (1107513)
  - The compiler now diagnoses possibly uninitialized automatic variables at the point of first use as seen in the source program, if not previously set by an assignment statement, or passed-by-reference as an argument in a procedure call.
- 2881037 (1107420)
  - ENTRY with the LIMITED attribute is now supported. Restriction: ENTRY LIMITED with STATIC INITIAL is not currently supported (AIX only).
- 2881035 (1107482)
  - The STRING built-in function has an implementation limitation of its result length of up to 32767 bytes. The compiler now diagnoses this limitation for a non-variable length result with an S-level diagnostic.
- 2880813 (1107384)
  - mfpli no longer loops endlessly when compiling some programs with the -pic option.
- 2878919 (1107206)
  - An erroneous diagnostic citing an invalid DEFINED overlay has been corrected.
- 2871953 (1106212)
  - An issue with GRAPHIC string comparisons has been fixed.
- 2869451 (1105800)
  - A problem with initialization of structures containing a CHAR(0) member has been fixed.
- 2868923 (1105719)
  - A problem with passing an unconnected array reference to an argument with CONNECTED in its descriptor has been fixed.
- 2868606 (1105886)
  - A new compiler option "-default connected" (or "-dft conn") applies the CONNECTED attribute to array parameter descriptors by default. When passing arguments to parameters without an explicit CONNECTED attribute, the compiler assumes the callee parameter to be connected. If the caller argument is unconnected (discontinuous in memory), a dummy connected argument is created at the call-point. The NONCONNECTED attribute when explicitly applied to parameter descriptors overrides "-default connected".
- 2868606 (1106271)
  - The compiler now diagnoses PICTURE specifications which cause internal compiler implementation limits to be exceeded.
- 2868176 (1105602)
  - A problem with GRAPHIC concatenation causing a SIGSEGV has been fixed.
- 2867892 (1105565)
  - Repeat factors for PIC X and PIC A specifications are now allowed up to 255. The maximum total field width of a picture specification remains at 255 bytes, now documented under Implementation Limits in the Open PL/I User's Guide.

- 2867770 (1105548)
  - A problem with an ENTRY invocation without () has been fixed.
- 2867705 (1105540)
  - A problem with a comparison of a BIT(1) to a numeric literal or FIXED BINARY variable has been fixed.
- 2866657 (1105363)
  - A possible problem with the scoping of implicit and contextual declarations has been corrected.
- 2865207 (1105109)
  - The diagnostic message MFPLI00176S when issued erroneously has been fixed. The text of the diagnostic has also been corrected and changed to W-level.
- 2864859 (1105066)
  - A problem with EBCDIC conversion of string literals under the Japanese locale has been corrected.
- 2859505 (1104311)
  - A problem calling entry variables based on pointers has been fixed.
- 2840869 (1101873)
  - The CHARVAL built-in is now supported.
- (627778)
  - The relational operator <> is now supported. It is equivalent to "Not Equals".
- (625262)
  - Previously, if the user had set TMP, TEMP, or MFPLI\_CONFIG\_DIR to a non-existent directory and attempted to debug a JCL Jobstream using CodeWatch, the job was wrongly terminated. A new CTF diagnostic is now generated which will allow the user to determine that they've incorrectly set the directory to be used for temporary files.
- 2882313 (1108052)
  - Previously, a diagnostic was issued if a macro variable was declared twice. It is now only issued if the second or subsequent declaration has different attributes from the initial declaration.
- 3108673 (1109680)
  - Previously, if a nested macro was invoked using a parameter that had been omitted, but which had a value assigned in the enclosing macro, the nested macro did not receive the parameter value.
- 3105212 (1109323)
  - Previously, the macro preprocessor issued a syntax error when a macro preprocessor variable was declared using the SCAN or NOSCAN attributes.
- 3104598 (1109315)
  - Previously, if the ANSWER statement was used in a PL/I Macro, the resulting output was not rescanned for replacement prior to being driven to disk.
- 2887974 (1108455)
  - Previously, if using the PL/I Macro Preprocessor to handle code which contained IBM's newest operator "<>" for "Not Equal", an error message was generated. The Macro Preprocessor has been enhanced to accept <> as not equal.
- 2885570 (1108085)
  - A previous fix related to the use of -margins and PL/I exponentiation caused a failure when a macro expanded and caused a comment to be pushed to straddle the right margin such that the / and \* were split. This no longer occurs.
- 2884503 (1107984)
  - Previously, if a % preprocessor statement was on the first valid column of a line which preceded a line which ended using all available columns and -margins was specified, then the data on the preceding line could be erroneously omitted. This no longer occurs.

2884467 (1107970)

- Previously, if declaring macro preprocessor arrays within a factored declaration, they were not correctly parsed/interpreted. This has now been fixed.

2880399 (1107344)

- Previously, if using RETURN; within a PL/I Macro, it was flagged as invalid syntax. This no longer occurs.

2880397 (1107334)

- The PL/I macro preprocessor now accepts the "\_" character in hex literal constants.

2880350 (1107312)

- The macro preprocessor now supports macro procedures written with a void parameter list.

2880349 (1107311)

- Previously, the use of open and close parens within the ANSWER expression caused an incorrect result and/or an error message. This no longer occurs.

2880347 (1107314)

- An enhancement made to support -incafter in a single macro pass broke the macro preprocessor's ability to use macro pp built-in functions outside of a macro pp procedure. This has been fixed.

2877724 (1106992)

- Previously, the macro preprocessor did not support the LEAVE statement for exiting a DO block. It is now supported.

2874544 (1106595)

- Previously, the macro preprocessor did not interpret a DO statement with "BY 0" as an infinite loop that could only be terminated by a LEAVE or GOTO. This has now been fixed.

2874169 (1106508)

- Previously, the macro preprocessor required the first token in a THEN or ELSE clause of an IF statement to be a % symbol when parsing outside of a macro procedure. This is no longer required.

(627710)

- Previously, %PROCESS statements in the code resulted in an error when the code was parsed by the macro preprocessor. %PROCESS is now parsed/ignored.

