# Micro Focus Enterprise Developer 2.2 Update 1 for Visual Studio

## Release Notes

**2014-06-20**

# Contents

# Micro Focus Enterprise Developer 2.2 Update 1 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.

**Micro Focus Heartbleed Update**

The OpenSSL library used in this product has been updated to version 1.0.1g to fix the "Heartbleed" vulnerability with TLS heartbeat requests.

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.

Micro Focus offers Enterprise Developer with the following licensing options that unlock different functionality:

| | |
|---|---|
| **Micro Focus Enterprise Developer Connect** | Enterprise Developer Connect is for customers looking to use modern and productive Eclipse-based tooling to develop mainframe applications directly on the mainframe. Close integration to mainframe configuration management systems and the ability to easily customize the Eclipse-based IDE to include mainframe-based tools and processes means developers can take full advantage of modern development tools without having to learn new development processes. |
| **Micro Focus Enterprise Developer** | Enterprise Developer is for customers looking to develop and modernize mainframe applications in a productive and modern Windows-based development environment, targeted for deployment onto an alternate server platform. Developers have the choice of either the Visual Studio or the Eclipse-based IDE and development and test tools are provided for all target environments currently supported by Micro Focus. |
| **Micro Focus Enterprise Developer for IBM zEnterprise** | Enterprise Developer for IBM zEnterprise gives customers the choice to develop directly on the mainframe or under Windows. Mainframe applications can be developed, maintained and modernized regardless of where they will be deployed, either back onto the mainframe or onto an alternative server environment. Support is provided for both the Visual Studio and Eclipse-based IDEs and for all the development and test tools for every target environment currently supported by Micro Focus - including z/Linux, AIX and x86 environments. Enterprise Developer for IBM zEnterprise combines all the capabilities of Enterprise Developer Connect and Enterprise Developer.<br><br>Full mainframe integration and the Application Workflow Manager are only available in the Eclipse-based IDE. |

In addition, this document contains information on workflow modelling extensions in the section *Enterprise Developer for IBM zEnterprise Workflow Modelling Extensions* .

**Note:** The Enterprise Developer Personal Edition option is not available with this release. You can use the Personal Edition with Enterprise Developer 2.1 Update 1 - you can register for it on the *Enterprise Developer Personal Edition section* on the Micro Focus Web site.

**Note:**

- Mainframe Access Server is only available with an Enterprise Developer or with an Enterprise Developer for IBM zEnterprise license and is not available with an Enterprise Developer Personal Edition license.

**Compiling for Enterprise Server or for Enterprise Server 2012**

Enterprise Developer for Visual Studio 2010 and Enterprise Developer for Visual Studio 2012 each target a different version of the COBOL run-time system - COBOL Server 2010 and Enterprise Server 2012 respectively.

Ensure that after you've edited the project in the preferred version of Visual Studio, you compile your source code in that version of Enterprise Developer which targets the version of the COBOL run-time in which you want your applications to run.

For example, if you build your application using Enterprise Developer for Visual Studio 2010 you cannot deploy the target files to Enterprise Server 2012; you must use COBOL Server 2010.

**Important:** 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 for Visual Studio 2010* in the product Help.

# Installation

## 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, it is recommended to have a minimum of 2GB of RAM.

The disk space requirements are, approximately:

**Windows**

| Platform | Enterprise Developer | Sentinel RMS License Manager |
|---|---|---|
| x86 Windows platforms | 450MB | 25MB |
| x64 Windows platforms | 550MB | 25MB |

**Note:** This includes the space needed to cache information locally so that you can modify the installation without the original source media.

**UNIX**

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

| Platform | Setup file size (MB) | Disk space required for the installation (GB) | Disk space required for running the product (MB) | Sentinel RMS license server (MB) |
|---|---|---|---|---|
| POWER running AIX | 414 | 1.66 | 828 | 33 |
| HP IA | 789 | 3.16 | 1580 | 61 |
| System Z running Red Hat Linux | 354 | 1.4 | 708 | 34 |
| x86-64 running Red Hat Linux | 372 | 1.48 | 744 | 40 |
| SPARC running Solaris | 442 | 1.77 | 884 | 38 |
| System Z running SuSE SLES | 359 | 1.44 | 718 | 34 |

| Platform | Setup file size (MB) | Disk space required for the installation (GB) | Disk space required for running the product (MB) | Sentinel RMS license server (MB) |
|---|---|---|---|---|
| x86-64 running SuSE SLES | 377 | 1.51 | 754 | 40 |

# Operating Systems Supported

**Note:** If you are using Enterprise Developer on a 64-bit operating system, you can produce either 32-bit or 64-bit applications.

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:**

- This product can be installed on earlier versions of Windows but it has not been tested on them.

# Software Requirements

**Windows:**

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

**Visual Studio IDE**

This product requires any of the following versions of Visual Studio:

- A full version of Microsoft Visual Studio 2010 or 2012 Premium, Professional, or Ultimate edition, or the respective version of Microsoft's Visual Studio Integrated Shell.

  **Note:**

  - Microsoft Visual Studio Express Edition is not supported.
  - You can download the Visual Studio Integrated Shell from the *Microsoft Download Center*. 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.

- If you do not have any of these versions of Visual Studio installed, the setup file will install the Visual Studio Integrated Shell.

- 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 4.0. This is included with the above versions of Visual Studio.
- Microsoft .NET Framework 4.5. This is included with Visual Studio 2012.

  **Note:**

  - Visual Studio 2010 Service Pack 1 is required if you are using Enterprise Developer for Visual Studio 2010 and Enterprise Developer for Visual Studio 2012 on the same machine. If you are connected to the Internet, the setup file downloads and installs Visual Studio 2010 Service Pack 1 automatically. If you do not have Internet access, you need to download Visual Studio 2010 Service Pack 1 on a machine that has Internet connection, and then copy the installer to your machine.

- In addition, when building a native COBOL project that contains resources you must replace the `cvtres.exe` in the `bin` and `bin64` directories of your Enterprise Developer installation with the version of the file which gets installed with Visual Studio 2010 SP1. You can download Service Pack 1 for Visual Studio 2010 from the *Microsoft Download Center*.

**UNIX/Linux:**

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.

- On Red Hat 6.*x*, you must have the following operating system libraries installed:

| All Enterprise Developer products | glibc-*.x86_64<br>glibc-*.i686<br>libgcc-*.x86_64<br>libgcc-*.i686<br>libstdc++-*.x86_64<br>libstdc++-*.i686 |
| --- | --- |
| **Additional libraries required to use the core_on_error runtime variable** | gdb - the gdb packages (for the GNU Project Debugger) can be installed from the install media for your OS. |
| **Additional libraries for Micro Focus Enterprise Developer Unix Components** | glibc-devel-*.x86_64<br>glibc-devel-*.i686 |

In addition, on IBM System z (390), you must have the following operating system libraries installed:

| **Additional libraries for Micro Focus Enterprise Developer Unix Components** | glibc-devel-*.s390<br>glibc-devel-*.s390x |
| --- | --- |

  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, Enterprise Edition (Java EE) 6 or Java 7 is required to execute COBOL JVM code and for native COBOL and Java interoperability. The earliest supported release of Java 6 is 1.6 Update 27. 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 1.6 is 1.6.0.13. 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 JDL 1.6 is Java 6.0.13. You can get the HP-UX Java JDK from *HP's Web site*.

- You need to set the JAVA_HOME environment variable. When installing the product, set this variable to a 32-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.

**Other Requirements**

⚠️ **Important:** This release requires version 10000.2.990 or later of the Micro Focus licensing software. 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 Licensing System 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. The following information specifies the third-party software required for each feature.

- *Application server support for interaction with Enterprise Server* on page 9
- *COBOL on Windows Azure* on page 10
- *Java Development Kit (JDK)* on page 10
- *Database Access* on page 10
- *Database Access - COBSQL (Pro*COBOL)* on page 10
- *Database Access - OpenESQL* on page 11
- *Database Access - HCO for SQL Server (HCOSS)* on page 12
- *Database Access - HCO for DB2 LUW* on page 14
- *Database Access - SQL Option for DB2* on page 14
- *Enterprise Server for .NET* on page 14
- *Micro Focus Rumba* on page 15
- *WebSphere MQ* on page 15
- *Windows Forms* on page 15

**Application server support for interaction with Enterprise Server**

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Java EE 5 and Java EE 6 are supported for the deployment of EJBs generated using the Interface Mapping Toolkit, as follows:

- Java EE 5 includes support for EJB 3.0 and Java Connector Architecture 1.5
- Java EE 6 includes support for EJB 3.1 and Java Connector Architecture 1.6

The following J2EE application servers are supported using the following JDKs:

| J2EE Application Servers | JDK (vendor) | Java EE |
|---|---|---|
| JBoss 5 | 1.5/1.6 (Oracle) | 5 |
| JBoss 6 | 1.6 (Oracle) | 6 |
| Oracle WebLogic 10 | 1.5 (Oracle) | 5 |
| Oracle WebLogic 12 | 1.6/1.7 (Oracle) | 6 |

| J2EE Application Servers | JDK (vendor) | Java EE |
|---|---|---|
| IBM WebSphere 7.0 | 1.5 (IBM) | 5 |
| IBM WebSphere 8.0 | 1.6 (IBM) | 6 |
| IBM WebSphere 8.5 | 1.6/1.7 (IBM) | 6 |

**COBOL on Windows Azure**

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Windows Azure requires additional software. See the Microsoft Windows Azure web site for a full list of the required software, but the following is a summary of the main prerequisites:

- Windows 7, Windows Vista® SP1 or higher, or Windows Server® 2008
- Visual Studio's Visual Web Developer feature
- Windows Azure Tools version 2.1 for Visual Studio - this includes the Windows Azure SDK
- Internet Information Services (IIS) 7.0 - this must be installed and enabled, with ASP.NET, which is not enabled by default

**Java Development Kit (JDK)**

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| | |
|---|---|
| **Native COBOL and Java Interoperability** | Oracle's Java Platform, Enterprise Edition (Java EE) 6 or Java 7 is required to execute COBOL JVM code and for native COBOL and Java interoperability. The earliest supported release of Java 6 is 1.6 Update 27. You can download Oracle's Java EE from *Oracle's Web site* and install it anywhere on your machine. |
| **Compiling Java** | Either the IBM or the Oracle Java Development Kit (JDK), version 1.5 or later, is required for compiling Java. |
| **Interface Mapping Toolkit (IMTK)** | **Restriction:** This feature applies only when the Enterprise Server feature is enabled. |
| | The JDK is required for generating Java interfaces from the Interface Mapping Toolkit or the `imtkmake` command. |

| | |
|---|---|
| **Java Beans** | Your Java client needs to be compiled with JDK 1.6 or greater. |
| **EJBs** | Use the same JDK vendor and version that is used by the application server. |

After installing the JDK, you need to set up your Java environment.

**Database Access**

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Before you can use Enterprise Developer to develop and deploy SQL applications that use COBSQL, HCO for DB2 LUW, HCO for SQL Server (HCOSS), or OpenESQL, ensure any third-party software prerequisites are installed and the environment is set properly.

**Database Access - COBSQL (Pro*COBOL)**

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**Note:** COBSQL (Pro*COBOL) is supported for native COBOL only.

| Availability | | | |
|---|---|---|---|
| **Feature/Platform** | **32-bit** | | **64-bit** |
| x86-64 running Windows | X | | X |

**XA Switch Module** The Oracle XA switch module is provided for COBSQL (Pro*COBOL), and is available on the same platforms as are indicated in the *Availability* section above.

**Certification of RDBMS Precompilers for Native COBOL** Certification of RDBMS precompilers with Micro Focus products is the responsibility of the RDBMS vendor, rather than Micro Focus. Certification information can be found within the relevant Oracle documentation. If you have an Oracle MetaLink account (*http://metalink.oracle.com*), document # 43208.1 provides details of all language compilers certified by Oracle for use with their precompilers.

**Preprocessors** COBSQL supports the following database preprocessors:

- Sybase Open Client Embedded SQL/COBOL Version 11.1 or later
- Oracle Pro*COBOL Version 11.1 (11gR1) or later
- Informix Embedded SQL/COBOL Version 7.3 or later

**Compiling** On x86 and x86-64 platforms, when compiling with COBSQL for use with Oracle, do not use the COBSQL directive option NOMAKESYN, since this directive results in COMP host variables, and on Intel platforms these are incompatible with the native byte order expected by Oracle.

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**Database Access - OpenESQL**

| Availability | | | |
|---|---|---|---|
| **Feature/ Platform** | **Native COBOL 32-bit** | **Native COBOL 64-bit** | **PL/I 32-bit** |
| x86-64 running Windows | X | X | X |

**XA Switch Modules** The ODBC One-phase Commit and the SQL Server XA switch modules are provided and are available on the same platforms as are indicated in the *Availability* section above.

To build the SQL Server XA module, you must have the Windows Software Development Kit (SDK) installed for your version of Windows.

**Native COBOL, .NET Managed COBOL, and PL/I**
- OpenESQL supports access to relational databases using ODBC 3.0-compliant drivers
- Refer to your driver vendor's documentation to determine whether your driver is suitable for use with OpenESQL

**.NET Managed COBOL**
- OpenESQL has been tested against the following ADO.NET data providers:

  - Microsoft provider for SQL Server
  - Microsoft provider for Oracle
  - IBM DB2
  - Oracle Data Provider for .NET (ODP.NET)
  - OleDb
  - Managed ODBC .NET providers

- Dynamic SQL using the SQL Descriptor Area (SQLDA) is not currently supported for OpenESQL applications compiled with the SQL(DBMAN=ODBC) directive.

**SQL CLR Integration**

The following software is required to use the SQL CLR integration feature, which is specifically for the development and deployment of COBOL stored procedures under Microsoft SQL Server.

Projects based on the SQL CLR Database Project template require:

- Visual Studio Professional 2010, Premium 2010, or Ultimate 2010
- SQL Server 2008 R2 targeting .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)

Projects based on the SQL Server Database Project template require:

- All of the following:
  - Visual Studio Shell 2010, Visual Studio Professional 2010, Premium 2010, or Ultimate 2010
  - Subsequent installation of:
    - Visual Studio 2010 SP1 (for any previously installed edition of Visual Studio 2010)
    - Microsoft SQL Server Tools (SSDT SDK)
- Any of the following:
  - SQL Server 2008 R2 targeting .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)
  - SQL Server 2012 targeting .NET CLR v4.0 framework (4.0, 4.5) or .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)
  - SQL Server Azure targeting .NET CLR v4.0 framework (4.0, 4.5) or .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)

**SQL CLR Integration**

The following software is required to use the SQL CLR integration feature, which is specifically for the development and deployment of COBOL stored procedures under Microsoft SQL Server.

Projects based on the SQL Server Database Project template require:

- Either of the following:
  - Visual Studio Shell 2012 and Microsoft SQL Server Tools (SSDT SDK)
  - Visual Studio Professional 2012, Premium 2012, or Ultimate 2012

- Any of the following:
  - SQL Server 2008 R2 targeting .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)
  - SQL Server 2012 targeting .NET CLR v4.0 framework (4.0, 4.5), or .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)
  - SQL Server Azure targeting .NET CLR v4.0 framework (4.0. 4.5) and also .NET CLR v2.0 frameworks (2.0, 3.0, 3.5)

⚠️ **Important:** The SQL CLR Database project template is not supported with Visual Studio 2012. Projects based on the SQL CLR Database project template are automatically upgraded to use the SQL Server Database project template when opened in Enterprise Developer for Visual Studio 2010.

