Micro Focus Enterprise Developer 2.3 for Eclipse

Release Notes

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Contents

Micro Focus Enterprise Developer 2.3 for Eclipse Release Notes

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

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. Full mainframe integration and the Application Workflow Manager are only available in the Eclipse-based IDE.

Note:

- The Application Workflow Manager is available within all Enterprise Developer variants and provides all the capabilities and tools to develop and maintain Application Workflow models. These models allow you to integrate tools and processes directly into Enterprise Developer. You can use the Application Workflow Manager with the following products:
  - Enterprise Developer - the Enterprise Developer setup file automatically installs the Application Workflow Manager.
  - IBM Rational Developer for System z (RDz) - see *Installing Application Workflow Manager into Rational Developer for System z (RDz)* in the installation instructions. This requires that Enterprise Developer Connect is installed and licensed.

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 Eclipse* in the product Help.

Note:

- This document contains a number of links to external Web sites. Micro Focus cannot be responsible for the contents of the Web site or for the contents of any site to which it might link. Web sites by their nature can change very rapidly and although we try to keep our links up-to-date, we cannot guarantee that they will always work as expected.
- Check the *Product Documentation* section of the *Micro Focus SupportLine Web site* and the *Micro Focus Infocenter* for any updates to the documentation which might have been uploaded.
- This product includes OpenSSL version 1.0.1m.

Installing Enterprise Developer

System Requirements

Hardware Requirements

Enterprise Developer has the following requirements in addition to the requirements of Eclipse. See the Eclipse documentation for details of its requirements.

In general, most modern machines will have the required processor and available RAM to run the Micro Focus products under Windows effectively. For planning purposes, you should consider having a minimum of 2GB of RAM though Micro Focus recommends at least 4GB of RAM for optimal performance.

Windows

The disk space requirements for Windows are, approximately:

Enterprise Developer	Sentinel RMS License Manager
4.5GB	75MB

Note: The disk space requirements include the size of the Eclipse IDE and the version of Java and the .NET Framework provided with the Enterprise Developer setup file. 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	Installer type	Setup file size (MB)	Disk space required for the installation	Disk space required for running the product (MB)	Sentinel RMS license server (MB)
POWER running AIX	Micro Focus installer	479	1.91 GB	958	36.5
HP IA	Micro Focus installer	866	3.46 GB	1.73 GB	69

Platform	Installer type	Setup file size (MB)	Disk space required for the installation	Disk space required for running the product (MB)	Sentinel RMS license server (MB)
System Z running Red Hat Linux	Micro Focus installer	390	1.56 GB	780	36
x86-64 running Red Hat Linux	Micro Focus installer	431	1.72 GB	862	46
SPARC running Solaris	Micro Focus installer	492	1.97 GB	984	40
System Z running SUSE SLES	Micro Focus installer	394	1.58 GB	788	36
x86-64 running SUSE SLES	Micro Focus installer	437	1.75 GB	874	46

z/Server requirements

z/Server has the following hardware requirements:

- IBM mainframe model z9 or later is required for installing and using z/Server. z/Server will not install on earlier hardware models.

Operating Systems Supported

Note: You can produce 64-bit and 32-bit applications on 64-bit operating systems.

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

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

Eclipse requirements

- Though Enterprise Developer does not support the 64-bit Eclipse, you can use the 32-bit Eclipse to create both 32-bit and 64-bit applications.
- Enterprise Developer requires a 32-bit Java installation.
- Enterprise Developer ships with Eclipse 4.4.2. After the installation, you can install the Enterprise Developer plug-in into other instances of Eclipse available on the same machine. The supported versions are 4.2 and 4.3 for the 32-bit Eclipse only. See *Installing Enterprise Developer into other instances of Eclipse* for instructions.

Other software requirements for Windows

- Oracle's Java Platform, Enterprise Edition (Java EE) 7 or Java 8 is required to run the Eclipse IDE, to execute COBOL JVM code and for native COBOL and Java interoperability. The setup file installs Java 8 u51 32-bit. You can download Oracle's Java EE from *Oracle's Web site* and install it anywhere on your machine.

  Note: If you have Java 7 installed on your machine and you do not want the setup file to install Java 8, you can install the product silently and use the `skipjre=1` command line option to skip installing Java 8. See *Installing Silently on Windows* for more details.
- The setup file also installs .NET Framework v4.5.2 and the Microsoft Visual C++ 2010 and 2012 Redistributables.

See the *Java Support Considerations for the Eclipse IDE* in the *Known Issues and Restrictions* section in your product help for considerations that apply to using the Eclipse IDE and Java.