(628209)

- Previously, a CTLASA file that was opened for output but not written to erroneously generated a CTLASA Page Feed when closed automatically. This has now been fixed.

3105667 (1109464)

- Previously, if an AREA variable was part of a structure, and the structure was BASED, AUTOMATIC or CONTROLLED storage then the AREA was not usable until it was initialized with the EMPTY built-in function. Enterprise Developer now mimic IBM's behavior and automatically initialize AREA variables to EMPTY() regardless of whether they are scalar or part of a structure.

3104275 (1109498)

- Previously, a combination of consecutive PUT SKIP() statements did not generate a series of CTLASA characters that matched the IBM Mainframe behavior. This has now been fixed.

3101399 (1108926)

- Previously, if using PUT EDIT LINE() with non-contiguous lines, there was an error in the calculation of the number of lines that needed to be skipped via CTLASA control characters. This has now been fixed.

2884058 (1107881)

- A problem with PUT SKIP EDIT when driven from an ON ENDPAGE has been corrected.

2882729 (1107653)

- A problem with ASA Control characters when utilizing the language feature that skips to a new page when the specified LINE is <= to the current line has been corrected.

2882011 (1107545)

- The MOD built-in function now works correctly with fixed dec or pic variables.

2881986 (1107540)

- Previously, an unflushed stream file which contained a buffer that would cause it to match the PAGESIZE of the file erroneously triggered ENDPAGE upon the close of the file. This no longer happens.

2879623 (1107246)

- Previously, if using PUT PAGE; followed immediately by another PUT statement which included a PAGE option, there were not two page ejects emitted as CTLASA characters. A secondary problem related to using the RECSIZE() option of the ENV Attribute to establish a longer than standard LINESIZE for a stream output file has also been corrected.

2875866 (1106719)

- An undocumented IBM behavior with regard to the generation of CTLASA control characters for the second line of the first page of a stream I/O file has been corrected.

2873492 (1106402)

- A problem with the comparison of two PIC variables which each contained multiple consecutive drift characters has been corrected.

2869873 (1105854)

- Previously, if reading SYSIN via a PL/I Program compiled with -ebcdic, from a physical dataset in an enterprise server region running in EBCDIC mode, the input was garbled. This no longer occurs.

2865346 (1105128)

- Previously, if using PUT SKIP(x) where x is greater than 1, on the first line of the first page of a PRINT CTLASA file, the use of ASA control characters did not mimic the undocumented behavior present in IBM's PL/I on z/OS. This has now been fixed.

2864096 (1104958)

- Previously, when a CTLASA file was OPEN(ed) and CLOSE(ed) without any data being written, a zero length file was created. Open PL/I now matches IBM's behavior and emits a single blank page feed line.

2863818 (1104911)

- Previously, if using an EXTFH.CFG where the [XFH-DEFAULT] contained INSERTNULL=OFF, the compiler would trap when compiling larger complex programs while attempting to read back in a temporary file created during the parsing phase. This no longer occurs.

2863220 (1105599)

- ECM now generates correct code to drive user-specified labels in exec sql whenever goto xxx; statements.

3105039 (1109297)

- The -optsql, -optcics, -optdli, and -optexec compiler options now support strings that can be as large as 2048.

2877088 (1106913)

## **REX Support**

[Back to the list](#)

- When running a REXX EXEC under Enterprise Server or Enterprise Server for .NET, an "Invalid Expression" error occurred for an assignment statement where the expression being assigned to the variable had been omitted. An empty string is now assigned to the variable if the expression is omitted.

2880655 (1107390)

- A REXX exec could fail with a S0C4 abend or an RTS 114 error if it was greater than 4096 bytes in length and specified either as in-stream data or catalogued as an RECFM=F or RECFM=V dataset.

2878613 (1107100)

## RM/COBOL

[Back to the list](#)

- When FILETYPE(21) was specified for a LINE SEQUENTIAL print file, you could receive a Run-Time System error "13". Writing to a printer from a Visual COBOL program through the RM File Manager (filetype 21) now works correctly.

2874987 (1106616)

## Run-Time System

[Back to the list](#)

- Adis SCREEN SECTION ACCEPT statements for PIC N DISPLAY-1 items now correctly accept DBCS characters with a lead byte of x"87".

3104586 (1109231)

- A error when using very long command lines with Profiler (or cobprof on UNIX) has been fixed.

2884968 (625185)

- You can now double-click (to run) managed executables that use the ACUFH file handler; previously, they may have failed with a COBRT198 error.

2880827 (1107388)

- When debugging a native Object COBOL application, the debugger no longer fails with an intermittent COBRT114 run-time error when getting the type and value of an object's handle.

2875531 (1106808)

- A multi-threaded application that makes use of the COBOL syntax for handling mutexes, monitors, events and semaphores, or the corresponding CBL\_ APIs, no longer fails intermittently with various run-time errors due to memory corruption.

2860205 (1104446)

- Animating a core file that has been moved to a different directory, for a core file produced by an application compiled to executable, no longer fails with a "Program is not animatable" error. Previously, it would on certain platforms.

2856631 (1103933)

- Detaching from animation that was started using the debug\_on\_error tunable could cause animation to re-start again for the initial error - this has now been resolved.

- In managed COBOL, a CANCEL data-name statement no longer fails or crashes if the contained program name is not space-terminated.

2887392 (1108320)

- Using user-defined class conditions in managed code no longer gives incorrect results.

2887005 (1108290)

- When executing a SQLCLR stored procedure for a second time, programs not found during the first execution might not be found dynamically.

2879012 (1107201)

- The backtab key now works correctly when performing ADIS screen i/o operations in managed code applications.

2877480 (1106928)

- Using the CBL\_FILENAME\_CONVERT library routine resulted in receiving an exception in managed COBOL if bit 3 was set for the function parameter and CTF tracing was then enabled.

2876179 (1106763)

- An environment variable with a value containing a leading space is no longer treated as having been deleted.