**Database Access - HCO for SQL Server (HCOSS)**

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| Microsoft SQL Server | SQL Server 2008 R2 or SQL Server 2012, Developer or Enterprise Editions, including Microsoft SQL Server Management Studio. | |
|---|---|---|
| **Database Migration** | • Microsoft .NET Framework 4.0 <br> • Microsoft OLE DB Provider for DB2, available in the SQL Server 2008 R2 or 2012 Feature Pack <br><br>    **Note:** Be sure to configure the OLE DB Provider to connect to the mainframe. See your Microsoft documentation for details. <br><br> • Mainframe DB2 <br><br> **Note:** <br> • We support only the mainframe DB2 versions that are currently under IBM support. <br> • If you intend to develop applications on your local machine, but deploy applications to a SQL Server database on a remote machine, you can install SQL Server Native Client 10.x (or later) for ODBC connectivity on your local machine instead of installing SQL Server. For information on configuring a deployment machine, see the section *Deploying Native Applications* below. | |
| **Application Migration** | **ADO.NET applications** | ADO.NET applications require either of the following combinations: <br><br> • SQL Server 2008 R2 and SqlClient Data Provider in .NET Framework 3.5 <br> • SQL Server 2012 and SqlClient Data Provider in .NET Framework 3.5 or 4.0 (4.0 is preferred)3.5, 4.0, or 4.5 (4.x is preferred) |
| | **COBOL Stored Procedures** | See the requirements specified in the *SQL CLR Integration* section under *Database Access - OpenESQL* in this topic. |
| **Deploying Native Applications** | **Development Machine** | • Enterprise Developer for Visual Studio 2010 <br> • If SQL Server 2008 R2 or 2012 is not installed, you must have Microsoft SQL Server 2008 R2 or 2012 Native Client installed |
| | **Development SQL Server Machine** | SQL Server 2008 R2 or 2012 <br><br>    **Note:** This can be the same machine as the development machine, but is not required to be |
| | **Deployment Machine** | • Enterprise Server or Enterprise Test Server installed <br> • If SQL Server 2008 R2 or 2012 is not installed, you must have Microsoft SQL Server 2008 R2 or 2012 Native Client installed <br><br> If you want to bind your application from the deployment machine, install the following software in addition: <br><br> • Microsoft .NET 3.5 framework, or later <br> • SQL Server 2008 R2 or 2012 System CLR Types <br> • SQL Server 2008 R2 or 2012 Shared Management Objects |
| | **Deployment SQL Server Machine** | SQL Server 2008 R2 or 2012 <br><br>    **Note:** This can be the same machine as the deployment machine, but is not required to be |

**Database Access - HCO for DB2 LUW**

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**Availability**

| Feature/<br>Platform | Native COBOL<br>32-bit | Native COBOL 64-bit | PL/I 32-bit |
|---|---|---|---|
| x86-64 running Windows | X | X | X |

**XA Switch Module**  The DB2 XA switch module is provided and is available on the same platforms as are indicated in the *Availability* section above.

**Certification of RDBMS Precompilers for Native COBOL**  Certification of RDBMS precompilers with Micro Focus products is the responsibility of the RDBMS vendor, rather than Micro Focus. You can find IBM document certification information for DB2/COBOL applications within the IBM Information Center for DB2, in the topic *Support for database application development in COBOL*.

**Preprocessor**  HCO for DB2 LUW supports the following database preprocessors:

- IBM DB2 LUW Version 9.5 or later
- IBM DB2 Connect Version 9.5 or later

**Host Compatibility Option (HCO)**  Host Compatibility Option requires that you have one of the following software products installed and configured:

- IBM Database Connect
- IBM DB2 LUW Personal Edition or DB2 Express-C
- DB2 LUW Workgroup or Enterprise Edition

You must also install the DB2 Application Development Client (formerly called DB2 SDK) or you will not be able to compile any DB2 programs.

**Database Access - SQL Option for DB2**

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| Feature/Platform | 32-bit |
|---|---|
| x86-64 running Windows | X |

**XA Switch Module**  XDB XA switch modules are provided and are available for the Windows x86-64 32-bit platform.

**Enterprise Server for .NET**

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- Microsoft .NET Framework 4.0
- Microsoft SQL Server 2008 R2. For beta or development installations, SQL Server Express 2008 R2 is sufficient.

  You can download Microsoft's SQL Server from *http://www.microsoft.com/sqlserver/en/us/get-sql-server/try-it.aspx*.
- A TN3270 terminal emulator. Micro Focus Rumba is supplied with this product.

  **Note:** You also need to enable IIS and some additional Windows features. Read the *Quick Start* section in your Enterprise Server for .NET help for further instructions on how to set up your operating environment.

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**Micro Focus Rumba**

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- On Windows 8, in order to install Micro Focus Rumba you must have the Microsoft .NET Framework 3.5 Service Pack 1 installed.

**WebSphere MQ**

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IBM WebSphere MQ version 7 and later.

**Windows Forms**

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- Microsoft Visual Studio is required for using the Interface Mapping Toolkit (IMTK) to generate Windows Forms and ASP.NET Web site test clients.
- Microsoft Internet Information Service (IIS) is also required for generating Windows Forms test clients.

# 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. The following information specifies the third-party software required for each feature.

- *Application server support for JVM COBOL* on page 15
- *Application server support for interaction with Enterprise Server* on page 16
- *Java Development Kit (JDK)* on page 17
- *Database Access* on page 17
- *Database Access - COBSQL (Pro*COBOL)* on page 17
- *Database Access - OpenESQL* on page 18
- *Database Access - HCO for DB2 LUW* on page 19
- *WebSphere MQ* on page 15

**Application server support for JVM COBOL**

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The following application servers are supported using the following JDKs:

| Application Servers | JDK version | Containers support version |
|---|---|---|
| Tomcat 7.0.39 | 1.6 / 1.7 | Servlets 2.5 |
| JBoss 6.1 | 1.6 / 1.7 | Servlets 2.5 |
| WebLogic 12.1.1 | 1.6 / 1.7 | Servlets 2.5 |
| WebLogic 12.1.1 on AIX 6.1 | 1.6.0 SR10 FP1 / 1.7 Release 1 | Servlets 2.5 |
| WebSphere 8.5 | 1.6 / 1.7 | Servlets 2.5 |
| WebSphere 8.5 on AIX 6.1 | 1.6.0 SR10 FP1 / 1.7 Release 1 | Servlets 2.5 |

**Note:**

- On AIX and zLinux, you need to have IBM's JDK. The earliest supported release of IBM's JDK 1.6 is 1.6.0.13. 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 JDL 1.6 is Java 6.0.13. You can get the HP-UX Java JDK from *HP's Web site*.
- On all other platforms, you need Oracle's JDK. The earliest supported release of Oracle's JDK 1.6 is 1.6.027. You can download Oracle's JDK from *Oracle's Web site*.

**Application server support for interaction with Enterprise Server**

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Java EE 5 and Java EE 6 are supported for the deployment of EJBs generated using the Interface Mapping Toolkit, as follows:

- Java EE 5 includes support for EJB 3.0 and Java Connector Architecture 1.5
- Java EE 6 includes support for EJB 3.1 and Java Connector Architecture 1.6

The following J2EE application servers are supported using the following JDKs:

| J2EE Application Servers | JDK (vendor) | Java EE |
|---|---|---|
| JBoss 5 | 1.5/1.6 (Oracle) | 5 |
| JBoss 6 | 1.6 (Oracle) | 6 |
| Oracle WebLogic 10 | 1.5 (Oracle) | 5 |
| Oracle WebLogic 12 | 1.6/1.7 (Oracle) | 6 |
| IBM WebSphere 7.0 | 1.5 (IBM) | 5 |
| IBM WebSphere 8.0 | 1.6 (IBM) | 6 |
| IBM WebSphere 8.5 | 1.6/1.7 (IBM) | 6 |

The availability of resource adapters for these Application Servers differs between UNIX platforms. The following table indicates where support is available for each platform:

| Feature/ Platform | JBoss 5 | JBoss 6 | Websphere 7.0 | Websphere 8.0 | Websphere 8.5 | Weblogic 10 | Weblogic 12 |
|---|---|---|---|---|---|---|---|
| AIX 6.1 on RS6000 | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |
| HP/UX 11.31 on Intel IA64 | 32- and 64-bit | 32- and 64-bit | 64-bit | 64-bit | 64-bit | 32- and 64-bit | 32- and 64-bit |
| Red Hat EL 6.2 on IBM390 | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |
| Red Hat EL 5.5 on AMD Opteron | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |
| Solaris 11 on AMD Opteron | 32- and 64-bit | 32- and 64-bit | | | | 32- and 64-bit | 32- and 64-bit |
| Solaris 10 on SPARC | 32- and 64-bit | 32- and 64-bit | | | | 32- and 64-bit | 32- and 64-bit |

| Feature/<br>Platform | JBoss 5 | JBoss 6 | Websphere<br>7.0 | Websphere<br>8.0 | Websphere<br>8.5 | Weblogic 10 | Weblogic 12 |
|---|---|---|---|---|---|---|---|
| SuSE SLES<br>11 SP1 on<br>IBM390 | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |
| SuSE SLES<br>11 on AMD<br>Opteron | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit | 32-bit |

**Java Development Kit (JDK)**

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| Compiling Java | Either the IBM or the Oracle Java Development Kit (JDK), version 1.5 or later, is required for compiling Java. |
|---|---|
| Interface Mapping Toolkit (IMTK) | **Restriction:** This feature applies only when the Enterprise Server feature is enabled.<br><br>The JDK is required for generating Java interfaces from the Interface Mapping Toolkit or the `imtkmake` command. |
| EJBs | Use the same JDK vendor and version that is used by the application server. |

After installing the JDK, you need to set up your Java environment.

**Database Access**

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Before you can use Enterprise Developer to develop and deploy SQL applications that use COBSQL, HCO for DB2 LUW, or OpenESQL, ensure any third-party software prerequisites are installed and the environment is set properly.

**Database Access - COBSQL (Pro*COBOL)**

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**Note:** COBSQL (Pro*COBOL) is supported for native COBOL only.

| Availability | Feature/Platform | 32-bit | 64-bit |
|---|---|---|---|
| | x86-64 running Red Hat Linux | X | X |
| | x86-64 running SuSE Linux | X | X |
| | IBM System p running AIX | X | X |
| | IBM System z running SuSE Linux | X | X |
| | Itanium running HP-UX | X | X |
| | x86-64 running Solaris | X | X |

| Feature/Platform | 32-bit | 64-bit |
|---|:---:|:---:|
| SPARC running Solaris | X | X |

**XA Switch Module**

The Oracle XA switch module is provided for COBSQL (Pro*COBOL), and is available on the same platforms as are indicated in the *Availability* section above.

**Certification of RDBMS Precompilers for Native COBOL**

Certification of RDBMS precompilers with Micro Focus products is the responsibility of the RDBMS vendor, rather than Micro Focus. Certification information can be found within the relevant Oracle documentation. If you have an Oracle MetaLink account (*http://metalink.oracle.com*), document # 43208.1 provides details of all language compilers certified by Oracle for use with their precompilers.

**Preprocessors**

COBSQL supports the following database preprocessors:

- Sybase Open Client Embedded SQL/COBOL Version 11.1 or later
- Oracle Pro*COBOL Version 11.1 (11gR1) or later
- Informix Embedded SQL/COBOL Version 7.3 or later

**Compiling**

On x86 and x86-64 platforms, when compiling with COBSQL for use with Oracle, do not use the COBSQL directive option NOMAKESYN, since this directive results in COMP host variables, and on Intel platforms these are incompatible with the native byte order expected by Oracle.

**Executing**

On HP-UX, to execute an application precompiled using Pro*COBOL (or COBSQL) after you have created a callable shared object of Oracle DBMS routines, you need set an environment variable, LD_PRELOAD, to point to the Oracle client callable shared object, for example:

```
LD_PRELOAD=$ORACLE_HOME/libdir/libclntsh.so
export LD_PRELOAD
```

where *libdir* is:

- lib32 for 32-bit environments
- lib for 64-bit environments.

A script is available that creates an executable run-time system or a callable shared object containing Oracle support. You can find the script in the Micro Focus Knowledge Base article titled *Building and executing Pro*COBOL applications on UNIX*.

## Database Access - OpenESQL

**Availability**

| Feature/ Platform | Native COBOL 32-bit | Native COBOL 64-bit | PL/I 32-bit |
|---|:---:|:---:|:---:|
| x86-64 running Red Hat Linux | X | X | X |
| x86-64 running SuSE Linux | X | X | X |
| IBM System p running AIX | X | X | X |
| IBM System z running SuSE Linux | X | X | |

| Feature/<br>Platform | Native COBOL<br>32-bit | Native COBOL 64-bit | PL/I 32-bit |
|---|---|---|---|
| Itanium running HP-UX | X | X | |
| x86-64 running Solaris | X | X | |
| SPARC running Solaris | X | X | X |

**Native COBOL**
- OpenESQL supports access to relational databases using ODBC 3.0-compliant drivers
- Refer to your driver vendor's documentation to determine whether your driver is suitable for use with OpenESQL

**Database Access - HCO for DB2 LUW**

**Availability**

| Feature/<br>Platform | Native COBOL<br>32-bit | Native COBOL 64-bit | PL/I 32-bit |
|---|---|---|---|
| x86-64 running Red Hat Linux | X | X | X |
| x86-64 running SuSE Linux | X | X | X |
| IBM System p running AIX | X | X | X |
| IBM System z running SuSE Linux | X | X | |
| Itanium running HP-UX | | X | |
| x86-64 running Solaris | | | |
| SPARC running Solaris | X | | X |

**XA Switch Module**  The DB2 XA switch module is provided and is available on the same platforms as are indicated in the *Availability* section above.

**Certification of RDBMS Precompilers for Native COBOL**  Certification of RDBMS precompilers with Micro Focus products is the responsibility of the RDBMS vendor, rather than Micro Focus. You can find IBM document certification information for DB2/COBOL applications within the IBM Information Center for DB2, in the topic *Support for database application development in COBOL*.

**Preprocessor**  HCO for DB2 LUW supports the following database preprocessors:

- IBM DB2 LUW Version 9.5 or later
- IBM DB2 Connect Version 9.5 or later

| **Host Compatibility Option (HCO)** | Host Compatibility Option requires that you have one of the following software products installed and configured: |
|---|---|

- IBM Database Connect
- IBM DB2 LUW Personal Edition or DB2 Express-C
- DB2 LUW Workgroup or Enterprise Edition

You must also install the DB2 Application Development Client (formerly called DB2 SDK) or you will not be able to compile any DB2 programs.

**WebSphere MQ**

IBM WebSphere MQ version 7 and later.

# Installing Enterprise Developer for Visual Studio

## Downloading the Product

1. Use the download links in your Electronic Product Delivery email.

   For more information follow the links for the installation instructions and the End User License Agreement.

You can download Enterprise Developer for Visual Studio 2012 from the Micro Focus SupportLine Web site and from the *Product Updates* section.

## 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.
- Enterprise Developer is available in different IDE variants, each one of which is targeted by one specific variant of the development product:

  - Enterprise Server - the deployment environment for COBOL applications created with Enterprise Developer for Visual Studio 2010 or Enterprise Developer for Eclipse
  - Enterprise Server 2012 - the deployment environment for COBOL applications created with Enterprise Developer for Visual Studio 2012

  You can only deploy applications to the specific variant of Enterprise Server that is targeted by the Enterprise Developer variant used to build the applications. For example, if you build your application using Enterprise Developer for Visual Studio 2012, you can only deploy the target files to Enterprise Server 2012. The application will not run in Enterprise Server.

## Installation restrictions and requirements

Before starting the installation you should consider the following:

- If, when you install Enterprise Developer for Visual Studio 2010, the machine does not have Microsoft Visual C++ 2010 Redistributable Runtime already installed, it is installed as required by Enterprise Developer. The installation of Microsoft Visual C++ 2010 Redistributable Runtime adds a number of .dll files, without digital signatures, into the winsxs directory.

- If, when you install Enterprise Developer for Visual Studio 2012, 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 you are installing this as an upgrade, make sure that none of the product files are in use when you start the installation. Also, the Visual Studio Help Viewer must not be opened.
- 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.

- Before installing this product, make sure that any existing Micro Focus Directory Server (MFDS) or CCITCP2 Windows service (on Windows) from an existing product is stopped and uninstalled. On Windows, do this as follows:

  1. Stop the MFDS and CCITCP2, using either the Windows Service Management Console GUI (`services.msc`) or from a command line prompt by typing:

     ```
     net stop mf_ccitcp2
     ```

     Only one instance of the MFDS or CCITCP2 service can run on a Windows machine.
  2. Uninstall the MFDS or CCITCP2 service.

     For MFDS, from a command line prompt enter: `mfds -u`

     For CCITCP2: `ccitcp2 -u`

  To run an earlier version of MFDS as a service after you have installed a later version:

  1. Stop and uninstall the MFDS service, as described above.
  2. Reinstall the earlier version, as follows:

     a. Open an  Enterprise Developer command prompt.
     b. Install the service. Enter the following command: `mfds -i`
     c. Start the service. Enter the following command: `net start mf_ccitcp2`

     🖊 **Note:** The two versions use different paths for environment and registry values, so the list of configured enterprise servers might be different depending on which version has been started, since, by default, different MFDS data repositories are used.

  MFDS 5.1 and later are able to import or use Enterprise Server configuration data generated by earlier versions of MFDS, but 5.0 or earlier versions of MFDS might not be able to read data generated by later versions.

  It is possible to run MFDS from a command prompt ("mfds") rather than as a service, but by default the "mfcobol" port is used (86) and this can only be used by one process at a time

# Installing and Licensing Micro Focus Rumba

The Enterprise Developer installer includes Micro Focus Rumba 9.0 which you can optionally install. The license for Enterprise Developer enables you to use the mainframe components of Rumba (Rumba for Mainframe).

Before using the Enterprise Developer installer to install or update Rumba, please note the following:

- If you have the full, standalone version of Rumba installed on your machine, it is recommended that you use the standard ways to upgrade this version to Rumba version 9.0 or later.

  It is not recommended to use the Enterprise Developer 2.2 Update 1 setup file to update Rumba as you may lose your license for the full Rumba version.
- If you are installing Enterprise Developer 2.2 Update 1 onto a machine that does not have Rumba installed, it is recommended that you select the Rumba option and install this with Enterprise Developer.

This installs the components you need to establish a mainframe 3270 connection (Rumba for Mainframe) and a 30-day trial license for the full Rumba product. After the 30-day trial period completes you will still access Rumba for Mainframe components as part of your Enterprise Developer license.

- If you are installing Enterprise Developer 2.2 Update 1 as an upgrade to an existing licensed installation of Enterprise Developer that is using an authorization code issued before Enterprise Developer 2.1 Update 1 (released in April 2013), it is recommended that you do not update the Rumba components previously installed with the earlier version of Enterprise Developer.

  If you do want to update Rumba, then select this during the 2.2 Update 1 installation and then contact Micro Focus SupportLine and ask for the Enterprise Developer 2.2 Update 1 authorization code. This will replace your existing 2.1 authorization code and will enable the updated version of Rumba.

# Installing as an Upgrade

This release will update existing installations of Enterprise Developer 2.2.

- Before installing this release as an upgrade to an existing installation of the previous version 2.2 of the product, you must uninstall any HotFixes of 2.2. This is to avoid some problems that might result in files not being installed.
- 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.

# Installing

> **Note:**
>
> - Before installing, check *Installation Restrictions and Requirements*.
> - See *Installing as an Upgrade* first for important information when upgrading an existing installation of Enterprise Developer.
> - This version of the product is a full install.

To install this product:

1. Run the `edvs2010_221.exe` (`edvs2012_22.exe` when installing the product for Visual Studio 2012 when installing the product for Visual Studio 2013) file 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.

> **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 Microsoft's known problem. 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.

# Enterprise Developer Installation Options

To install Enterprise Developer you run `edvs2010_221.exe` which contains a number of product `.msi` files (Windows Installer packages). When run, `edvs2010_221.exe` performs some initial system checks then sequentially installs the `.msi` files.

**Note:** The following applies to `edvs2012_22.exe` when installing the product for Visual Studio 2012. The following applies to `edvs2013_22.exe` when installing the product for Visual Studio 2013.

`edvs2010_221.exe` can take a number of parameters, enabling you to specify a number of different types of installation:

- Standard Installation

   **Format:**
   ```
   edvs2010_221.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:**
   ```
   edvs2010_221.exe /passive
   ```
   **Summary:**
   Full installation, but the components are installed non-interactively using default options and directories.
- Silent Installation

   **Format:**
   ```
   edvs2010_221.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:**
   ```
   edvs2010_221.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:**
   ```
   edvs2010_221.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:
`edvs2010_221.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.

# Microsoft Terminal Server

You can use this product with Microsoft Terminal Server but note that a separate end-user license is required for each user who accesses it, even if the product is running on a single machine. See your *End User License Agreement*.

Microsoft Terminal Server is an environment for running multiple instances of a single-user product. It is not a platform where a single-user product can be made to perform as a multi-user product.

To install onto a terminal server:

- Log on to the physical terminal server with a user ID that has administrator privileges.
- Use **Control Panel** > **Programs** and follow the instructions on the screen.

When you install the product on Microsoft Terminal Server or similar terminal software, do not execute more than one installation at the same time.

When you install Microsoft Terminal server, you must assign a unique port address to each user. Then the very first time that each user logs into Enterprise Developer and starts the terminal server, they should:

1. Select **Options** > **Project** > **Port address for Web Server**.
2. Type in the assigned port address.

This is necessary because the default port address for the Web server is 80. Once this has been allocated to the first user, when the next user attempts to start the Web server, the software recognizes that this port is in use and rejects the attempt. Consequently each user requires an individual port address.

# Installing from a Server

There are two methods for installing this product on users' machines using a server. You can:

- Copy the product onto the server and then use Setup under control of a third-party software distribution package, such as Microsoft's Systems Management Server (SMS), to install the product onto multiple users' machines.

  This method of installation and the associated file are not supported by Micro Focus. They are provided on an "as is" basis and have not been tested in any form. You can use them at your own discretion.
- Install onto the server. Then users run Setup to install from the server onto their own machines.

Both methods give you control of what options the user can install and mean you do not have to send the installation media to every user, as they install from the server instead.

# Windows Compatibility Mode

In Windows Vista and Windows Server 2008, if you have problems starting Enterprise Server instances using the Micro Focus Enterprise Server Administration HTML GUI, ensure that none of the Enterprise Server program files are configured to use a Windows compatibility mode. You can check for compatibility modes by examining the file properties for the program file using Windows Explorer:

1. Open the **Properties** dialog box for the file.
2. Click the **Compatibility** tab.
3. Ensure that **Run this program in compatibility mode for** is not checked.
4. Click **Show settings for all users** and ensure that **Run this program in compatibility mode for** is not checked.

**5.** Click **OK** on both dialogs to update the file properties.

Verify that `<install-dir>\base\bin\mfds.exe` is not set to run in a compatibility mode.

- For 32-bit Enterprise Server, check `bin\cas*.exe` and `bin\mfcs.exe`
- For 64-bit Enterprise Server, check `bin\win64\cas*.exe` and `bin\win64\mfcs.exe`.

# After Installing

You are now ready to run Enterprise Developer. From the Windows taskbar click **Start > All Programs > Micro Focus Enterprise Developer > Enterprise Developer for Visual Studio *nnnn***.

> **Note:** The Start menu is not available on Windows 8 and Windows Server 2012. You use the Start screen to invoke programs.

> **Note:** For applications created with earlier Micro Focus products or earlier versions of Enterprise Developer, note the following:

| | |
|---|---|
| **Database Access** | Managed applications using SQL(DBMAN=ODBC) that were compiled in Enterprise Developer 2.1 Update 1 must be recompiled in Enterprise Developer 2.2 Update1. |
| **Existing Applications** | 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 for Visual Studio 2010* in the product Help. |

Please refer to the *Start Here* and *Product Information* sections in your product Help. Here, you will find information on getting started including tutorials and demonstration programs.

> **Note:**
> - The first release of Visual Studio 2010 has a browser-based help system, Microsoft Help Viewer 1.0, which does not include an index for the locally-installed help. Navigation of the content is only available using the table of contents and Search and the help contents for the Help system does not expand and collapse in the same way as previous Help systems.
> - If you have problems trying to view the Micro Focus help, ensure that the Visual Studio Help Library is pointing to local help. From the Visual Studio menu click **Help > Manage Help Systems > Choose online or local help** and check the **I want to use local help** button.
> - Visual Studio 2010 SP1 provides an upgrade of the help system, Microsoft Help Viewer 1.1, which provides a stand-alone help viewer with an index and a fully expandable table of contents.
> - If you do not want to install Visual Studio 2010 SP1, you can install some third-party tools that enable the index or the fully expanding table of contents. For more information, see the topic *Help on Help*.
>
> - To view the help in Visual Studio 2012, 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**.
> - For full details of the Visual Studio 2012 Help system, see the locally installed Microsoft Help Viewer 2.0 Help, which is available from Help menu in the IDE.
> - On Windows 8 and Windows Server 2012, an issue with Microsoft Help Viewer 2.0 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**.

# Installing Micro Focus Enterprise Developer Unix Components

✎ **Note:**

- Micro Focus Enterprise Developer Unix Components is only available with an Enterprise Developer or Enterprise Developer for IBM zEnterprise license and is not available with an Enterprise Developer Personal Edition license.

## Downloading the Product

1. Use the download links in your Electronic Product Delivery email.

   For more information follow the links for the installation instructions and the End User License Agreement.

## Installing

✎ **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 affects 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`.

These are the steps to install this product:

1. Give execute permissions to the setup file:
   ```
   chmod +x setup_entdev_2.2_update1_platform
   ```
2. Run the installer from the Process User ID login:
   ```
   ./setup_entdev_2.2_update1_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).

   To install in a different location use the `-installlocation="Location"` parameter to specify an alternative directory location. For example:
   ```
   ./setup_entdev_2.2_update1_platform -installlocation="full path of new
   location"
   ```

**Note:** You can use variables or the tilde syntax for the path for `-installlocation`. For example, the following examples are equivalent:

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

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

```
-installlocation="~/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.

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, `-EDadminID="esadm"`. The default user ID is the one that runs the installer. |
| **-CASrtDir** | Specifies the location were the Enterprise Server run-time system files are placed - for example, `-CASrtDir="/home/esuser/casrt/es"`. The default location is `/var/mfcobol/es`. |

**Note:**

- 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_2.2_update1_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.

1. To set up your product, execute:

```
. /opt/microfocus/EnterpriseDeveloper/bin/cobsetenv
```

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

```
cob -V
```

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

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

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

# 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 the application installation is complete you can install the license silently by executing the following commands:

| | |
|---|---|
| **If you have access to the Internet and an authorization code** | Run the following as root:<br><br>```cd /var/microfocuslicensing/bin```<br>```./cesadmintool.sh -authorize AuthorizationCode``` |
| **If you don't have access to the Internet but have a file from Micro Focus that contains the license string** | Run the following as root:<br><br>```cd /var/microfocuslicensing/bin```<br>```./cesadmintool.sh -install FileName```<br><br>where *FileName* is the name of the text file that contains all the license strings to be used. |

# UNIX and Linux Installer Issues

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

- Download the 32-bit Java distribution in a compressed .tar format from the Oracle Web site.
- Untar the distribution into a location different from the one used for the 64-bit Java version. For example, untar in `/usr/local/java32` and not in `/usr/local/java`.
- Set JAVA_HOME and LD_LIBRARY_PATH to the 32-bit version of Java so that it is used to install and run Enterprise Developer.

| | |
|---|---|
| **License Infrastructure Installer** | • On some Solaris platforms, you can receive the following error message when SafeNet license server needs to be installed or upgraded on your machine: |

```
tar: /safenet.tar: No such file or directory
```

To resolve this issue, wait for the installation to complete and then perform the following:

**1.** Navigate to the `safenet` directory in the COBDIR location.
**2.** With superuser permissions execute: `./MFLicenseServerInstall.sh`

- 🖊 **Note:** The following information applies when you are installing on Red Hat Enterprise Linux (RHEL) 7. (RHEL 7 is a beta version and support for it is a technical preview only).

Certain configuration changes in RHEL 7 (such as the `/etc/inittab` file no longer available) required a change in the MF SafeNet license installer for this platform and the way you can manually manage the licensing service.

By default, the MF SafeNet licensing service is still configured so that it starts automatically when starting your machine. Only on RHEL 7, you must use the `systemctl` command available with the OS if you need to override the default behaviour – for example, if you do not want run the MF SafeNet licensing service at start-up or if you do not want the service to automatically start when you are configuring trace levels.

1. Create a file, MFSafeNet.service, in `/usr/lib/systemd/system/` with the following contents:

```
----------- start of /usr/lib/systemd/system/
MFSafeNet.service -----------
    [Unit]
    Description=Micro Focus SafeNet licensing daemons.
    Documentation=http://supportline.microfocus.com

    [Service]
    Type=forking
    ExecStart=/var/microfocuslicensing/bin/startboth.sh
    ExecStop=/var/microfocuslicensing/bin/stopboth.sh
    Restart=no

    [Install]
    WantedBy=multi-user.target
-----------  end of /usr/lib/systemd/system/
MFSafeNet.service  -----------
```

2. Use the systemctl command to manage the SafeNet service:

```
[ asroot ] systemctl option MFSafeNet
```

Where some of the values that *option* can take are:

| | |
|---|---|
| **reenable** | Installs the SafeNet service. |
| **is-enabled** | Checks the status of the SafeNet service. Does not require root privileges. |
| **start** | Starts the SafeNet service. |
| **stop** | Stops the SafeNet service. |
| **restart** | Restarts the SafeNet service. |
| **disable** | Disables the SafeNet service so it does not start when the machine is booted. |
| **enable** | Enables the SafeNet Service so it starts when the machine is booted. |

For more information about systemctl, refer to the help available with the RHEL OS.

**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.

## Repairing on UNIX

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

# Installing Mainframe Access Server

✎ **Note:** Mainframe Access Server is only available with an Enterprise Developer or with an Enterprise Developer for IBM zEnterprise license and is not available with an Enterprise Developer Personal Edition license.

### Introduction

The installation process for Mainframe Access Server (MFA) uses a single FTP operation to transfer all of the mainframe software into a partitioned data set that you pre-allocate. When this transfer is complete, the remaining installation activities are all done on the mainframe. You customize and submit the pre-built FRESTORE job to restore the product data sets from the uploaded files and then continue with customization steps to create an operational Mainframe Access Server.

### Requirements

- IBM TCP/IP 4.0, or Interlink TCP/IP 3.1 or higher
- Two APPLIDs, two TCP/IP ports
- Availability of APF security authorization support personnel
- Access to a network share with acceptable space for source and data, as well as the ability to access the IP address and ports used to access MFA
- The following installation-specific variable information:

| Variable | Description |
| --- | --- |
| *drive* | |
| *userid* | TSO user-ID for FTP to your mainframe |
| *pswd* | TSO password for the FTP user-ID |
| *your.mainframe.name* | TCP/IP host name or IP address of your mainframe |
| *prodhlq* | A NEW high level qualifier that will be assigned for all Host Connectivity data sets when the new Mainframe Access product is installed. These are NOT existing product data sets, but rather brand new files that you will be creating for this base version. |

⚠ **Important:** The installation of a new version of MFA creates new product run-time data sets before the upgrade is applied. Any existing Host Connectivity 3.01 libraries remain intact, and can be used for fallback. If you prefer to retain your former production library names and re-use your existing prodhlq, rename your old libraries beforehand.

Make a note of the maintenance level of your current Mainframe Access Server. Messages MFM0001I and MFM0014I on the syslog and XDBOUT sysout data set show the maintenance

level at startup. You may need to know what level you are upgrading from when you complete post-installation customizations for this upgrade.

**Install Mainframe Access Server**

In the instructions that follow, the information that you must provide is shown as one of the variable names from the table of information in the previous section. For example, if your high-level qualifier (*prodhlq*) value is MY.MFA, then substitute MY.MFA for *prodhlq*.