2872919 (1106405)

- A CANCEL of a dataname containing low values no longer causes a Run-Time System error in managed COBOL code.

2872140 (1106247)

## SQL: COBSQL

[Back to the list](#)

- A problem that caused the COBSQL preprocessor to incorrectly parse comments beyond column 72 has been fixed.

3101746 (1108980)

- A problem with COBSQL producing a duplicated cursor data item when KEEPCOMP was used has been fixed.

2874051 (1106531)

- A problem that caused the COBSQL preprocessor to incorrectly process source lines with characters in column 73 and beyond has been fixed.

2869958 (1109899)

## SQL: OpenESQL

[Back to the list](#)

- A problem that occurred when SQLCODE was set incorrectly and an EXECUTE IMMEDIATE statement was executed multiple times has been fixed.

2990794 (1108754)

- A problem using SQL(PROCOB) and SQL(DATE=EXTERNAL) with Oracle fully managed data access provider for .NET has been fixed.

2989291 (1108639)

- Performance when using SQL(PROCOB) with OpenESQL ADO.NET runtime and Oracle unmanaged provider has been improved by reducing occasions where Oracle's ALL\_SYNONYMS table is accessed.

2913100 (1108599)

- A problem that occurred when a stored procedure that makes dynamic COBOL CALLS executes an EXEC SQL CLOSE <cursorName> WITH RETURN TO CALLER statement has been fixed. For this fix to be effective, the stored procedure must not be compiled using SQL(OPTIMIZESPCURSORS).

2887060 (1108265)

- A problem fetching from a cursor defined for a stored procedure call that doesn't return a result set has been fixed.

2885499 (1108075)

- A problem with DESCRIBE CURSOR in COBOL SQLCLR stored procedures for cursors that retrieve result sets from nested stored procedure calls has been fixed.

2883792 (1107841)

- A problem in COBOL stored procedures that occurred when a COBOL CALL followed a cursor OPEN for a TSQL procedure call has been fixed.

2881606 (1107529)

- For .NET applications accessing Oracle databases, character values used in numeric host variables caused performance degradation. This has been fixed.

2877103 (1107035)

- A problem that caused OpenESQL to incorrectly handle FETCH statements when the number of host variables did not match the number of columns in the result set has been fixed. Host variables in excess of result columns remain unchanged. If the number of host variables is fewer than the number of result columns, SQLWARN 3 is set to 'W' in the SQLCA. Note: When using PostgreSQL with ODBC, you must adjust the DSN configuration to disable updatable cursors because OpenESQL provides its own support for updatable cursors with PostgreSQL.  
2876426 (1106813)
- A COBOL stored procedure could not retrieve multiple result sets from an OpenESQL cursor via a nested stored procedure call. This has been corrected, and the retrieval of multiple result sets from a COBOL stored procedure is now supported.  
2875262 (1106668)
- The OpenESQL preprocessor incorrectly expanded a group host variable used in a CURSOR SELECT statement, resulting in a run-time error. The preprocessor has been modified to generate a COBES0130 error message in this case.  
3104602 (1109289)
- A problem that prevented OpenESQL applications calling SQL Server stored procedures with no parameters when using the legacy 'SQL Server' ODBC driver has been fixed. Important: We strongly discourage use of the legacy 'SQL Server' ODBC driver. Instead, we recommend that for best performance and functionality, use the ODBC driver that corresponds to the version of SQL Server used by the application.  
3100550 (1109071)
- A problem with HCOSS code generation that occurred when duplicating input host variable references (for example when substr() is used with 2 rather than 3 parameters) has been fixed.  
3100098 (1108819)
- A problem with the OpenESQL native routine that provides DSNTIAR emulation sometimes caused an RTS114 error. This has been fixed.  
2989595 (1108699)
- A new OpenESQL directive, GEN-SQLCA, has been added to generate the SQLCA copybook in a program when it has not been explicitly included. This directive provides additional support when migrating applications compiled with STDSQL(YES) on the mainframe.  
2887858 (1108368)
- A problem with the MSSQL XA switch module sometimes causing a CICS transaction to abort if it ended without closing all FORWARD and READ ONLY cursors has been fixed.  
2887074 (1108340)
- An inconsistency in reporting data truncation warnings when using PostgreSQL has been fixed.  
2886648 (1108201)
- OpenESQL and OCI have been updated to prevent RTS198 errors when using DSNTIAR with ODBC. To take advantage of this new functionality, specify the cob -d command flag to resolve DSNTIAR with the correct callable shared object. For example, to compile a COBOL program into an executable on a 64-bit platform with OESQL DSNTIAR: cob -x program.cbl -d DSNTIAR@cobmfsntiar64.so -L\$COBDIR/lib -lmpfliz -lplidump -llmgr -lm Or, to compile a PL/I program into an executable on a 32-bit platform with OESQL DSNTIAR, execute the following two commands: mflpx -c PROGRAM.pli -sql odbc -optsql "behavior=mainframe nosmftrace" cob -x PROGRAM.o -d DSNTIAR@cobmfsntiar.so -L\$COBDIR/lib -lmpfliz -lplidump -llmgr -lm  
2884651 (1107997)
- A problem when using OpenESQL for JDBC with the "Use Dynamic Calls" project option has been fixed.  
2883500 (1107955)
- A problem with SQL(AUTOFETCH) that affected SQL Server FORWARD READ ONLY WITH HOLD cursors performance has been fixed.

2880840 (1107580)

- The ADO.NET Run-Time System for OpenESQL now returns the correct value in SQLERRD(3) after a cursor fetch when other statements are executed between any fetches on the cursor.

2880814 (1107386)

- OpenESQL now allows FREE to be used as an SQL identifier. It is server dependent if this is supported at compile time when using SQL(CHECK) and at run time.

2880673 (1107368)

- A new OpenESQL directive, CLOSE\_ON\_COMMIT, has been added to provide greater control over cursor behavior on COMMIT for cursors that are not explicitly declared using WITH HOLD.