Follow these steps to load Mainframe Access Server:

1. Download the installation file from the link in your Electronic Product Delivery email and extract its contents to a directory on the PC.
2. On the mainframe, allocate a new partitioned data set named *prodhlq*.UPLOAD to receive the uploaded files. Use the following data set characteristics for this upload library:

```
DSORG=PO                      <=== PDS (partitioned data set)
RECFM=FB                      <=== record format fixed and blocked
LRECL=80                      <=== 80 character record size
BLKSIZE=3120                  <=== 3120 character block size
SPACE=(3120,(3500,500,50))    <=== allocate blocks (BLKS) size 3120
                                   3500 primary blocks
                                   500 secondary blocks
                                   50 directory blocks
```

3. On the PC, issue the following FTP commands. The actual text of the FTP prompts and responses that you see may differ slightly from those shown in this example.

   a. Start FTP:

   ```
   C:\>ftp your.mainframe.name
   Connected to your.mainframe.name.
   220-FTPD1 IBM FTP CS/390 VxRy at YOUR.MAINFRAME.NAME, hh:mm:ss
   220 Connection will close if idle for more than 5 minutes.
   User (your.mainframe.name:(none)): userid
   331 Send password please.
   Password: pswd
   230 userid is logged on. Working directory is "userid.".
   ```

   b. Change the working directory on the mainframe to be the upload library that you allocated:

   ```
   ftp> cd 'prodhlq.UPLOAD'
   250 The working directory "hlq.UPLOAD" is a partitioned data set.
   ```

   c. Set file transfer type to binary:

   ```
   ftp> binary
   200 Representation type is Image
   ```

   d. Set FTP prompting off to transfer all files without interruption:

   ```
   ftp> prompt
   Interactive mode Off.
   ```

   e. Transfer all files from the extracted \Upload directory to members in the *prodhlq*.UPLOAD library:

   ```
   ftp> mputdrive:\upload\f*
   200 Port request OK.
   125 Storing data set prodhlq.UPLOAD(Fxxxxxxx)
   250 Transfer completed successfully.
   ftp: xxxx bytes sent in x.xx seconds (xxx.xx Kbytes/sec)
   .
   .
   .
   ```

   f. When `mput` has transferred all files the `ftp>` prompt appears. End the FTP connection:

   ```
   ftp> quit
   221 Quit command received. Goodbye.
   ```

   g. On the mainframe, verify that all files transferred successfully and that for each Fxxxxxxx file in the \Upload directory there is a corresponding member in the *prodhlq*.UPLOAD data set. There should be 10 members, F1 through to F9 and FRESTORE.

4. On the mainframe, edit member FRESTORE in the upload library, *prodhlq*.UPLOAD. Follow the instructions in that member to customize the JCL and then submit that job to restore the product libraries from the uploaded files and populate your new product runtime libraries.

5. Start Mainframe Access Server.

### After installation

Since the program libraries can change between versions, it is necessary to either create new procedures, or back up the old procedures, and at least modify the DSNQUAL=*prodhlq* within your MFA sample started task procedures as provided by Micro Focus. The *prodhlq*.LOADLIB and *prodhlq*.SASC.LINKLIB must both be authorized.

Verify successful maintenance application by checking the Mainframe Access Server startup message:

```
MFM0001I: Mainframe Access V4.00 (BASE ) is active
```

The "(BASE )" indicates the product maintenance level. Also check for "V4.00" in the Mainframe Access Data Connect server startup message:

```
MFA303I MFA/DATACONNECT V4.00 - BASE COPYRIGHT (C) 1987-2012 MICRO FOCUS...
```

When you are satisfied with the new version installation you may delete the UPLOAD data set from your system.

### New parameters and members in the CNTL samples data set

The following updated members are found in the CNTL data set.

| | |
|---|---|
| MFA | sample MFA started task |
| MFAS | *new* sample MFAS started task for Data Connect |
| MFAAS | sample MFAAS application server started task |
| MFAVTAM | sample MFA VTAM definitions |
| PARMS | sample PARMS for MFA started task |
| PARMSAS | sample PARMSAS for MFAAS started task |
| SERVERS | sample SERVERS configuration for MFA |
| UPQUICK | configuration notes |

If you are migrating from Host Connectivity 3.01 WebSync 10 or earlier, you may want to retain your existing CNTL members from your current version as an installation test. You can simply copy the existing MFA started task JCL and change the STEPLIB to reference the new product libraries. You will however need to modify the MFAS started task JCL since the module names for Data Connect have been changed to allow co-residence within the same authorized library as MFA.

Review the Change Log in each of the new members. Read the documentation for any new parameters in the Readme and in the updated Mainframe Access Administrator's Guide. Add these new parameters and other changes to your working copies. If necessary, customize the new parameters for your installation.

Once you are satisfied with the operation of Mainframe Access, you can consolidate the configuration settings into the new high-level qualified CNTL members.

# Uninstalling

### Windows

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

**UNIX**

> **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_EnterpriseDeveloper2.2.sh` script in the `$COBDIR/bin` directory.

> **Note:** The installer creates separate installations for the product and for Micro Focus License Administration. Uninstalling the product does not automatically uninstall the Micro Focus License Administration or the prerequisite software. To completely remove the product you must uninstall the Micro Focus License Administration as well.
>
> To uninstall Micro Focus License Administration:
>
> 1. Execute as root the `UnInstallMFLicenseServer.sh` script in the `/var/microfocuslicensing/bin` directory.
>
>    The script does not remove some of the files as they contain certain system settings or licenses.
>
> You can optionally remove the prerequisite software. For instructions, check the documentation of the respective software vendor.

# Licensing Information

📝 **Note:**

- If you have purchased licenses for a previous release of this product, those licenses will also enable you to use this release.
- The Enterprise Developer Personal Edition option is not available with this release. You can use the Personal Edition with Enterprise Developer 2.1 Update 1 - you can register for it on the *Enterprise Developer Personal Edition section* on the Micro Focus Web site.
- Your entitlement for using this product is governed by the Micro Focus End User License Agreement and by your product order. 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 buy and activate a full unlimited license

To buy a license for Enterprise Developer, contact your sales representative or Micro Focus SupportLine.

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

## To start Micro Focus License Administration

From the Windows Taskbar click **Start** > **All Programs** >**Micro Focus License Manager** > **License Administration**.

📝 **Note:** On Windows 8 and Windows Server 2012, you use the Start screen to invoke programs.

## Installing licenses

## 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:** This topic only applies if you have an authorization code.

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

🖉 **Note:** This topic only applies if you have an authorization code.

This method of authorization is required if your machine 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.

# New Features in Enterprise Developer 2.2 Update 1

This release provides enhancements in the following areas:

**Visual Studio IDE**

This release provides the following enhancements to COBOL support in the IDE:

| | |
|---|---|
| **Expanded Copybook View** | (Visual Studio 2012 only.) The Expanded Copybook View functionality in the editor was added in the 2.2 release and this has been enhanced in 2.2 Update 1 so it is now possible to debug into the expanded copybooks. The functionality includes: |

- Stepping inline in the expanded copybook view when debugging - when stepping into or hitting a breakpoint in the copybook, the copybook automatically expands. You can disable this feature from the IDE preferences.
- Showing Pinned Data tips inside the expanded copybook.
- Support for **QuickWatch** and **Add Watch** inside the expanded copybook.
- Executing some of the debugger commands from the context menu from the expanded copybook view - for example, **Show Next Statement**, **Run To Cursor** and **Set Next Statement**.

Some limitations apply.

| | |
|---|---|
| **Call Hierarchy** | (Visual Studio 2012 only.) Enterprise Developer now supports the Visual Studio **Call Hierarchy** window for analyzing COBOL PERFORM statements. |
| **Find All References** | The Find All References functionality now works for managed OO COBOL code. |
| **Navigation** | You can now use **Alt+Shift**+Up Arrow (or Down Arrow) to navigate the variables in the editor. |
| | You can use the drop-down types and members to navigate to the different sections (Linkage section, File section etc.) in your source files. |
| **Project Details Window** | The **Project Details Window** now includes columns showing the COBOL dialect of the files and the SQL properties set on them. |

| | |
|---|---|
| **Run-Time Configuration** | |

- You can now use the application configuration file (`application.config`) in native COBOL projects to specify some additional settings such as the search order for called programs, command line handling, or file handling. You can do this from the new **Run-Time Configuration** tab.
- When an executable is built using the IDE, the application configuration file is automatically copied to the output folder and is renamed as `<executable-base-name>.exe.mfgcf`.

| | |
|---|---|
| **Samples** | This release includes the following new samples: |

- Airport Demo (managed) - shows how to create a COBOL WCF REST service and then use a client application to consume it.
- Airport Demo (native) - a basic lookup program that reads the information about airports from a .dat file and outputs the distance between two airports.

The Sandcastle sample has been updated and now uses Sandcastle Help File Builder v1.9.8.0.

**Solution Explorer**   (Visual Studio 2012 only.) Support is now available in Solution Explorer for the following features:

- Errors and warnings filters - click the arrow next to the ⏰ (Pending Changes Filter) icon in the Solution Explorer toolbar, and either click ⊗**Errors Filter** or **Errors and Warnings Filter** to show the files that result in errors or also cause warnings.
- Searching in Solution Explorer - You can use the search field in Solution Explorer to search for files in your solution. Searching also finds copybooks in the copybook dependency view even if they are not part of any of the projects in the solution.

### Micro Focus Heartbleed Update

The OpenSSL library used in this product has been updated to version 1.0.1g to fix the "Heartbleed" vulnerability with TLS heartbeat requests.

### Btrieve Support

Support for the Btrieve file handling system from Pervasive Software Inc. has been added into Enterprise Developer.

Support is restricted to native COBOL, in a Windows environment.

### COBOL Source Information

The **Quick Browse** option is now available as a context menu command in the editor.

### Compare and Synchronization Monitor

With the release of Enterprise Developer 2.2 Update 1, the Compare and Synchronization Monitor has been updated to version 2.

Version 2 is greatly improved in terms of performance, especially during initial checkout of partitioned data sets or when synchronizing a large number of members. Also, the user interface has been improved, and some of the functions available in the old version have now changed or become obsolete.

### Compiler Directives

The following Compiler directives have been added in this release:

**ILPARAMS**   Determines the way in which you call a method that contains an array as its last receiving parameter.

**INIT-BY-TYPE**   Initializes Working-Storage Section data items to a default value, according to their type.

- Alphabetic, alphanumeric, alphanumeric edited, and numeric edited items are initialized to spaces.
- Numeric items are initialized to zero.
- Pointer items are initialized to null.
- Index items are initialized to the value 1.

### Database Access

The following new features have been added as part of database access support:

| | |
|---|---|
| **HCO for DB2 LUW** | • Support added for DB2 LUW version 10.5.<br>• Enhanced RETURN-CODE processing.<br>• The HCO DDL processor now accepts column names with a length greater than 18 characters.<br>• The HCO Import Data tool now processes CLOB data less than 32K in size.<br>• The HCO Import Data tool can now convert DSNTIAUL import files to delimited format, enabling the actual import to be done by DB2 LUW IMPORT and LOAD utilities. This is done using the new SAVEDEL and CHARDEL parameters. |
| **HCO for SQL Server (HCOSS)** | • Support for the mainframe SET CURRENT SQLID statement.<br>• Support for the mainframe LEFT and RIGHT scalar functions.<br>• Data Migration tools now support the mainframe ALIAS and SYNONYM objects. |
| **OpenESQL** | • Enhanced internationalization support for UNICODE, DBCS and MBCS.<br>• Enhanced GET DIAGNOSTICS statement support.<br>• Enhanced LOB support for CLOB, BLOB and DBCLOB data types.<br>• ADO.NET connection editor now provides context help.<br>• Enhanced IDE support for OPTION directives.<br>• Now provides support for the creation of save points and rolling back to save points. |
| **XA Switch Modules** | **Restriction:** This feature applies only when the Enterprise Server feature is enabled.<br><br>• New two-phase commit module for SQL Server based on Microsoft's XA switch. This provides support for xa_recover.<br>• Support for DB2 LUW version 10.5.<br>• Support for Oracle version 12.1. |

**Enterprise Server Integration in the IDE**

You can now use the context menu for the servers in Server Explorer to enable the display of the Enterprise Server log information in the Output window.

**Enterprise Server MQ-IMS Bridge**

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

This release provides support that enables WebSphere MQ applications to communicate with IMS applications in an Enterprise Server region.

**Environment Variables**

The following environment variable has been added in this release:

**strictvsam**  strictvsam enables strict mainframe emulation when processing VSAM files.

When set to ON and running under mainframe emulation, file status 37 is returned for an existing VSAM file when opened for OUTPUT if the file has data or previously had data written to it, or if the file is of a different format to the file on disk. When set to OFF, file status 0 is returned and a new file is created when an existing VSAM file is opened for OUTPUT. This variable is set to OFF by default.

**Fileshare Recovery**

Recovery of Fileshare data files has been enhanced.

Rollback recovery is a faster process that aims to fix the files from their failed state.

This process cannot be used in all scenarios, but a new user exit has also been introduced that allows you to programmatically control which files you wish to recover with this process.

Hot backups are also a new introduction, which allow you to perform a backup without having to shut down Fileshare.

**Line Numbering for COBOL Programs**

This release provides options for auto-inserting or removing line numbers in source files open the editor. Features include:

- COBOL numbering - line numbers are inserted in the sequence area of the code (columns 1 - 6), starting at 000100 at the first line, and incrementing by 100.

  If it recommended that you use COBOL numbering only if your files are in fixed or variable source format.
- Standard numbering - line numbers are inserted immediately to the right of area B, in columns 73 - 80, starting at 00001000 at the first line, and incrementing by 1000.

  If it recommended that you use Standard numbering only if your files are in fixed format.

- The **Renumber** and **Unnumber** commands available from the context menu in the editor.

**Local Catalog**

From within Server Explorer in the IDE, you can add one or more local catalogs, and then use them in conjunction with Drag and Drop to drag down data set items from your mainframe, edit them and then move them back to the mainframe or to your testing environment.

**Mainframe Emulation**

Previously, MGMTCLAS was supported by simply saving it on the catalog record when a dataset was allocated in JCL using the MGMTCLAS parameter on the DD statement. Starting with this release, you can use batch jobs to define MGMT classes and to specify the EXPIRE AFTER time (in days).

**Mainframe Subsystem**

| | |
|---|---|
| **Casspool performance enhancement** | As part of an enhancement to improve performance when browsing the spool queue of an Enterprise Server, you must update the casspool file for any Enterprise Server created before Enterprise Developer 2.2 Update 1 before you can submit jobs to it. |

To update the casspool for each Enterprise Server, from a command prompt, run `fixcasspool.bat`, located in `%COBDIR%\bin` and `%COBDIR%\bin64`, using the following syntax:

```
fixcasspool.bat casspool.dat backup.dat
```

Where:
**casspool.dat**

> The spool file, located in the same directory as the Enterprise Server's system catalog, that will be updated.

**backup.dat**

> A file that will be created with a backup of the old `casspool.dat` file. If `backup.dat` already exists, the update is not run.

If you do not update casspool and attempt to start Enterprise Server, the following messages are displayed in the console:

```
JES000011E Batch Spool File Error; Status [39]
```

```
JES000130E Note JES000011 Error - New casspool indexes may need
generating. See error description in product docs
```

**Managed COBOL Syntax**

This release includes the following enhancements to the managed COBOL syntax:

| | |
|---|---|
| **Specifying parameters in the method signature** | You can now specify passing parameters and returning items in the method signature, instead of using a Procedure Division header. This applies to methods, indexers, iterators, constructors and delegates. |
| **CONSTANT keyword** | Use the CONSTANT keyword on a field to protect it from being altered. |
| **Operations on string fields** | You can now use the STRING, UNSTRING and INSPECT statements on fields of type string. |

**PL/I**

PL/I support within the IDE now includes the following enhancements:

*   Support for new built-in functions

    The PL/I Compiler and Runtime now support the following new built-in functions:

        DAYS
        DAYSTODATE
        SECSTODATE
        SECS
        WEEKDAY
        DAYSTOSECS
        ONSUBCODE
        REPATTERN
        IAND
        IOR
        INOT
        OMITTED
        XMLCHAR

    This provides an improved functionality and a greater language compatibility when you migrate applications from a z/OS environment.
*   Support for %OPTION in the PL/I macro preprocessor

    You no longer need to modify application code that uses %OPTION in order for it to compile successfully.
*   Support for QUOTE() and COMMENT() built in functions.

    This enables the use of PL/I macros that generate code using these built-in functions.
*   Support for IBM Style %INCLUDE(s) that utilize PDS name as part of include file names.

    The PL/I macro preprocessor now parses the %INCLUDE syntax of the form shown below and utilizes the –isuffix and –ipath Compiler directives to locate the "member".
    ```
    %INCLUDE MYPDS(MYMEMBER);
    ```

    This provides an improved language compatibility with the application code without the need to modify the original underlying source code.
*   Support for PL/I AREA data items up to 2Gb.

    Open PL/I now supports the declaration and usage of variables of type AREA up to 2Gb in size. This provides you with improved functionality and greater language compatibility when migrating applications

from a z/OS environment as there is no need to modify the code in order to deal with a maximum area size of 32Kb.