2879558 (1107305)

- A problem with HCOSS handling of nested table references in DB2 statements has been fixed and error messages when using SQL(STRICTPARSE) have been improved.

2879503 (1107286)

- The SQLBGP COBSQL compiler directive option has been added to ensure successful background parsing of EXEC SQL statements when the Pro\*COBOL installation resides on a remote machine and not on the local machine.

2877618 (1107292)

- A problem that prevented SQL(CHECK) from working correctly on some databases has been fixed.

2877284 (1107021)

- When used with the SQL(USER-SQLDA=MAINFRAME) directive, the OpenESQL preprocessor could incorrectly generate ES0100 errors if a group variable was used in an EXEC SQL FETCH statement. This has been fixed.

2876420 (1106803)

- The OpenESQL preprocessor sometimes failed to return comp data items correctly if compiled with SQL(DIALECT=MAINFRAME). This has been fixed.

2874931 (1106606)

- The OpenESQL preprocessor has been updated to generate a more meaningful message, COBES0129, when it encounters an undefined host variable.

2874408 (1106624)

- A problem with SQL(NORSLOCATORS) leaking SQL Server server cursors has been fixed.

2872613 (1106294)

- HCOSS handling of the DB2 CHAR() function did not always properly apply the compile-time settings of DATE and TIME as the default formats when CHAR was called with a date or time value but no date or time format parameter was supplied. This has been fixed.

2872518 (1106404)

- A new SQL compiler directive option, OPTIMIZECURSORS, has been added to optimize memory consumption when using OpenESQL for ADO.NET with Oracle, DB2, or PostgreSQL. The default setting is SQL(OPTIMIZECURSORS=YES). See the OPTIMIZECURSORS reference topic in the documentation for complete information.

2871132 (1106056)

- Decimal and host variables with the same length are now converted to EBCDIC correctly when CHARSET(EBCDIC) is enabled; however, if you link native COBOL applications that use display numeric variables in SQL statements using CHARSET(EBCDIC), you might get a link error. To resolve this issue, see the OpenESQL topic under Known Issues and Restrictions.

2857755 (1104091)

- A problem with the ODBC switch module not reporting broken connections to Enterprise Server when xa\_start() is called has been fixed.

2843672 (1108847)

- A problem that caused the OpenESQL preprocessor to incorrectly interpret UNICODE(PORTABLE) has been fixed.
- The SQL xa\_open string has been updated to include the PACKAGEPATH option, which enables the use of substitution markers to customize the package path based on the current JCL or CICS user name, XA resource name, enterprise server region name, or a combination. In addition, when used with the UserP option, the PACKAGEPATH option value changes when the user for the connection changes.
- A problem using SQL(DATEDELIM) with SQL(DATE=JIS) has been fixed.
- OpenESQL has been updated to enable execution of selected SQL statements at compile time. You can use this functionality to create temporary tables during compilation and to enable the use of SQL(CHECK) with temporary as well as permanent tables.
- The encoding of the sqltype fields in SQLDA has changed and any applications that use dynamic SQL with SQLDAs might require application code change. The new sqltype encoding scheme adds 0x2000 to sqltype when an integer, a small integer or a big integer host variable is COMP and 0x1000 and when any indicator host variable is COMP. Otherwise, COMP-5 is assumed for indicators and for integer, small integer and big integer host variables.

## SQL Option for DB2

[Back to the list](#)

- A problem with the Declaration Generator that prevented COBOL copybooks from being generated correctly for tables with timestamps and XML columns has been fixed.  
2875742 (1106868)
- The XDB preprocessor has been updated to support source connect files that previously generated a "File not found" error for EXEC SQL INCLUDE statements located on the source connect drive.  
2912819 (1108471)
- The XDB ECM has been enhanced to handle temporal table query syntax.  
2876438 (1106807)
- Implemented the JDBC ResultSet Interface getBigDecimal methods that do not require a scale argument: getBigDecimal(int columnIndex) and getBigDecimal(String columnLabel).  
2877817 (1106963)
- A problem that caused an X020 syntax error on SELECT DISTINCT (TRIM)has been fixed.  
3105393 (1109324)
- A problem that prevented the XDB engines to successfully process a COUNT(DISTINCT expression) scalar function when the expression was a concatenated expression enclosed in parentheses has been fixed.  
2884227 (1107903)
- A problem that caused a thread stack overflow on scalar function recursions that use CONCAT has been fixed.  
2884046 (1107882)
- A problem with the XUTLB LOAD grammar prevented the reserved word DATE from being used as a table name. This has been fixed.  
2882727 (1107652)
- An problem when correlating a subquery produced a PDMP242 error. This has been resolved.  
2880672 (1107367)
- A problem that caused a FETCH FIRST clause in a scalar subquery to be ignored has been fixed.  
2880671 (1107366)
- A problem using the reserved word DOCUMENT as an identifier in the first argument of a scalar function has been fixed.

2874154 (1106483)

- CAST AS TIMESTAMP using the special character 'T' as the date/time delimiter was not allowed. This is now allowed.

2874153 (1106484)

- An issue with the ordering of a result set caused the incorrect row to be returned on a FETCH FIRST ONLY clause. This has been fixed.

2873390 (1106435)

- An issue with index optimization of LIKE predicate processing has been resolved.

2873389 (1106391)

- A problem that sometimes caused the XDB Server to shut down before completing location checkpoint operations by maintenance threads has been resolved.

2847090 (1102750)

- An problem with LIKE predicate index query optimization that caused missing result set rows has been fixed.

2841168 (1101910)

- A problem that prevented the restoration of LOB data from a record with an LOB column after deleting the record and then rolling back from a Save Point has been fixed.
- XDBMONN has been updated to issue the correct error message when it is started, but the server is not running.
- The server Name be displayed in the status bar of the XDB SQL Wizard.

2865763 (1105197)

- Using ALLOW EDITING on an SQLWizard result set could result in the query being corrupted. This has now been fixed.

2865336 (1105171)

- The restriction that prevented the editing of result sets generated from alias tables has been removed.