- Enhanced compatibility with the DISPLAY() REPLY() syntax.

  The PL/I Compiler and runtime now provide a DISPLAY() REPLY() syntax that is no longer dependent upon the use of the SYSIN and SYSOUT DD's and that no longer causes behavioral differences if stream IO to SYSIN/SYSOUT is intermingled with programs using DISPLAY() REPLY().

- Support for big-endian style bit strings on little-endian platforms.

  Using a new Compiler directive –bitsltr to compile programs that have logic that is dependent on big-endian bitstring ordering enables you to utilize the code unchanged on Open PL/I little-endian platforms (such as Windows, Red Hat Linux, SUSE Linux). This enables you to migrate applications that make an assumption about bit ordering on the underlying operating system or hardware and to run them unchanged.

- Support for the –initcall Compiler directive.

  Compiling a PL/I program with the –initcall directive causes the specified program to be invoked prior to any user logic. This enables you to customize your environments and do things such as tracking which routines have been invoked, detect memory corruption prior to routine startup, establish database connectivity.

- Support for the "F" option in PLIDUMP.

  A PLIDUMP which was generated using the "F" option will now attempt to list all known information about files which have been accessed during the execution of the program and includes information about the last IO operation, key values, and a dump of buffers, if available. This enables you to identify more easily the cause of file-related failures and what file operations were in progress at the time of failure.

- Early Adopter support for PL/I data structures Data File Tools.

  In the IDE, you can now generate a PL/I structure map (.str) which can be utilized by the Data File Tools utility to generate a formatted layout for a PL/I Data File. The PL/I data structure must be compiled in advance with the -adt Compiler directive. This enables you to see what is in each field within a PL/I data file record, and to modify them in a logical way without having to know the offset, length and raw format of the data item.

- Support for PL/I debugger notification for ON Unit invocation.

  You can now request that the debugger stops when a PL/I ON Unit is about to be triggered. This enables you to locate the ON Unit, establish appropriate breakpoints within the ON Unit and determine the cause of the ON Unit being triggered.

- Support for PL/I debugger notifications for the load of shared libraries and .dll files.

  You can now request that the debugger issues a notification when a shared object or a .dll file has been dynamically loaded. This enables you to stop a program when a dynamic program has been loaded and to establish the appropriate breakpoints, watch lists, etc.

- Alternative Index Performance Improvements for the CASSPOOL command.
- Support of the SHAREOPTIONS property in a VSAM cluster.
- Support for setting directives automatically for PL/I files.

  In Visual Studio, click **Tools > Options > Micro Focus > Directives > PL/I**.
- A new page in the project and file properties enables you to set SQL directives on PL/I source files.

**Preprocessors**

IDE support is now available for selecting and using third-party preprocessors installed on your machine and integrated with Enterprise Developer for building native COBOL Mainframe Subsystem applications.

A guide for third-party vendors and administrators showing how to integrate additional preprocessors with Enterprise Developer is now available in the product help in the *General Reference > Integrated Preprocessor Interface* section.

**Rumba Integration with Visual Studio**

Visual Studio now offers context menu commands for launching the Rumba mainframe display (Desktop or embedded) from Solution Explorer or from Server Explorer. The embedded Rumba display now provides keyboard mapping and color settings.

You can use the display of choice both in debugging and when running applications.

**Run-time Launch Configuration Files**

Use a run-time launch configuration file to ensure an application can be launched when it is deployed in a separate location to the run-time system (in the case of dynamically bound applications), or when the licensing daemon is not already running.

# Known Issues

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

In addition, note the following:

**ASP.NET**  It is not possible to run ASP.NET Web Sites or Web Services on a production machine (one that has Micro Focus Enterprise Server installed) without an additional setup. This is because the production machine does not contain development tools such as the COBOL Compiler. To workaround this, you need to do the following steps:

1. Compile the site prior to deploying it using the **Publish Web Site** command in Visual Studio.
2. Edit the `.asmx` file of the Web service project or the `.aspx` file of the Web site and delete the `Language="COBOL"` statement.
3. Edit the `Web.config` file with a text editor and delete the line which contains:
   `<compiler language="COBOL"...`
4. Ensure that a .NET Server license is installed using Apptrack.

**CICS**
- An EXEC CICS DELAY statement may sometimes produce a difference of one second.

**COBOL Watchpoints**  The debugger ignores a COBOL watchpoint that is hit if there is no statement following the statement that modifies the data on which that watchpoint is set.

**Documentation**
- In Visual Studio 2012, clicking **Help** > **Micro Focus Product Help** > **Product Documentation** results in the message "Cannot find requested topic on your computer". If you see this message, click Micro Focus Enterprise Developer 2.2 for Visual Studio 2012 in the **Contents** tab to display the documentation as expected.
- If you install Enterprise Developer for Visual Studio 2012 and its documentation is not available in the Microsoft Help Viewer, perform the following steps:

  1. In Visual Studio 2012, click **Help** > **Add and Remove Help Content**.
  2. Choose the **Manage Content** tab.
  3. Check the **Disk** radio button, then navigate to the folder containing the Enterprise Developer for Visual Studio 2012 documentation. By default, this is `C:\Program Files (x86)\Micro Focus\<product name>\help`.
  4. Select `helpcontentsetup.msha` and click **Open**.
  5. In the content list, click **Add** next to the Enterprise Developer entry.
  6. Click **Update**.
  7. Click **Yes** on the User Account Control and Microsoft Help Viewer 2.0 dialog boxes to enable the update to continue.

  The documentation for Enterprise Developer for Visual Studio 2012 is added to the Microsoft Help Viewer.

  **Note:**

  This problem only occurs if you install Enterprise Developer for Visual Studio 2012 while documentation for Visual Studio 2012 is being downloaded or updated, which typically happens when you install Visual Studio 2012 or run it for the first time.

| | |
|---|---|
| **Enterprise Server** | • The Historical Statistics Facility may generate incorrect records for SSTM-enabled enterprise servers. |
| **Expanded Copybook View (in Visual Studio 2012)** | • When you add a COPY statement in a COBOL program and then show it in Expanded Copybook View, the line for the copybook statement is read-only. If you then perform an Undo in the COBOL program, the COPY statement is removed while the contents of the copybook is still shown in the program.<br>• **Replace All** does not work inside the Expanded Copybook View<br>• For copybooks with file extensions that are not traditionally associated with COBOL you must first add the file extension to the list of known copybooks extensions in **Tools > Options > Text Editor > File Extensions** before you can show them in Expanded Copybook View. |
| **ICETOOL Emulation** | ICETOOL emulation for managed code is not available in this release. |
| **Installation** | • Before installing this release as an upgrade to an existing installation of the previous version 2.2 of the product, you must uninstall any HotFixes of 2.2. This is to avoid some problems that might result in files not being installed. This is required only on Windows.<br>• 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.<br>• When installing this product for Visual Studio 2010, if you already have Visual Studio 2010 Isolated Shell with Service Pack 1 (SP1) installed, you might experience problems with starting Visual Studio after the installation. This is a Microsoft issue relating to the Integrated Shell (installed as part of the Micro Focus product installer) overwriting some Visual Studio SP1 components. To resolve the issue you need to repair Visual Studio 2010 SP1. |
| **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. |
| **Native COBOL** | On Windows XP, when building a native COBOL application in Visual Studio, a dialog may pop up with error "Unhandled exception at 0xc0006866 in cobol.exe: 0xC0000005: Access violation reading location 0xc0006866)". This is caused by Symantec antivirus runtime protection. To resolve this, you need to apply the following fix from Symantec: *http://www.symantec.com/business/support/index?page=content&id=TECH97280&locale=en_US*. |
| **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). |
| **Visual Studio IDE** | • In the properties of a managed project, the **Application** page currently allows you to select any of the static methods in the application as a **Startup** object. This is |

incorrect. You should always set only the first static method or the program name as a Startup object in order for the project to build.

- Using Call Hierarchy locks the source files currently opened in the editor. To work around this problem, you need to trigger a syntax check - for example, by making a small change to one of the open files.

# Significant Changes in Behavior or Usage

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

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

- *.NET Compiler*
- *MTO - JCL ESMAC*
- *MTO - JCL MVS*
- *MTO - JCL System Catalog*
- *MTO - JCL Utils - IDCAMS*
- *Open PL/I Compiler*
- *Open PL/I Debugger*
- *Open PL/I RTS*
- *SQL: COBSQL*

**.NET Compiler**

*Back to the list*

- In member reference in managed COBOL syntax, you may now only use parentheses when referencing methods. You can no longer specify parentheses when referencing fields or properties, as this will produce a syntax error. For example:

```
set intLength to testString::Length()
```

must change to:

```
set intLength to testString::Length
```

**MTO - JCL ESMAC**

*Back to the list*

- As part of an enhancement to improve performance of the spool display function, several new indices have been added to the `casspool.dat` file. If you are upgrading from a previous release, you must convert the `casspool.dat` file of any enterprise server created before Enterprise Developer 2.2 Update 1 to the new format before starting any JES-enabled enterprise server and submitting jobs to it.

  This release provides the following scripts that convert the `casspool.dat` file to the new format:

  - On Windows: `fixcasspool.bat` in `%COBDIR%\bin` or `%COBDIR%\bin64`
  - On UNIX/Linux: `fixcasspool.sh` in `$COBDIR\bin`

  ,

  To convert the `casspool.dat` file, run the appropriate script from an Enterprise command prompt using the following syntax:

  - On Windows:

    ```
    fixcasspool.bat <old-location>casspool.dat <new-location><backup_filename>
    ```
  - On UNIX/Linux:

    ```
    fixcasspool.sh <old-location>casspool.dat <new-location><backup_filename>
    ```

  Where:

- *<old-location>* - the fully or partially qualified location of the existing `casspool.dat` file, if not in the current directory. Optional.
- `casspool.dat` - the spool file that will be updated. The file is located in the same directory as the enterprise server's system catalog.
- *new-location* - the fully or partially qualified location where the backup file will be created, if not in the current directory. Optional.
- *backup_filename* - the name of the file that will be a back-up of the old `casspool.dat` file. If the file name already exists, the script terminates without converting the `casspool.dat` file.

If you do not convert `casspool.dat`, attempts to start the enterprise server fail with the following messages:

```
JES000011E Batch Spool File Error; Status [39]
        JES000130E Note JES000011 Error - New casspool indexes may need
generating. See error
        description in product docs
```

2654417 (1090421)

**MTO - JCL MVS**

*Back to the list*

- The final disposition processing of temporary datasets has been corrected to be in line with the mainframe processing, with a default value of PASS unless DELETE has been specified in the DD card. Previously, the default value was DELETE.

  2671175 (1091627)
- When running batch programs, receiving an "Out of Space" error requires operator intervention to continue processing.

  2642115 (1089055)

**MTO - JCL System Catalog**

*Back to the list*

- You can now use MGMTCLAS to provide an EXPIRE AFTER number of days. This is used to calculate an expiry date for datasets allocated using the MGMTCLAS parameter.

  2664639 (1090992)
- MFLEX*.DAT files were not being moved with spool files. Spool housekeeping now deletes LEX files when it deletes JESYSMSG. Also, to identify any remaining orphan LEX files, the MF_SPOOL_HK_LEX_SCAN environment variable sets spool housekeeping to scan the data directory for LEX files older than the max retain period.

  2659555 (1090759)
- Spool housekeeping has been rewritten to provide a number of new features. These will be described in the product documentation.

  (592452)

**MTO - JCL Utils - IDCAMS**

*Back to the list*

- The state of VSAM virgin files is now being correctly processed.

  2686149 (1093587)
- A REPRO COUNT of zero is now processed as zero records to be included in the REPRO operation.

  2665006 (1091034)

**Open PL/I Compiler**

- On Intel platforms, the -bitsltr Compiler option can be used to store bit strings left-to-right within each byte. This is similar to Big Endian bit ordering on Intel platforms. The Intel default is to store bit strings right-to-left within each byte similar to the Intel hardware bit ordering.

  2675860 (1092098)
- The libraries `libmf.so`, `libespli.so` and `libespliz.so` are no longer delivered. This is transparent if linking PL/I objects using mfplx or ldpli, and no changes are needed to your build process.

  However, if linking PL/I objects using either the UNIX ld command or the Enterprise Developer cob command, you must include the libraries `libmfpli.so` when linking stand-alone Open PL/I objects (executed outside of Enterprise Server), or `libmfpliz.so` when linking PL/I objects executed under the control of Enterprise Server.

  To do this, use the option -lmfpli for stand-alone Open PL/I objects or -lmfpliz, respectively, for PL/I executed under Enterprise Server. These options replace the –lmf option.
- Open PL/I applications must be recompiled and re-linked in order to use them with this release.

**Open PL/I Debugger**

- The debugger now stops before an ON UNIT triggers. This lets you perform debugging on the ON UNIT itself. You can configure the ON UNITS the debugger stops on.

  2674783 (1092319)

**Open PL/I RTS**

- Writing to SYSPRINT when running outside of Enterprise Server now drives output directly to the terminal and does not buffer the I/O.

  2477031 (1076203)

**SQL: COBSQL**

- COBSQL now displays appropriate COBOL syntax errors after encountering EXEC SQL statement errors.

  2673619 (1093197)

# Resolved Issues

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

- *.NET Compiler*
- *.NET CICS (General)*
- *.NET ESQL Support*
- *.NET JCL (General)*
- *.NET RTS*
- *Adis*
- *Assembler Compiler: HLL Macro Assembler*
- *Assembler Program Execution*
- *CAS (COBOL App Server) General*
- *CAS Admin Console*
- *CAS Resource Manager Interface*
- *CAS Security*
- *CAS XA Switch modules*
- *CASRDO*
- *Compiler*
- *Compiler ECM Support*
- *CICS BMS Screen Painter*
- *Documentation*
- *ES Monitor/Control (ESMAC)*
- *File Handling - External File Handler*
- *File Handling - Fileshare*
- *File Handling - Sort / JCL Sort*
- *HCO for Microsoft SQL Server*
- *LE370 Support*
- *MDSA API for CAS*
- *MF Communications Server*
- *MF Directory Server*
- *MF Server Administrator (GUI)*
- *MFA: GUI components*
- *MFA: Mainframe*
- *MFIO*
- *Micro Focus Heartbleed Update*
- *MTO - CICS BMS Screen painter*
- *MTO - CICS Communications*
- *MTO - CICS ECM/Preprocessor/Translator*
- *MTO - CICS Emulation*
- *MTO - CICS ESMAC*
- *MTO - IMS DB*
- *MTO - IMS MFS*
- *MTO - IMS Other*
- *MTO - IMS TM*
- *MTO - JCL ESMAC*

**.NET Compiler**

- When compiling for managed code with the RM(ANSI) directive, the EXIT PROGRAM statement now works as expected. Previously, it was causing all files open in the program to be closed, which should only occur if the RM directive (without the ANSI parameter) is specified.

  2690872 (1093437)
- (As 1091900) Previously, when the NOBOUND directive was set, generation of a level 88 condition name on a subscripted item could result in a system error.

  2685375 (1093076)
- An INITIALIZE statement without the REPLACING phrase now initializes PIC N data items to DBCS spaces (x"8140"). In a previous version, this was incorrectly initializing to ASCII spaces (x"20").

  2682846 (1092779)
- An INITIALIZE statement applied to a particular element of a subscripted group, where a space fill should precede a sub-occurs item, now applies the space filling to the correct element of the subscripted group.

  2682845 (1092778)
- A problem has been fixed where an INITIALIZE statement referencing a group that redefines something did not function correctly if the group itself was not otherwise referenced.

  2681790 (1092700)
- Arithmetic statements involving subscripted operands no longer cause bad code generation. Previously, this was likely to happen when the subscripted data item was declared at 01 level, or was declared within a group, which itself was never referenced.

  2677890 (1092368)

- In previous product versions, the event which was the target of an attach or detach statement could not be specified as the end of a member reference chain. This meant that it was not possible to have statements like:

```
attach method self::MyMethod to self::TextBox::TextChanged
```

  This is now fixed.

  2676123 (1092130)
- Property initializers as part of the 'new' (constructor) expression are now functioning correctly.

  2674668 (1091974)
- Previously, when the NOBOUND directive was set, generation of a level 88 condition name on a subscripted item could result in a system error.

  2673571 (1091900)
- Previously, a mixture of static and instance files within a class could result in bad code generation. This has now been resolved.

  2672322 (1091732)
- Previously, in situations where a reference-modified move from a `pic x` to a `pic n` field has the same length expression on each side, compiling produced incorrect code which resulted in the target being truncated.

  2670726 (1091595)
- Type inference for generic methods is now working as expected. Previously, in certain cases, it was causing 'COBCH0829 Could not find method...' errors.

  2670658 (1091643)
- Programs compiled to managed code, and which use the SSRANGE directive, no longer produce system errors at compile time.

  2668437 (1091389)
- After stepping into an INVOKE or a PERFORM statement, the call stack will now point to the INVOKE or PERFORM itself, and not to the statement following it.

  (583690)
- When compiling for .NET, XML comments that are attached to types and members (for example, methods and fields) now generate warnings if the XML text is not correctly formatted.

  (595368)
- Previous versions of the product allowed the caller of a method, in which the last parameter was an array, to specify a list of zero or more arguments of the array element type, in place of a single array argument. By default, this behavior is now only supported when the array parameter in the target method has the PARAMS attribute. To restore the old behavior, the new ILPARAMS directive has been introduced.

  (599666)
- Previously, the resolution of shortened type names (those without explicit namespace) could fail when different programs had different ILUSING lists. This could occur when there were multiple programs in a project and one or more of them had $set statements with the ILUSING directive.

  (599903)
- A problem where generic classes would wrongly appear to have errors on background parse has been resolved.

  (601182)

**.NET CICS (General)**

*Back to the list*

- The seelistener process in Enterprise Server for .NET no longer consumes excessive CPU when certain TN3270 printer clients are connected.

  2692412 (1093527)
- In Enterprise Server for .NET CICS, SEND MAP ERASEAUP no longer resets the modified data tag of fields (MDT) on the screen. This duplicates the behavior of mainframe CICS.

  2690966 (1093406)
- Output sometimes did not appear when printing to a Rumba 3270 printer from Enterprise Server for .NET.

  2683870 (1093091)
- Enterprise Server for .NET was not resetting TDQ triggers correctly after the first trigger for a queue had occurred.

  2683584 (1092878)
- In Enterprise Server for .NET, a transaction using EXEC CICS STARTBR that specified an FCT with an invalid key/offset was causing an exception during task finalisation. This resulted in the task not being removed from the request queue and the active tasks count not being decremented.

  2682803 (1092816)
- Connecting a 3270 printer to an Enterprise Server for .NET region was causing the seelistener process to consume a large amount of CPU.

  2681456 (1092653)
- In Enterprise Server for .NET, the EXEC CICS RECEIVE MAP API no longer hangs if the data from the terminal refers to a field that does not exist in the input map structure.

  2677163 (1092258)
- CICS regions could fail to start on local machines if very large resource definition files were being used.

  2670293 (1091581)
- In Enterprise Server for .NET, EXEC CICS RECEIVE MAP now correctly sets the field input length (to 0) and the input data (to low-values) when an empty field is received.

  2668153 (1091454)
- In Enterprise Server for .NET, BMS fields are now justified properly based on the use of the JUSTIFY parameter in the BMS field definition or the presence of the NUM attribute if JUSTIFY is not specified.

  2667621 (1091399)
- You no longer receive an RTS 105 or RTS 200 when two or more transactions running in parallel invoked an EXEC CICS LOAD.

  2667508 (1091340)
- EXEC CICS SEND MAP DATAONLY ERASEAUP no longer incorrectly resets field attributes which should be preserved.

  2667382 (1091990)
- In Enterprise Server for .NET, the EXEC CICS RECEIVE MAP statements now correctly receive all fields for maps where some of the fields are not defined in the order in which they appear on the screen.

  2667207 (1091319)
- Enterprise Server for .NET now support the SEND TEXT NOEDIT CICS API.

  2663897 (1091320)
- Previously, double-clicking a file in the Spool or the Catalog views of the Enterprise Server for .NET Administration UI failed to start the File Viewer, if it was hidden.

  (599906)
- Previously, it was difficult to locate the public assemblies of Enterprise Server for .NET in the Visual Studio **Add Reference** dialog as they did not have the prefix "Micro Focus".

(599909)

- Connection strings defined in the `<MicroFocus.SEE>` section of the `machine.config` file were corrupted when the HCO for SQL Server tool "Manage Connections" updated the `machine.config` file two or more times in a session.

(601595)

### .NET ESQL Support

*Back to the list*

- OpenESQL did not correctly handle EXEC ADO BIND CONNECTION statements that passed the connection name in a host variable.

2681358 (1092636)
- Previously, the OpenESQL precompiler split DBCS SQL statements which resulted in receiving a managed OpenESQL run-time error when processing the statements.

2672260 (1091722)
- The LIKE operator was not invoked properly for .NET DATAROWS cursor search conditions.

2671820 (1091683)
- Some consistency issues with sensitive cursors have been resolved in the ODBC, JDBC and ADO run-time systems for OpenESQL.

2667592 (1091300)

### .NET JCL (General)

*Back to the list*

- In the Enterprise Server for .NET UI, the "DS Org" and "RECFM" fields of the "Allocate New Dataset" and "Edit Existing Dataset" dialogs now correctly show the currently selected value and the available options in the respective drop-down lists.

2674486 (1091956)

### .NET RTS

*Back to the list*

- An error when converting values from type decimal to other COBOL data types has been fixed.

2695116 (1093886)

### Adis

*Back to the list*

- REVERSE-VIDEO now works as expected when using the X"AF" function.

2683509 (1092851)
- MS ACCEPT statements now sound a beep when invalid characters are entered into integer or decimal fields. Integer fields no longer accept invalid characters and normalise.

2680081 (1092542)
- MS ACCEPT statements now display numerics with space fill and sign leading so that integers and decimals are appropriately aligned.

2680081 (1092543)
- The attributes specified in the screen section are now displayed correctly after a call to the X"AF" function 81 has been made.

2650012 (1089634)

**Assembler Compiler: HLL Macro Assembler**

*Back to the list*

- The /PREPASM operand used with the BMS generator utility to invoke the MFASM Assembler to expand copyfiles (MFBMSCL <bms_filename> /PREPASM) was affected by a long and spacey filename fix to the MFASM command line handler that resulted in the Assembler macro processor not running. The issue with the command line has now been fixed and COPY statements in BMS modules are now expanded correctly.

  2685507 (1093084)

**Assembler Program Execution**

*Back to the list*

- Previously, if you assembled and linked an Assembler module with the ANIM option turned on and then you ran it under Enterprise Developer 2.1, and the ES_CONSOLE_SERVER environment variable was not set to YES, an error 197 would occur as the Assembler run-time system attempted to bring up the Assembler debugger and make screen displays from it. Now, if ES_CONSOLE_SERVER is not set, the Assembler run-time turns the debugging flag off and just zooms through the module without invoking the Assembler debugger. Additionally, ES_CONSOLE_SERVER now accepts both YES or Y as values and they can be either upper or lower case.

  (596477)

**CAS (COBOL App Server) General**

*Back to the list*

- Multiple casout calls (using the -r option) in a single process now work correctly.

  2694290 (1093800)
- When accessing TS/TD on error, the file status is now displayed correctly.

  2684719 (1093023)
- HSF records no longer contain incorrect dates when a task runs past midnight at the end of a month.

  2644616 (1089363)
- Messages issued from casstop are now sent to stdout.

  2643162 (1089019)
- All system abend messages are now reported to the console.

  (602933)

**CAS Admin Console**

*Back to the list*

- The JES Program Path and CICS Transaction Path now accept paths of up to 4096 characters.

  2665324 (1091104)

**CAS Resource Manager Interface**

*Back to the list*

- A thread synchronisation issue was causing responses to be lost intermittently. For stateful requests, this could result in lost SEPs (whereby a SEP would appear as busy even though it was not processing any work).

  2686429 (1093442)

**CAS Security**

*Back to the list*

- A new user objectclass instance added to an LDAP-based external security manager now has its initial login attempts count value set correctly.

  2637659 (1088656)

**CAS XA Switch modules**

*Back to the list*

- The Declared Global Temp table is being dropped at CICS end of task with XDB as resource manager.

  2682648 (1093069)
- A new SQL Server XA switch module provides support for xa_recover and also handles implicit rollback by SQL Server more cleanly than previous switch modules.

  2679162 (1092481)

**CASRDO**

*Back to the list*

- Clicking **Resources > JES > Catalog** in ESMAC now opens the initial screen without showing the results of any previous searches.

  2656391 (1090454)

**Compiler**

*Back to the list*

- LOCAL-STORAGE data in nested programs now behaves as expected and as it does on the mainframe - as LOCAL-STORAGE of the main program.

  2693843 (1093746)
- A MOVE from a group item to a DBCS target that requires padding now behaves as expected.

  2692634 (1093553)
- DELETE statements that contain the END-DELETE scope terminator now compile as expected.

  2690465 (1093235)
- UNSTRING on LINKAGE SECTION data items with reference modification could sometimes give the wrong result.

  2684812 (1092998)
- Using large EXEC SQL statements no longer causes the Compiler to hang.

  2684713 (1092993)
- The ? NUMERO SIGN (U+2116) Shift-Jis FA59/8782 is now converted correctly to EBCDIC value 446e under CHARSET(EBCDIC).

  2683297 (1092823)
- MOVE figurative constant to PIC G item under CHARSET(EBCDIC) now returns the expected results.

  2683091 (1092801)
- A MOVE CORRESPONDING statement with a GLOBAL subscripted target now compiles as expected.

  2682557 (1092981)
- A program compiled with the FDCLEAR Compiler directive and containing a numeric file record now compiles as expected.

  2678050 (1092326)

- The asterisk character is now treated correctly in COPY REPLACING text under mainframe emulation.

  2676006 (1092571)
- A literal greater than 80 bytes but less than 160 bytes in length and containing non-ASCII characters will now compile as expected with a mainframe dialect.

  2670083 (1091560)
- Programs that contain EXEC INCLUDE statements inserted by a preprocessor now debug as expected.

  2661838 (1091416)
- ISO2002 and SNI table VALUE syntax is now working as expected for multi-dimensional tables that are not directly nested within each other.

  2651916 (1089808)
- The Compiler error message 62 (COBCH0062) has been clarified by changing "Nested COPY replacement not supported" to "Nested COPY replacement causes termination of parent COPY replacement".

  (599823)
- The SQL TYPE DBCLOB(n) now creates the correct COBOL record structure.

  (599679)

**Compiler ECM Support**

*Back to the list*

- The SQL(CHECK) option no longer incorrectly affects the setting of the unrelated NCG option 'CHECK'.

  2685791 (1093351)

**CICS BMS Screen Painter**

*Back to the list*

- The BMS compiler no longer generates a MOD or copy file if errors or severe errors are encountered during compilation. To revert to the previous behavior, where the BMS compiler generates a MOD or copy file even if it encounters errors or severe errors, specify the /IE directive.

  (595227)

**Documentation**

*Back to the list*

- You may now specify an SSL-enabled listener when submitting jobs via CASSUB. You achieve this by using the tcpssl protocol on the /s or -s switch.

  2671020 (1091619)
- When creating a VSAM data set using the DEFINE CLUSTER command, records are assumed to be variable-length, unless the NUMBERED parameter is used and the RECORDSIZE parameter specifies the same length for the average and maximum record size, in which case, fixed-length is assumed.

  2615989 (1088176)
- A compiler directive INIT-BY-TYPE has been provided to allow initialization of each data type to a sensible value for that type.

  2650462 (1091658)
- The INITIALIZE verb now supports multiple categories in a single REPLACING clause.
- Variable length record files that are 4 bytes or smaller are padded to 8 bytes.

  2537147 (1081777)
- The installation instructions now list the required libraries for IBM System z (390) in the *Software Requirements* section of the installation instructions of the product help.

2683015 (1092919)

### ES Monitor/Control (ESMAC)

*Back to the list*

- In the ESMAC (casrdo45) page, there is now provision to filter and list the members of a particular PDS. The filter text is PDSNAME(*). The PDSNAME should be the complete name of the PDS, and cannot contain any wildcards.

  2500753 (1078391)

### File Handling - External File Handler

*Back to the list*

- 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)
- When using the RMFM File Handler, a file status '05' is returned when executing a DELETE FILE statement, if appropriate. This emulates the behavior of the RM/COBOL run-time.

  2685220 (1093089)
- A rollback recovery of a REWRITE where the record size was being reduced was producing incorrect results.

  2685069 (1093085)
- When a DD name is associated with several concatenated data sets of different charsets, the returned data has the charset encoding of the first data set. However, if the first data set is LSEQ, the returned data has the charset encoding of the application program.

  2677941 (1092434)
- cobfhrepro2 now produces the correct output for FCD2.

  2664465 (1090972)
- A new environment variable, STRICTVSAM, has been introduced. When it is set to ON and under a mainframe emulation, a file status of 37 is returned when you open an existing VSAM file for OUTPUT and the file has or previously had some data written to it, or if the file format is different from the file on disk. The default for this variable is OFF.

  2660766 (1090639)
- When reading concatenated datasets, each dataset in concatenation must use the same RECFM, either all FB or all VB.

  2654517 (1091793)
- The FOLDER section in a file handler configuration file now supports relative paths.

  2653787 (1090290)
- Btrieve files are now supported, using the xfh2btr call conversion module, for native COBOL, running in a Windows environment.

  2598434 (1086466)
- 64-bit fileshare clients would fail to connect if any cci configurations settings were used.

### File Handling - Fileshare

*Back to the list*

- The Escape character was not being honoured for filenames passed to FSVIEW which caused filenames containing $ to be interpreted as environment variables.

  2660207 (1093021)

- MFJSORT now correctly displays the file status of a queried VSAM file, rather than a generic error message, when the file being queried returns a non-zero file status.

  2589273 (1092107)

**File Handling - Sort / JCL Sort**

*Back to the list*

- When VLFILL is specified in OUTFIL, the variable length records smaller than the LRECL/OUTREC are now correctly padded with the value specified in VLFILL rather than with spaces.

  2680553 (1092622)
- Under ICETOOL emulation, the maximum size of an ON Field for PD data type has been increased from 8 to 31 bytes in order to emulate mainframe behavior.

  2680285 (1092551)
- The PARM options CORE, SIZE and MSG are now parsed and ignored.

  2675829 (1092090)
- After a SORT operation, the memory allocated by SORTTEMPSPACE is correctly freed.

  2666797 (1091311)
- MFSORT now correctly sorts NU fields when SORT-EBCDIC is specified.

  2663772 (1090910)

**HCO for Microsoft SQL Server**

*Back to the list*

- The NOSTMTCACHE SQL compiler directive option is invalid and no longer available when setting SQL Preprocessor options from the IDE.

  2694876 (1093861)
- OpenESQL returned an error when a FETCH had more output host variables than the number of available result columns; OpenESQL now ignores excess columns, resulting in improved compatibility with DB2.

  2694548 (1093840)
- Previously, a problem occurred with DB2 YEAR() function when taking date duration or timestamp duration as argument with the directive SQL(DIALECT=MAINFRAME).

  2683713 (1092874)
- Using FETCH OR SELECT INTO statements that have more output host variables than the number of columns in the result no longer results in errors.

  2676276 (1092708)
- The SPD generator did not honor the EXTERNAL NAME option correctly during the generation of the stored procedure wrapper.

  2659338 (1090674)
- HCOSS now emulates mainframe SET CURRENT SQLID and SET CURRENT SCHEMA statements.

  2507765 (1078735)

**LE370 Support**

*Back to the list*

- LE370 parameters that continue on the next line are no longer flagged.

  2681691 (1092669)

- TSO ALLOCATE command emulation now supports the use of "F B".

  2668742 (1091453)
- An unsupported LE option in the code no longer invalidates the options that follow.

  2668740 (1091425)
- A fault that caused the data received by an EBCDIC program when a 'READ from SYSIN' was performed to be in ASCII format has been corrected.

  2657391 (1090401)
- CEE3PRM now successfully retrieves the parm value to the calling program.

  2654879 (1090140)

## MDSA API for CAS

*Back to the list*

- If an enterprise server instance is started by an Enterprise Server user account that has execute privilege but not update privilege for that server, you now receive an INSUFFICIENT_ACCESS error when the server starts.