2857585 (1104067)

- When the SQLWizard is invoked by MFA Drag & Drop to import unload data to a table it no longer returns an X352/X95 error.

## **XML Support**

[Back to the list](#)

- XMLPARSE no longer returns -19 in XMLSS mode.

2913116 (1108661)

- Opened XML files are now closed when the COBOL program called by JCL is terminated.

2885450 (1108132)

- A new directive "OUTENC(INPUT)" is created to ensure encoding of the output text will be the same as the input encoding specified in the XML declaration.

2870879 (1106332)

- XMLIO now handles REDEFINE data items correctly.

2795744 (1096302)

# Other Issues Resolved in This Release

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

- 2884374 (1107928)
- 2875256 (1106645)
- 2871954 (1106649)
- 3103304 (1109198)
- 2857117 (1106716)
- 3106240 (1109462)
- 2989573 (1108689)
- 2874306 (1106666)
- 2848671 (1102872)
- 2878662 (1107084)
- 2864100 (1104959)
- 3101450 (1108990)
- 2884755 (1107973)
- 2884754 (1108098)
- 2883962 (1108118)
- 2883962 (1108119)
- 2878826 (1107101)
- 2878227 (1107012)
- 2877589 (1106938)
- 2875248 (1106679)
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- 2146936 (1059549)
- 2876653 (1106832)
- 2865001 (1105155)

# Unsupported Functionality

The following features or functionality are no longer supported:

- The HOSTSIGNS Compiler directive is no longer supported. Micro Focus recommends that you use the following Compiler directives instead: SIGN-FIXUP, HOST-NUMMOVE, and HOST-NUMCOMPARE.

# Installation

## Before Installing

### Downloading the Product

You can download Enterprise Developer from the *Product Updates* section of the [Micro Focus SupportLine](#) Web site.

## 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 the supported operating systems, check the *Product Availability* section on the Micro Focus SupportLine Web site: <http://supportline.microfocus.com/prodavail.aspx>.

#### Note:

- You can produce both 32-bit or 64-bit applications with Enterprise Developer installed on a 64-bit operating system.
- This product can be installed on earlier versions of Windows but it has not been tested on them.

#### 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 2015 or 2017 must, however, be installed in advance.

**Note:**

- Besides the software listed below, the setup file also installs the 64-bit Java 8 Update 102.
- This product includes OpenSSL version 1.0.2j.

**Visual Studio IDE**

You must have Microsoft's Visual Studio installed in advance.

You need one of the advanced versions of Visual Studio listed below or the Visual Studio Integrated Shell (only supported by Enterprise Developer for Visual Studio 2012 or 2013):

Professional, Premium, or Ultimate (for Visual Studio 2012)

Professional, Premium, Ultimate or Community Edition (for Visual Studio 2013)

Professional, Enterprise or Community Edition (for Visual Studio 2015)

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

Microsoft's Visual Studio Express Edition is not supported.

If there is no Visual Studio installed on your machine, the setup file for Enterprise Developer for Visual Studio 2012 or 2013 will install the Visual Studio Integrated Shell. Alternatively, you can download the Visual Studio Integrated Shell from the [Microsoft Download Center](#) and install it before you install Enterprise Developer. If you choose to install the Shell, ensure you run the installer to complete the installation - run `vsintshell.enu.exe` from the location where you installed the download.

Note that some Visual Studio features might not be available with the Shell. This includes WCF or the Visual Studio 2013 Connected IDE experience in the Visual Studio 2013 Shell - the help for more details.

**Important:**

- A problem with Microsoft's Windows 10 prevents installing the Visual Studio 2013 Shell on that version of the OS. You must install an advanced edition of Visual Studio 2013 on Windows 10 before you start the installation of Enterprise Developer for Visual Studio 2013.
- Enterprise Developer for Visual Studio 2015 does not support Visual Studio 2015 Shell as the Shell has a number of restrictions to COBOL development. The Visual Studio 2015 Shell is not included in the setup for Enterprise Developer for Visual Studio 2015 and before you start the installation, ensure that there is an advanced edition of Visual Studio 2015 installed on your machine.
- On Windows 8.1 RT, Windows 8.1 or Windows Server 2012 R2, you must have the Windows update KB 2919355 before you install Visual Studio 2015. Download KB 2919355 from the [Microsoft Download Center](#).
- When installing Visual Studio 2017, ensure you select the Help Viewer component for installing to ensure you can 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.
- Code generation issues in Microsoft's 64-bit JIT (just-in-time) compiler delivered as part of .NET Framework version 4.6 can result in incorrect execution of some COBOL code compiled to .NET. Version 4.6 of the .NET Framework is currently shipped as default with Visual Studio 2015 and Microsoft's Windows 10. The problems include incorrect execution of MOVE and STRING statements applied to alphanumeric operands, and incorrect execution of the ROUNDED phrase for arithmetic statements.

Some of these issues only seem to be reproducible in COBOL language applications compiled to .NET and some can be reproduced in other languages (C# or Visual Basic).

These problems have been reported and acknowledged by Microsoft and it is our belief that they either have resolutions or are working on fixes for all of them. For further information about these

issues and guidelines on how to disable the latest version of the 64-bit JIT compiler, see [RyuJIT Bug Advisory](#) and [Troubleshooting RyuJIT](#).

As of October 2015, Microsoft have released the following updates that address these issues with the .NET Framework 4.6:

- Hotfix rollup 3088955 for the .NET Framework 4.6 on Windows Server 2012 and Windows 8 - see: <http://www.microfocus.com/docs/links.asp?vc=mskb3088955>.
- Hotfix rollup 3088956 for the .NET Framework 4.6 on Windows Server 2012 R2 and Windows 8.1 - see: <http://www.microfocus.com/docs/links.asp?vc=mskb3088956>
- Hotfix rollup 3088957 for the .NET Framework 4.6 on Windows 7 SP1, Windows Server 2008 SP2, Windows Server 2008 R2 SP1, and Windows Vista SP2 - see: <http://www.microfocus.com/docs/links.asp?vc=mskb3088957>.
- Cumulative update 3093266 for Windows 10: September 30, 2015 (available through Windows Update) - see: <http://www.microfocus.com/docs/links.asp?vc=mskb3093266>.