  2664445 (1091238)

## MF Communications Server

*Back to the list*

- When using casout to get job information, sometimes you could receive an error and the output was trucated.

  2693283 (1093638)
- An issue where terminating 3270 sessions would result in high CPU usage in the MFCS process has been fixed.

  2682179 (1092886)
- In version 2.2 of this product, the received data was missing from the trace messages for CTG and ISC conversations. This has now been fixed.

  2674286 (1091971)
- Some of the Enterprise Server functions for informing running enterprise server of security updates and for retrieving the list of printers available on the server system were broken in Enterprise Developer 2.2. This has now been fixed.

  (601260)
- You no longer receive exceptions in MFCS when the data-trace option is enabled for a CTG listener.

  (601465)

## MF Directory Server

*Back to the list*

- When using the export and import functionality of the MFDS XML Enterprise Server configuration, XRM name and label definitions are now exported and imported correctly.

  2683510 (1092852)
- When using the export and import functionality of the MFDS XML Enterprise Server configuration, the open and close string properties of XRM resources now support the inclusion of double quotes.

  2682635 (1092777)
- When adding or editing an IMS MPR definition in the Enterprise Server Administration GUI, you can now use comma as a separator in the class field to enter multiple class definitions.

2676449 (1092164)

- The mfds export and import command line options -x and -g XML now also support exporting and importing enterprise server script configuration information.

2668554 (1091412)

- XML import in the MFDS no longer fails if the XML source code contains long paths.

2668553 (1091409)

- When using the Enterprise Server Administration to edit the properties of JES Initiators, JES Printers, IMS MPRs and XRMs, the GUI now rejects duplicate names.

2668020 (1091336)

- Session cookies in the browsers for the Enterprise Server Administration GUI now use the HttpOnly flag for additional security.

2666975 (1091258)

- The browser auto-complete feature is now disabled for the password fields in the Enterprise Server Administration GUI.

2666975 (1091260)

- If the Enterprise Server Administration HTML GUI is in "restricted access" state, a logged on user now needs to have "administer user" levels permission to see the "Display" options in the LHS of the GUI. This includes the "Directories", "Statistics", "Sessions" and "Journal" menu options. The "administer user" option is available by default to any member of the #DSAdmin MFDS user group. In MLDAP ESM security, this permission is defined by Update, Add or Delete ACE permissions against the "User Administration" resource in the "Enterprise Server Administration" resource class under "Enterprise Server Resources".

2663991 (1090934)

- When exporting the Enterprise Server configuration in XML format with the "mfds -x" command line option, the MSS ISC and CTG listener information was not formatted correctly, which resulted in an incorrect behavior when you reimported the XML configuration.

2651735 (1090147)

- When you use the Enterprise Server Administration HTML GUI to create a user group, the following characters are no longer allowed in name: '< >', ';', '"' and '&'.

**MF Server Administrator (GUI)**

- When trying to change a password from the Enterprise Server Administration HTML logon page, additional checks are made before reporting the success or failure of the request.

2659582 (1090525)

- The execution scripts configured for an enterprise server instance can now use the credentials specified on the Start\Stop page of the server in Enterprise Server Administration. For example, to use the specified credentials to start an enterprise server instance, you need a script with the following command:
  - On Windows:

    ```
    casstart /r%ES_SERVER% /u%TXUOPERATOR% /p%TXPOPERATOR%
    ```
  - On UNIX:

    ```
    $ES_SERVER, $TXUOPERATOR
    ```

Where:

- TXUOPERATOR resolves to the user id.
- TXPOPERATOR resolves to the password.

After the enterprise server instance uses these environment variables, they are reset to blank and are no longer available to query.

2599100 (1086661)

**MFA: GUI components**

- Missing SI characters no longer cause an abend. Incorrect DBCS character streams are now ignored.

  2667289 (1091404)
- After the MFA server sends a 9/218 error ("Unsupported DCB/DSORG"), the data set is released and can then be reallocated.
- If an x37 out of space abend occurs when running an MFDAS EXPORT command, the affected data set is deallocated and available for use.

**MFA: Mainframe**

- The MFA server now works with CA Endevor R16.0. You will need to update your MFA and MFAE JCL in order to use the new libraries.

  2692338 (1093691)

**MFIO**

- MFGENER now works with the server using FCD3 protocol.

  2676130 (1092134)
- The comments in the MFAVTAM sample member have been updated.

  2674286 (1091976)
- SM2 no longer segfaults when a member has been deleted on the mainframe.

**Micro Focus Heartbleed Update**

The OpenSSL library used in this product has been updated to version 1.0.1g to fix the "Heartbleed" vulnerability with TLS heartbeat requests.

**MTO - CICS BMS Screen painter**

- BMS COPY files will be found in the /SYSLIB folder when the /PREPASM directive is used to include the COPY files.

  2685507 (1093277)
- The message "BMSCH1101S COPY file expansion requires directive /PREPASM" is no longer displayed if copy file expansion fails due to errors in the copy file.

  2669082 (1091499)
- The BMS Compiler no longer fails with an access violation error when invoking a user pre-processor (/PCOMP=...).

  2669050 (1091679)
- The BMS Compiler no longer fails if the /MAP name exceeds seven characters. A message is displayed and the name is truncated to seven characters.

**MTO - CICS Communications**

- When converting a transaction typed on a DBCS terminal from EBCDIC to ASCII, the conversion did not use the length of the transaction but the length of the variable that was holding it. This has been fixed and the conversion now uses the length of the transaction.

  2676259 (1092144)

**MTO - CICS ECM/Preprocessor/Translator**

- DFHRESP(TIMEDOUT) was missing from the CICS precompiler tables. The value has now been added.

  2675857 (1092238)

**MTO - CICS Emulation**

- In CICS transaction routing, BMS Maps in DBCS environment are now displayed correctly.

  2680118 (1092510)
- When importing a startup list that had more than one group in it, only the first group was imported. This has been fixed.

  2659018 (1090500)
- When the casprt process dies, it will now be restarted automatically.

  2593342 (1086058)

**MTO - CICS ESMAC**

- The ESMAC page now displays CICS TERM definitions correctly.

  2676448 (1092163)

**MTO - IMS DB**

- An IMS application written in PL/I could produce an unexpected error RTS114 in MFIMSEP.

  2680509 (1092550)
- A non-zero return code from an IMS application program written in PL/I now sets JES COND CODE.

  2680115 (1092509)
- IMS Data Capture exit routines were not called for the destination parent segment during update of a concatenated segment in a logical DB when the logical child segment did not have an exit defined.

  2676941 (1092370)
- You could receive an error RTS 114 in MFIMSDBS if a BMP was killed after issuing a large number of uncommitted database updates.

  2671177 (1092024)
- Previously, Roll Forward recovery was incorrectly asking whether to recover the same file multiple times.

**MTO - IMS MFS**

*Back to the list*

- Screen data in a conversational transaction is no longer misaligned when the first field after the transaction code contains spaces.

  2680867 (1092593)

**MTO - IMS Other**

*Back to the list*

- The message "OPEN ERROR ON MESSAGES FILE, STATUS=35 DSN=IMSWND.MSG" was sometimes issued in place of an IMS error message, depending on the preceding program execution in a JES initiator.

  2665550 (1091186)

**MTO - IMS TM**

*Back to the list*

- IMS-TM no longer becomes unresponsive upon multiple application ABENDs.

  2664063 (1091514)

**MTO - JCL ESMAC**

*Back to the list*

- When browsing the catalog via ESMAC, the maximum number of lines displayed is controlled by the environment variable ES_MAX_CATALOG_LINES, which has a default value of 5000. This is introduced for stability and performance reasons. If you wish to display more than 5000 lines, you need to set the environment variable to a higher value in Configuration Information on the General tab in MFDS. See "Setting Environment Variables for Micro Focus Directory Server" in the online documentation for more information.

  2671855 (1091696)

**MTO - JCL MVS**

*Back to the list*

- A new environment variable, JES_PRINT_SPOOL_MSG=[CONSOLE|LOG|SILENT], can be used to control the disposition of the spool dataset printing message (JES000029I). Environment values are:

  - CONSOLE - send the message to the console (default).
  - LOG - write the message to a special log file named PRNT_SPL_MSG_YYYY_MM_DD.DAT where YYYY_MM_DD is the current date. This file resides in the same directory as casspool.dat, and a new file is created every day.
  - SILENT - no message. Use this option with caution, as you will have no audit log of your spool datasets.

    **Note:** This environment variable is introduced for high print load users, where print messages to the console impact system performance.

  2660637 (1091746)

**MTO - JCL System Catalog**

*Back to the list*

- In the MVSCATPB API, the second and any subsequent reads of catalog records for dynamic PDS were not returning the extension lisy.

  2685834 (1093098)
- New empty dynamic pds members are now retained if they have been opened for output, to extend, or for an update.

  2681745 (1092834)
- Deleting the JESYSMSG from ESMAC (casrdo43) now deletes all the associated files.

  2659558 (1090837)
- The last change date on the catalog entry for a dynamic PDS model is set to the current date when a new member is added to the PDS.

  2581611 (1091084)

**MTO - JCL TSO**

*Back to the list*

- An issue related to temporary datasets later referred to as permanent ones has been corrected.

  2676531 (1092360)
- A problem when running batch programs with large parameters has been fixed. A parameter with length of up to 100 characters can now be passed to the user program.

  2671469 (1091663)
- Previously, after a batch job using IKJEFT01, a SEP was incorrectly terminating with CASKC0026E Error unloading service '' after IKJEFT step with DSN.

**MTO - JCL Utils**

*Back to the list*

- Setting MFALLOC_PCFILE=Y would not create the file if RECM=LSEQ.

  2682866 (1092920)
- Using MFGENER to copy RECFM=VB to RECFM=FB no longer results in bad data in the output file.

  2679429 (1092796)
- When copying an LSEQ dataset to a dataset with no dsorg specified, IEBGENER did not correctly assign the default dataset characteristics.

  2663396 (1090889)
- There is now an extra validation for IEBGENER to check that the attributes of concatenated SYSUT1 files are compatible.

  2654517 (1090132)
- When a job deletes a G0000V00 dataset belonging to a GDG, the DG manager updates its internal BIAS/G00000V00 table to reflect it, so that subsequent references to the GDG via relative BIASes within the same job are resolved the same way as on the mainframe.

  2650338 (1089941)

**MTO - JCL Utils - IDCAMS**

*Back to the list*

- An existing SYSIN of type Dynamisc PDSM no longer causes a failure.

  2686421 (1093226)
- It is now possible to use wildcards to specify the names of PDS members to delete.

  2684823 (1093005)

**NCG**

- An error could occur at generate time for programs with calls to INTRINSIC functions that had multiple ALL subscript parameters.

    2695026 (1093885)
- An issue in cob which caused a core dump when all entry points in the main program were invalid has been fixed.

    2663974 (1090927)
- An issue has been resolved where the debugger would not step into the code when a PERFORM statement is the last statement in a WHEN branch of an EVALUATE statement.

**Open PL/I CICS Preprocessor**

- Passing the CICS Preprocessor option -optcics with exci=y results in the correct preprocessing to enable batch operation with CICS connect if separate commands rather than mfplx are used to process the program. For example, to correctly preprocess and enable batch operation with CICS connect for the program pliexcit.pli, you would enter these separate commands:

```
mfpp –margins 2,72 pliexcit.pli -pp pliexcit.pp
        mfexecpp –cics –optcics exci=y pliexcit.pp -ppcics pliexcit.ppc
        mfpp pliexcit.ppc -pp pliexcit.pp2
        mfpli –mvs pliexcit.pp2 –o pliexcit.obj
        ldpli –mvs –dll pliexcit.obj
```

    2675232 (1092033)
- A semi colon is no longer emitted within the comment with the -full_list macro preprocessor option specified. Also, when using %INCLUDE, the generated comment line for multiple files included with a single statement no longer erroneously contains the name of the file which included them.

    2676504 (1092187)
- COMMAREA no longer incorrectly passes to linked-to programs.

    2667530 (1091299)

**Open PL/I Compiler**

- Using the concatenate operator with character varying strings now works correctly when compiled with -opt.

    2692333 (1093522)
- A problem with a CHAR(1) repetition factor of 32765 causing the Compiler to loop indefinitely has been fixed.

    2684548 (1092979)
- Procedures returning picture numeric data now work correctly when compiled with the -opt compiler option set to 3.

    2681995 (1092728)
- A possible compiler abort when using the -map option no longer occurs.

    2680528 (1092553)
- A problem that caused a compiler abort with ONCODE 90011 no longer occurs.

    2679977 (1092500)
- A problem causing the XMLCHAR built-in to not work correctly no longer occurs.

    2678830 (1092398)

- A problem causing the XMLCHAR built-in to not work correctly no longer occurs.

  2678830 (1092399)
- Internal: The undocumented option -newalign was provided to Luigi B. et al for this functionality specifically for NCG.

  2675416 (1092054)
- A problem with Static structure assignments causing Error MFPLI01233E no longer occurs.

  2675201 (1092023)
- A problem with binary integer constants in certain built-ins no longer occurs.

  2675077 (1092015)
- A problem causing a Compiler Abort ERROR 2000A no longer occurs.

  2673693 (1091875)
- Converting FIXED DEC to BIT no longer produces the wrong number of bits.

  2673494 (1091883)
- The ODBC pre-compiler no longer incorrectly passes a long SQL statement to pre-compiler services resulting in an MFPLI01250S error.

  2673288 (1091838)
- A problem with large string concatenation producing blanks and data loss during Restricted Expression Evaluation no longer occurs.

  2673288 (1092450)
- Unnamed structure members no longer cause compiler errors.

  2673130 (1091820)
- When a BYVALUE parameter is greater than 4 bytes, such as a non-ideal argument that is not a true immediate, the argument is now passed as -if enclosed by parentheses instead of generating a severe error.

  2667144 (1091256)
- A problem no longer occurs when passing a named constant of type pointer as an argument to a subroutine.

  2665622 (1091101)
- A program that previously triggered a SIGSEGV when compiling with the Open PL/I Compiler no longer does so.

  2645146 (1089173)
- The PL/I compiler now supports the REPATTERN built-in function.

  2467971 (1075524)

**Open PL/I Macro Preprocessor**

- The macro preprocessor no longer generates extraneous additional linefeed characters when using -margins with a %REPLACE statement where the new text exceeds the length of the original %REPLACE constant text.

  2692525 (1093557)
- The Open PL/I Macro Preprocessor no longer incorrectly handles the IBM deviation of the %INCLUDE which used the format: %INCLUDE PDS(MEMBER); The Macro Preprocessor now parses for "MEMBER" and uses the -isuffix and -ipath options to locate the %INCLUDE file.

  2691090 (1093340)
- The macro preprocessor no longer goes into an infinite loop when incorrectly coding a macro preprocessor function with missing parameters and punctuation.

2682716 (1092764)

- A %XINCLUDE is no longer skipped due when a prior %XINCLUDE is conditionally excluded.

2682455 (1092750)

- When a PL/I Macro uses the STATEMENT option of the PROCEDURE statement and is invoked within the input source using the keyword format without a trailing semi-colon, the macro preprocessor no longer goes into an infinite loop.

2681527 (1092655)

- When a macro generates a single line of returned CHAR data containing multiple logical lines and no carriage returns, the returned data no longer wraps at or near 256 bytes if using the -margins option. when using the -margins option, the macro preprocessor will now use the right margin as the point where wrap is attempted. This results in the customer macro producing a comment that is formatted similar to the mainframe format, providing an improvement over previous functionality.

2679415 (1092449)

- The macro preprocessor no longer fails processing or flags a macro as having incorrect function parameters if an unquoted period (.) is passsed to a macro preprocessor function.

2678366 (1092352)

- When a construct such as '01'/'02'/'03' exists in source code without any spaces between the literal constants and the divide symbols, a mismatched quote is no longer erroneously created by the macro preprocessor, causing %IF to be incorrectly evaluated.

2677263 (1092243)

- PL/I source code with mismatched single or double quotes and more than 16384 bytes before either another quote terminator or and end of the file no longer results in a heap corruption and termination of the macro preprocessor without first generating a preprocessed source deck.

2676511 (1092209)

- Using the macro preprocessor -full_list option on a user program that had a syntactically incorrect %INCLUDE statement no longer causes the macro preprocessor to trap.

2676508 (1092171)

- PL/I programs using the macro preprocessor built-in functions COMMENT() or QUOTE() no longer revieve warning messages, and the generated code is no longer different to what is generated on the mainframe.

2675054 (1092006)

- The macro preprocessor no longer erroneously generates an error message when a comment containing a percent sign (%) is immediately preceded by a multiplication symbol (*).

2673315 (1091839)


**Open PL/I RTS**

- When using buffered file I/O that is flushed to disk as a result of an implicit or explicit CLOSE, the "out of space" error now correctly raises a PL/I "ERROR" condition.

2680494 (1092560)

- Previously, when transitioning from one IMS trancode to the next, the PL/I run-time system was not initializing or deinitializing correctly.

2675644 (1092070)

- The ANY and ALL built-in functions no longer produce the wrong number of bits.

2673494 (1091882)

- If the EXTSM (sort engine) initializes but is not used, the sort engine now properly performs a clean-up and de-initialization before any subsequent re-initialization. This allows the sort engine to be in a proper state for subsequent calls to PLISRTD.

2672840 (1091787)

- The PL/I PLIDUMP facility has been enhanced to display information about the files which have been accessed during execution if the "F" PLIDUMP option is specified.

2671365 (1092268)

- Invoking the DELAY() statement with a negative value no longer causes the application to sleep for a longer than anticipated period given the specified value. The sleep period is now immediate.

**Open PL/I SQL Preprocessor**

*Back to the list*

- The OpenESQL pre-compiler sometimes incorrectly processed host variables in the FETCH INTO statement for PL/I compiles, resulting in ES0109 errors.

2683997 (1092921)

- The DB2 pre-compiler incorrectly generated MPLIE0095S errors if a fixed CHAR host variable was defined as greater than 254 characters.

2681503 (1092687)

- The DB2 pre-compiler failed to generate required code if the PL/I program had a one character name, which resulted in severe MFPLI00082S errors.

2681500 (1092774)

- A SQL preprocessor issue with using the [NODIALECT] option no longer occurs.

2677880 (1092301)

- The generated source code now contains %rdebug in the correct place.

2674774 (1091987)

- The SQL precompiler no longer incorrectly process PL/I programs with a particular language construct.

2673850 (1091889)

- Previously, you received an incorrect error message if an INIT clause in your code contained an undeclared variable.

2673452 (1091871)

- The SQL preprocessor could generate code that resulted in Compiler errors if an END <program name> statement was split over two lines.

2672588 (1091776)

**RJSE - JCL**

*Back to the list*

- MFA server can now import SYSOUT data sets with a maximum LRECL of 32K which is the system limit.

2658439 (1090815)

**Run-Time System**

*Back to the list*

- When a container end event is received, all external files that are open in the container now close correctly.

2513669 (1079282)

**SQL: COBSQL**

*Back to the list*

- COBSQL Pro*COBOL error messages displayed only up to 80 characters.

  2681983 (1092788)
- Previously, commented-out END-EXEC statements were causing a Compiler error. COBSQL now ignores such statements.

  2680341 (1092533)
- The COBSQL precompiler was updated so it does not attempt conversion of source lines containing the continuation character.

  2663986 (1090930)

**SQL: DB2 ECM**

*Back to the list*

- When a CREATE TABLE statement contained a PARTITION parameter, the HCO DDL processor sometimes generated invalid DDL.

  2682214 (1092725)
- A new option (SAVEDDL) is available in the HCO DDL processor. With this option set, any DDL converted from the input DDL file is saved and not executed. The DDL processor now supports specifying the IN <tablespace> and COMPRESS <option> parameters but not modifying them.

  2673448 (1091907)
- Previously, the HCO IMPORT tool could go into a loop if the LOB column was in the import data set.

  2673443 (1091887)
- When compiling on a 64-bit systems, the DB2 pre-compiler incorrectly generated an error "DB0121 Package name is too long."

  2673259 (1091920)
- The HCO DDL processor now accepts column names greater than 18 characters. Previously, in this situation, you received SQLCODE error -205 when the DDL was processed.

  2673085 (1091829)
- The HCO IMPORT tool now supports a new parameter (SAVEDEL) which enables converting DSN import files to delimited format. When used with this paramter, the HCO IMPORT tool only converts the file and does not perform an actual import.

  2672865 (1091891)
- The HCO Import Data tool was not checking for invalid lengths passed for VARCHAR column data; the tool now checks this and when an invalid length is passed, issues an error message identifying the affected column.

  2661781 (1091056)

**SQL: HCO for SQL Server**

*Back to the list*

- HCOSS now handles statements of type "SET hostVariable = CURRENT SQLID" correctly.

  2693537 (1093690)
- The HCOSS Assess Application Migration tool flagged CALL statements as errors without checking parameter directions. These CALL statements are now flagged as 'in doubt' to initiate an assessment of parameter directions.

  2685247 (1093156)
- The OpenESQL preprocessor and runtime now support AMODE(31) address pointers and swapping COMP fields in SQLDA for user-defined mainframe style SQLDAs.

  2684229 (1092978)

- COBOL stored procedures could not perform database updates when called from a SQL Server trigger.

  2680257 (1092809)
- OpenESQL and HCOSS now correctly compile statements that contain CASE expressions.

  2679336 (1092605)
- OpenESQL now supports a generic syntax for setting and rolling back to transaction save points that work with Oracle, DB2, and SQL Server.

  2676145 (1092138)
- Although mainframe DB2 supports FETCH INSENSITIVE from SENSITIVE STATIC cursors, which has a SQL Server equivalent KEYSET cursor, SQL Server does not support FETCH INSENSITIVE from KEYSET cursor. This is a permanent limitation.

  2676140 (1092137)
- OpenESQL did not support BLOB, CLOB, and DBCLOB host variables larger than 64K.

  2649752 (1089622)

**SQL: OpenESQL**

- OpenESQL did not support using the DB2 VALUES INTO statement with DB2 LUW.

  2694069 (1093906)
- The OpenESQL preprocessor incorrectly rejected host variable character definitions that contained x'091' characters.

  2692065 (1093465)
- You can now specify SQL(NOCHECKSINGLETON) in applications that require compatibility with older products to check for unfetched rows after a singleton SELECT. In such cases, the returned SQLCODE value is zero rather than an error or a warning.

  2691736 (1093420)
- The SQL(TSTAMPSEP)compiler directive could not be explicitly set to a space character, for example SQL(TSTAMPSEP= ). This is now the default setting unless overridden by specifying SQL(DIALECT=MAINFRAME).

  2691212 (1093364)
- In the IDE, the TSTAMPSEP directive was not listed as an OpenESQL compiler directive option.

  2685702 (1093116)
- When SQL(NODETECTDATE) is set after SQL(DIALECT=MAINFRAME), HCOSS does not attempt to convert date, time or timestamp literals in static or dynamic SQL statements.

  2685422 (1093615)
- DB2 LUW applications could not use DECLARE GLOBAL TEMPORARY TABLE statements that were not syntactically valid for DB2 z/OS.

  2685219 (1093346)
- The sqlda.cpy copybook could not be compiled using the ENTCOBOL mainframe dialect.

  2682522 (1092825)
- A new XA switch module is now available that supports XA recovery.

  2680297 (1092528)
- Previously, you would receive error COBCH002 when SQL(NOPRE) was specified because the ODBC precompiler would try to generate code using a variable which was not defined.

  2679267 (1092438)
- The OpenESQL pre-compiler generated code that swap COMP host variables incorrectly if the SQL statement got an SQL runtime error.

2677606 (1093013)

- The OpenESQL precompiler sometimes incorrectly generated swap code for COMP host variables if they were used for both input and output in same SQL statement which resulted in SQLCODE of +100 being returned.

2675122 (1092454)

- A problem with SQL(CHECK) no longer occurrs when using binary host variables.

2673281 (1091832)

- A problem with nested select queries in ESQL 'select into' statements has been fixed.

2672519 (1091768)

- Previously, an incorrect code was generated for an INSERT statement that used an indicator variable array when DBMAN=ADO was set.

2671938 (1091715)

- The support for EXEC SQL GET DIAGNOSTICS has been extended to include DB2_ROW_NUMBER, ROW_NUMBER and COLUMN_NUMBER as diagnostic items that can be retrieved by an application.

2670955 (1091611)

- The OpenESQL preprocessor could sometimes improperly decode DBCS host variable characters which resulted in receiving an "ES0109 Invalid data name" message.

2670725 (1091594)

- The OpenESQL pre-compiler incorrectly changed the underscore character (_) to a dash character (-) in an EXEC SQL WHENEVER statement.

2670723 (1091593)

- Dynamic SQL statements were not releasing JDBC cursors.

2670548 (1091585)

- OpenESQL for JVM COBOL prevented type byte[] host variables from being used.

2667023 (1091240)

- The SQL Directives information available within the Visual Studio and Eclipse IDEs contained an error regarding the available options for the XDB(DATE) and XDB(TIME) directives.

2666213 (1091185)

- Some issues relating to the use of PIC G /PIC N DISPLAY-1 and some DBCS host variables have been resolved.
- When using Data Direct ODBC drivers, PIC N NATIONAL host variables always uses UTF-16 instead of UTF-8 which previously happened on some platforms.
- Some problems with using Data Direct's ODBC driver for Microsoft SQL Server have been fixed.

**Visual Studio IDE**

- When using a continuous integration system (such as Team Foundation Server), it was not possible to build any COBOL project unless the user account under which the builds were executed had been used to start Visual Studio at least once.

2690873 (1093514)

- When you use the **Create Project From Existing Code Files** wizard to create COBOL projects, it now sets the output name or the assembly name to match the name of the project and also selects the correct build configuration.

2684455 (1092962)

- When adding a file as a link to a virtual folder of a project when virtual view is switched on, the IDE no longer creates a physical folder when you switch off the virtual view in Solution Explorer.

2676171 (1092151)

- Opening the project properties for a Managed Procedural Multi-Output project from the context menu now works correctly.

  2672907 (1091794)
- Creating a COBOL project in a directory containing DBCS characters could result in build errors.

  2664439 (1090964)
- Executables can now use run-time tunables without you having to set the COBCONFIG.BLOCK environment variable provided that the Application Configuration file for the executable is located in the same folder as the executable and is named `<executable-base-name>.exe.mfgcf`.

  2644263 (1089150)
- You now receive Compiler output when you are using MSBuild from the command line to build projects, when the verbosity level is set to Minimum.

  2617055 (1091210)
- Managed COBOL programs that use RM/COBOL data file support now work correctly when you debug or run them from within Visual Studio.

  2609061 (1087614)
- An issue where changing the project properties would not trigger a background parse has been resolved.
- In a managed COBOL project in which some of the programs contained errors, if you opened a program that did not contain errors, it was sometimes marked as containing errors in Solution Explorer. If you subsequently opened the program containing errors and fixed them, the errors would not be removed from the Error List or from Solution Explorer.
- If you specified that a virtual folder should include file extensions that matched the extensions of items in the project, those items did not move to the virtual folder immediately.
- Previously, copybooks on sequential lines expanded inline in the source code were incorrectly colored as read-only though you could still edit the expanded code as expected.
- When you specified project location and project type in the **Create New Project From Existing Code** File wizard, if you added subfolders on the same page, the Next button would not be enabled.
- When converting Net Express projects to Visual Studio solutions, the conversion no longer creates a project named "**<*SolutionName*> Shared**".
- Sometimes, it was not possible to type anything in a copybook expanded inline at the start of the line immediately following the end of the copybook.
- The column position for items in columns 128-256 appeared negative.
- When Virtual View was enabled, adding a form, a WPF object or a settings file to a .NET project resulted in an error.
- Deleting a virtual folder that contained other virtual folders could cause the IDE to hang.
- If you moved, renamed or deleted a virtual folder, turned off the Virtual Folder view and then turned it back on, files would sometimes move to other virtual folders or disappear from Solution Explorer.
- For native COBOL projects that contain dependencies on library files or objects that are not part of the project, if one of those dependencies is updated and you rebuild the project, the project will be relinked using those updated files.
- If you used the REPLACE statement in a program, the **Show All Copybooks** command would have no effect for that program.
- The default debugging options for Native COBOL in **Tools > Options > Debugging > COBOL** are now correctly enabled.
- It was not possible to navigate to an item in another file, where the item was on a line number greater than the number of lines in the current file.
- You can now use the 'Submit JCL' context menu item for JCL files in a native Mainframe Subsystem Application project when the project is not associated with any enterprise server. Using the command creates a temporary server for the job submission.
- The Add Existing Item dialog now includes a filter which enables you to add files of several supported types at the same time.

- When navigating to an error on a source line that contains tabs, the highlighted code sometimes did not match the error.
- The Virtual View in Solution Explorer now provides a default virtual folder for service interfaces. The folder does not show though for existing projects in which you have added your own virtual folders.
- Previously, it was not possible to debug a project using "Start Project" if the output name of the project was specified on the "COBOL Link" tab in the project's properties.
- The Add Existing Item dialog now displays all supported COBOL file extensions, including any new ones that you have added to the IDE options. If you configure the IDE options to add or remove file extensions from the list of extensions for COBOL source files, you must restart the IDE before the change to take effect.
- If an error or warning is detected in a copybook, the icon for the program containing the error will now be updated to reflect this.
- The COBOL Source virtual folder now only contains files which can be compiled (which have their Build Action set to Compile in the file properties). Files which were previously in this virtual folder but do not compile will now appear in the Copybooks virtual folder or in the project root. Similarly, for PL/I projects, the PL/I Source virtual folder now only contains files which can be compiled. Files that were in this folder which do not compile will now appear in the project root.
- Copying block selections of code and pasting them in an expanded copy view no longer replaces the selected lines of code entirely with the pasted text.
- If a source file that contains errors or warnings is added to the project as a link, it is now correctly displayed in Solution Explorer with the error or warning icon instead of the link icon.
- If you created a virtual folder in Solution Explorer and specified file extensions for that folder that matched the extensions of existing items in the project, the new folder could not be expanded to view the files it contains.
- The members generated by the Implements Smart Tag are no longer inserted in unsuitable locations in the code when the expanded copybook view is turned on in the editor.
- Show All Copybooks would not show a copybook if, though it itself could be shown, it contained copybooks, all of which could not be shown inline.
- The following new default virtual folders are available in this release for non-Mainframe Subsystem projects - Content (for HTML and ASPX pages), Styles (for CSS stylesheets), Scripts (for JavaScript), Images (for bitmaps such as JPEG and PNG). For projects where you have created your own virtual folders, or have moved files between the virtual folders, your changes will be preserved and will override the new defaults.
- When adding existing files to a managed COBOL Mainframe Subsystem project, the Add Existing Item dialog now includes filters that enable you to only show the supported file types.
- The options in **Tools > Options > Text Editor > Micro Focus COBOL** are now set correctly after installing or updating the product.
- Changing the **Build Action** property for a file in a project configured to compile to multiple executables no longer causes a rebuild of the entire project.
- Sometimes, when showing copybooks inline, it was not possible to enter anything at the start of the line immediately following the end of the expanded copybook.

**Web Service Client**

*Back to the list*

- Support for nested COUNT IN clauses has been added to the generated Web Service Console Client. Empty and unused array fields will no longer be returned in the client output.

  2278428 (1066547)

**XDB Server**

*Back to the list*

- MFDB2UNL.CBL now allows the use of semi-colons within SQL statements.

2661513 (1090755)

## XDB: Problems not classed above

*Back to the list*

- Previously, TESTCOVER configuration could cause spurious errors in XDB utilities.

  2677742 (1092299)

## XML Syntax Support Preprocessor

*Back to the list*

- PREXML now handles conditional compilation correctly.

  2665552 (1091113)
- An XML file being opened for input is now closed correctly.

  2664760 (1091006)

## XML Syntax Support Runtime

*Back to the list*

- The XML run-time system now handles non-US EBCDIC characters correctly.

  2665518 (1091086)

# 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 WebSync service, where you can download fixes and documentation updates.
- The Knowledge Base, a large collection of product tips and workarounds.
- Examples and Utilities, including demos and additional product documentation.

To connect, enter *http://www.microfocus.com* in your browser to go to the Micro Focus home page.

**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*. 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.

## 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.

# 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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