The following software is also required:

- Microsoft Windows SDK is required if you are using the Visual Studio Shell. See the [Microsoft Download Center](#) and search for Windows SDK.
- Microsoft .NET Framework 4.5. This is included with Visual Studio 2012.
- Microsoft .NET Framework 4.5.1. This is included with Visual Studio 2013.
- Microsoft .NET Framework 4.6. This is included with Visual Studio 2015.
- Microsoft .NET Framework 4.6.2. This is included with Visual Studio 2017.

### Selecting the Visual Studio 2017 components to install

The Visual Studio 2017 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.

The Help Viewer component is not installed by default and must be selected before you start the Visual Studio installation to ensure you can view the Enterprise Developer product help.

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

- .NET Framework version 4.6.2
- Debugger
- Visual Studio's Help Viewer
- Data services

A number of workloads and components are optional - for example, Azure, WCF, Web, WPF or SQL CLR application development. If you require any of these, you can select them when you start the Visual Studio 2017 installer or, enable them after completing the installation - see the next section.

### Installing Visual Studio 2017 features that are not currently installed

If a feature of Visual Studio 2017 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 2017 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 2017:

1. Start Visual Studio 2017.
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 2017:

1. Start Visual Studio 2017.
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.

## Internet Explorer 10

Internet Explorer 10 (IE 10) is required by the installation of Visual Studio 2013. If you are installing Enterprise Developer on a machine that has no Visual Studio 2013 installed, the setup file installs Visual Studio 2013 Shell provided that IE 10 is installed beforehand. You can download IE 10 from [Microsoft's Web site](#).

## IIS Express

IIS Express is required if you want to use the Web development tools. You can download IIS Express from the [Microsoft Download Center](#).

## Other Requirements

 **Important:** This release requires version 10000.2.990 or later of the Micro Focus License Administration tool. For local servers, you do not need to install it separately, as the setup file installs a new Enterprise Developer client and a new licensing server on the same machine.

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

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

## Additional Software Requirements on Windows

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

See this information in the Micro Focus Infocenter, in the product help for Enterprise Developer for Visual Studio 2012 ([click here](#)), Enterprise Developer for Visual Studio 2013 ([click here](#)), Enterprise Developer for Visual Studio 2015 ([click here](#)) and Enterprise Developer for Visual Studio 2017 ([click here](#)).

## 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 for Visual Studio 2012 or 2013, the machine does not have Microsoft Visual C++ 2012 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.
- If, when you install Enterprise Developer for Visual Studio 2015, the machine does not have Microsoft Visual C++ 2013 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.

## 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 | Sentinel RMS license server |
|--------------------------------|----------------|-----------------|------------------------------------------|---------------------------------------------|-----------------------------|
| POWER running AIX              | Micro Focus    | 513 MB          | 2.05 GB                                  | 1.03 GB                                     | 35 MB                       |
| HP IA                          | Micro Focus    | 909 MB          | 3.64 GB                                  | 1.82 GB                                     | 66 MB                       |
| System Z running Red Hat Linux | Micro Focus    | 409 MB          | 1.64 GB                                  | 818 MB                                      | 34 MB                       |
| x86-64 running Red Hat Linux   | Micro Focus    | 512 MB          | 2.05 GB                                  | 1.02 GB                                     | 44 MB                       |
| ppc64le running Red Hat Linux  | Micro Focus    | 301 MB          | 1.20 GB                                  | 602 MB                                      | 1 MB                        |
| SPARC running Solaris          | Micro Focus    | 519 MB          | 2.08 GB                                  | 1.04 GB                                     | 38 MB                       |
| System Z running SUSE SLES     | Micro Focus    | 271 MB          | 1.08 GB                                  | 542 MB                                      | 1 MB                        |
| x86-64 running SUSE SLES       | Micro Focus    | 519 MB          | 2.08 GB                                  | 1.04 GB                                     | 44                          |
| ppc64le running SUSE SLES      | Micro Focus    | 271 MB          | 1.08 GB                                  | 542 MB                                      | 1 MB                        |

## Operating Systems Supported

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

## Software Requirements for Micro Focus Enterprise Developer Unix Components

These are the software requirements for Micro Focus Enterprise Developer Unix Components:

- The pax archiving utility is required by the setup file. Pax is distributed with most UNIX/Linux systems but, if it is missing, you must install it separately. To verify pax is installed, run `pax --help` or `pax --version` at the command line.
- Required libraries for Red Hat and SUSE Linux platforms - The installer 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 Library Name                          | 64-bit Library Name     | Platform           |         |         |             |           |
|-----------------|----------------------------------------------|-------------------------|--------------------|---------|---------|-------------|-----------|
|                 |                                              |                         | s390               | SUSE 11 | SUSE 12 | Red Hat 6.x | Red Hat 7 |
| glibc           | glibc-*.i686                                 | glibc-*.x86_64          | glibc-*.s390       |         |         | X           | X         |
| libgcc          | libgcc-*.i686                                | libgcc-*.x86_64         | libgcc-*.s390      |         |         | X           | X         |
| libstdc++       | libstdc++-*.i686                             | libstdc++-*.x86_64      | libstdc++-*.s390   |         |         | 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         |
| elfutils-libelf | elfutils-libelf.i386 or elfutils-libelf.i686 | elfutils-libelf.x86-64  | N/A                |         |         | X           | X         |
| libelf-devel    | elfutils-devel.i386 or elfutils-devel.i686   | elfutils-devel.x86-64   | N/A                |         |         | X           | X         |
| libelf-devel    | libelf-devel-32bit-0.137-8.19                | libelf-devel-0.137-8.19 | N/A                | X       | X       |             |           |
| libelf1         | libelf1-32bit-0.137-8.19                     | libelf1-0.137-8.19      | N/A                | X       | X       |             |           |

\* Additional libraries required to use the `core_on_error` runtime variable. The gdb packages (for the GNU Project Debugger) can be installed from the install media for your OS.

\*\* Operating system libraries required for PL/I support on both SUSE and Red Hat.

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

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

- Oracle's Java Platform (64-bit) version 1.8.92 or above is required. Java 7 and 8 (32 or 64-bit versions) are supported for executing JVM COBOL code and for native COBOL and Java interoperability. You can download Oracle's Java EE from [Oracle's Web site](#) and install it anywhere on your machine.



**Note:**

- On AIX and zLinux, you need to have IBM's JDK. The earliest supported release of IBM's JDK is 7.0 Service Refresh 8. You can get IBM's AIX JDK from [IBM's Web site](#).
- On HP-UX, you need to have HP-UX JDK. The earliest supported release of HP-UX is JDK 7.0.11. You can get the HP-UX Java JDK from [HP's Web site](#).

To execute JVM COBOL code, you need to set the environment as follows:

- You need to 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:

```
JAVA_HOME=java_install_dir
```

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

- You need to 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. The LANG settings are English and Japanese only.

- 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
```

## Additional Software Requirements for Micro Focus Enterprise Developer Unix Components

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

See this information in the Micro Focus Infocenter, in the product help for Enterprise Developer for Visual Studio 2012 ([click here](#)), Enterprise Developer for Visual Studio 2013 ([click here](#)), and Enterprise Developer for Visual Studio 2015 ([click here](#)).

## UNIX and Linux Installer Issues

### 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 `-EDadminID=[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 `edvs2012_30.exe` file (or either `edvs2013_30.exe`, `edvs2013_30.exe`, or `edvs2015_30.exe`) and follow the wizard instructions to install the prerequisite software and the product.

The installer installs Enterprise Developer, Enterprise Server for .NET, and offers to install Micro Focus Rumba. The setup file will also install any missing prerequisite software as listed in the topic *Software Requirements*.



### Note:

- When the installation has completed, on some editions of Windows you might receive a notification that Visual Studio 2012 has compatibility issues. This is a known Microsoft issue. To resolve it, follow the instructions in the notification for obtaining help online, or download the KB2781514 update for Visual Studio 2012 from the [Microsoft Download Center](#).
- If you are installing onto a machine that has an existing Micro Focus product that uses an older Sentinel RMS License Manager, you might be prompted to remove it and install the Micro Focus License Administration. By doing this you maintain the existing Sentinel RMS license files while adding the Micro Focus License Administration. If you are unsure about existing licenses on your computer or removing the Sentinel RMS License Manager, consult your System Administrator. If you want to proceed, remove Sentinel RMS License Manager by using **Program and Features** (Windows Vista or later), and rerun the installation file.
- Trial licenses cannot be used with remote desktop services. If you want to use your product in this way, please contact Micro Focus SupportLine to obtain a relevant license.
- We recommend that you install any updates for Visual Studio and the .NET Framework that are available at the [Microsoft Download](#) site.
- If you install JDK you might be prompted to install the latest update. The latest update is not required for use with Enterprise Developer but you can install it if you wish.

# Installing Micro Focus Enterprise Developer Unix Components

 **Note:** 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.

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_3.0_platform
```

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

```
./setup_entdev_3.0_platform
```

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

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

## 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_3.0_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, remove the file and install Sentinel RMS server manually.

 **Note:**

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.

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`.

## 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 in the Micro Focus Infocenter
- *Installing the Mainframe Components* - available in the product Help and in the Micro Focus Infocenter
- *Installing on Microsoft Terminal Server and Citrix* - available in the product Help and in the Micro Focus Infocenter

See this information in the Micro Focus Infocenter, in the product help for Enterprise Developer for Visual Studio 2012 ([click here](#)), Enterprise Developer for Visual Studio 2013 ([click here](#)), Enterprise Developer for Visual Studio 2015 ([click here](#)), and Enterprise Developer for Visual Studio 2017 ([click here](#)).

## On Windows

### Installing as an Upgrade

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

- Before installing this release as an upgrade, ensure you create a back-up of your Enterprise Server configuration. To do this, on the Enterprise Server Administration home page, click **Export** and then select **Export Enterprise Server configuration and Security Manager definitions**. This creates a backup folder in the `c:\programdata\micro focus\Enterprise Developer\MFDS`. You can restore the Enterprise Server configuration after installing this release - click Import on the Enterprise Server Administration home page.

### Enterprise Developer Installation Options

To install Enterprise Developer you run `edvs2012_30.exe` which contains a number of product `.msi` files (Windows Installer packages). When run, `edvs2012_30.exe` performs some initial system checks then sequentially installs the `.msi` files.



**Note:** The following applies to `edvs2012_30.exe` when installing the product for Visual Studio 2012. The following applies to `edvs2013_30.exe` when installing the product for Visual Studio 2013. The following applies to `edvs2015_30.exe` when installing the product for Visual Studio 2015.

`edvs2012_30.exe` can take a number of parameters, enabling you to specify a number of different types of installation:

- Standard Installation

**Format:**

`edvs2012_30.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-interactive Installation

**Format:**

`edvs2012_30.exe /passive`

**Summary:**

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

- Silent Installation

**Format:**

`edvs2012_30.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:**

```
edvs2012_30.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:**

```
edvs2012_30.exe /q RumbaCheckbox=1
```

**Summary:**

Full installation of Enterprise Developer and of the Micro Focus Rumba 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:

```
edvs2012_30.exe /?.
```

**Note:**

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

## Installing Enterprise Developer into Several Editions of Visual Studio 2017

Visual Studio 2017 is offered in different editions, Professional, Enterprise or Community Edition, that can all co-exist on the same machine. When you install Enterprise Developer, its setup file installs it into any edition of Visual Studio 2017 installed on the machine.

If, after Enterprise Developer is installed, you install a different edition of Visual Studio 2017, you can use the **MFVSIXINSTALL** utility (available in the Enterprise Developer installation directory) to plug Enterprise Developer into that edition.

To install Enterprise Developer in all editions of Visual Studio 2017:

1. Locate `MFVSIXInstall.exe` in `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\vsix`.
2. Run `MFVSIXInstall.exe`.

This starts the VSIX Installer utility that will install all the required components into the existing editions of Visual Studio 2017.

3. Click **Modify** in the **VSIX Installer** dialog box to start the installation.
4. Click **Close** when the installation is completed.

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

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

## 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:

```
./opt/microfocus/EnterpriseDeveloper/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`.

## 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_3.0_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="location" ] [ -ESadminID="User ID" ] [ -CASrtDir="location" ], where:`

- ESSysLog** Specifies a location in which the build will create the Enterprise Server System log file - for example, `-ESSysLog="/home/esuser/logs"`. The default location is `/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:

```
-silent -IacceptEULA
```

For example, execute:

```
[as root] setup_filename -silent -IacceptEULA
```

## After Installing

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

## On Windows

### Starting the Product

You are now ready to run Enterprise Developer:

#### Windows 7 and Earlier

- From your desktop, click **Start > All Programs > Micro Focus Enterprise Developer > Enterprise Developer for Visual Studio 2012**.
- From your desktop, click **Start > Visual Studio 2017**.

#### Windows 8, 8.1, and Windows Server 2012

- From the **Start** screen, click the **Enterprise Developer for Visual Studio 2012** tile.
- Click the **Visual Studio 2017** tile.

#### Windows 10 and Later

- Click **Start > Micro Focus Enterprise Developer > Enterprise Developer for Visual Studio 2012**.
- Click **Start > Visual Studio 2017**.

## Viewing the Product Help

To view the documentation installed with your product:

1. Start Visual Studio.
2. 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 Browser**.
3. Click **Help > View Help**.

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

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

If, after Enterprise Developer was installed, you do not see its product help in the Help Viewer, you need to install the documentation manually as follows:

1. In Visual Studio 2017, ensure the Visual Studio Help Viewer is installed.

See *Installing missing components of Visual Studio 2017* in *Software Requirements* for instructions on how to install it.

2. Start Visual Studio.
3. Click **Help > Add and Remove Content**.

This starts the Microsoft Help Viewer.

4. Click the **Manage Content** tab and click **Disk**.
5. Click the browse button next to **Disk** and navigate to the `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\Help` folder.
6. Select `helpcontentsetup.msha` and click **Open**.

This loads the Enterprise Developer documentation.

7. Click **Add** and then **Update**.

After the installation is complete, the Enterprise Developer product Help appears in the Help Viewer.



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

## Repairing

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

To repair your installation on versions of Windows Vista or later:

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

## Uninstalling

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

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

When you uninstall, the only files deleted are those that the installation software installed. If the product directory has not been removed, delete any unwanted files and subdirectories within it using Windows Explorer.



**Note:** The installer creates separate installations for Micro Focus Enterprise Developer, Enterprise Server for .NET, 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.

### 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_EnterpriseDeveloper3.0.sh` script in the `COBDIR/bin` directory.



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

To uninstall Micro Focus License Administration:

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

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

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

# Licensing Information



## Note:

- If you have purchased licenses for a previous release of this product, those licenses will also enable you to use this release.
- If you are unsure of what your license entitlement is or if you wish to purchase additional licenses, contact your sales representative or [Micro Focus SupportLine](#).

## To start Micro Focus License Administration

### Windows 7 and Earlier

- From your desktop, click **Start > All Programs > Micro Focus License Manager > License Administration**

### Windows 8, 8.1, and Windows Server 2012

- From the **Start** screen, click the **License Administration** tile

### Windows 10 and Later

- Click **Start > Micro Focus License Manager > License Administration**

## Installing licenses

You need either a license file (with a `.mflic` extension) or an authorisation code which consists of a 16-digit string of letters and numbers.

### If you have a license file

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

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

1. Start Enterprise Developer.
2. Click **Help > Micro Focus Product Help > Product Licensing** to open the **Product Licensing** dialog box.
3. Ensure **I have a full Enterprise Developer Team Edition license** is checked.

4. Click **Browse** next to the **License file** field.
5. Select the license file (which has an extension of `.mflic`), and then click **Open**.
6. Click **Authorize** to install the license.

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

## If you have an authorization code

### Authorizing your product when you have an Internet connection



#### Note:

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

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

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

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

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

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

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

The Micro Focus SupportLine Manual product authorization Web page is displayed.

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

## **To obtain more licenses**

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

# Updates and SupportLine

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

## Further Information and Product Support

Additional technical information or advice is available from several sources.

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

- The *Product Updates* section of the Micro Focus SupportLine Web site, where you can download fixes and documentation updates.
- The *Examples and Utilities* section of the Micro Focus SupportLine Web site, including demos and additional product documentation.
- The *Support Resources* section of the Micro Focus SupportLine Web site, that includes troubleshooting guides and information about how to raise an incident.

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



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

If you obtained this product directly from Micro Focus, contact us as described on the Micro Focus Web site, [www.microfocus.com](http://www.microfocus.com). 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 <http://community.microfocus.com>.
- The Micro Focus YouTube channel for videos related to your product - see <https://www.youtube.com/user/MicroFocusIntl>.

## Information We Need

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

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

On Windows, if you are reporting a protection violation you might be asked to provide a dump ( `.dmp` ) file. To produce a dump file you use the **Unexpected Error** dialog box that is displayed when a protection violation occurs. Unless requested by Micro Focus SupportLine, leave the dump setting as `Normal`

(recommended), click **Dump**, then specify a location and name for the dump file. Once the dump file has been written you can email it to Micro Focus SupportLine.

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

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

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

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

To run MFSupportInfo:

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

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

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

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

This creates a `.zip` archive, `MFSupportInfo_Log_MachineName_YYYY-MM-DD_HH-MM-SS.zip`, in the `%temp%` directory.

4. Send the diagnostic information to your Micro Focus SupportLine representative:

The following requires an Internet connection and an Email client:

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

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

## Creating Debug Files

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

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