Software requirements for 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.
- The following operating system libraries must be installed:

Library	Platform			
	SUSE 11	SUSE 12	Red Hat 6.*x*	Red Hat 7
glibc-locale-32bit	X	X		
gcc	X	X		
gcc*.i686			X	X
glibc-*.x86_64			X	X
glibc-*.i686			X	X
libgcc-*.x86_64			X	X
libgcc-*.i686			X	X
libstdc++-*.x86_64			X	X
libstdc++-*.i686			X	X
gdb*	X	X	X	X
libelf-devel-0.137-8.19**	X	X	X	X
libelf1-0.137-8.19**	X	X	X	X
libelf1-32bit-0.137-8.19**	X	X	X	X

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

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

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

- Xterm, the terminal emulator for the X Window System, is part of your UNIX/Linux distribution but is not installed by default. Use your UNIX/Linux installation media to install it.
- Oracle's Java Platform, Enterprise Edition (Java EE) 7 or Java 8 is required to run the Eclipse IDE, to execute COBOL JVM code and for native COBOL and Java interoperability. The setup file installs Java 8 u51 32-bit. You can download Oracle's Java EE from *Oracle's Web site* and install it anywhere on your machine.

  Note:

  - On AIX and zLinux, you need to have IBM's JDK. The earliest supported release of IBM's JDK is 7.0 Service Refresh 8. You can get IBM's AIX JDK from *IBM's Web site*.
  - On HP-UX, you need to have HP-UX JDK. The earliest supported release of HP-UX is JDK 7.0.11. You can get the HP-UX Java JDK from *HP's Web site*.
- 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.
- GNOME menus and buttons have been standardized across all applications so that icons are not displayed by default. To keep the icons and the look and feel of previous versions, enable the menus_have_icons property with the command:

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

Other Requirements

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

If you have a network server, you must update the license server before installing the product as the client is not able to communicate with license servers of versions older than 10000.2.660. On Windows, you can check the version of your license server by clicking **Help > About** in the Micro Focus License Administration tool. To check the version of the license server on UNIX, run `/var/microfocuslicensing/bin/mfcesver` or `/var/microfocuslicensing/bin/cesadmintool.sh`.

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 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	1.7	Servlets 2.5
JBoss 7.1.1	1.7	Servlets 2.5
WebLogic 12.1.1	1.7	Servlets 2.5
WebSphere 8.5	1.7	Servlets 2.5

You need Oracle's JDK. The earliest supported release of Oracle's JDK 1.7 is 1.7.027. You can download Oracle's JDK from *Oracle's Web site*.

Application server JCA support for 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 Java application servers are supported using the following JDKs:

Application Servers	JDK (vendor)	Java EE	COBOL RA	CICS RA
JBoss 5.1.0	1.6 (Oracle)	5	X	
JBoss 6.1.0	1.6 (Oracle)	6	X	
JBoss 7.1.1	1.7 (Oracle)	6	X	X
Oracle WebLogic 10.3.5	1.6 (Oracle)	5	X	
Oracle WebLogic 12.1.1	1.6/1.7 (Oracle)	6	X	
IBM WebSphere 7.0	1.5 (IBM)	5	X	
IBM WebSphere 8.0	1.6 (IBM)	6	X	
IBM WebSphere 8.5	1.6/1.7 (IBM)	6	X	X

AppMaster Builder Distributed Generation Server

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Restriction: This feature applies only when the AppMaster Builder AddPack has been installed, and applies only to Windows platforms.

IBM WebSphere MQ version 7 and later.

Java Development Kit (JDK)

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Native COBOL and Java Interoperability	Oracle's Java Platform, Enterprise Edition (Java EE) 7 or Java 8 is required to run the Eclipse IDE, to execute COBOL JVM code and for native COBOL and Java interoperability. The setup file installs Java 8 u51 32-bit. 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.

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Consolidated Trace Facility

- The Microsoft .NET Framework 2.0 or later is required for the CTF Viewer. It is available from the Microsoft .NET downloads area.

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), SQL Option for DB2, 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*, 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.

Testing

For this version, COBSQL was tested with Oracle 11.1, 11.2, and 12.1.

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Database Access - OpenESQL

Availability

Feature/ Platform	Native and JVM Managed COBOL 32-bit	Native and JVM Managed COBOL 64-bit	PL/I 32-bit	PL/I 64-bit
x86-64 running Windows	X	X	X	X

XA Switch Module

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

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

Native 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

JVM Managed COBOL

OpenESQL supports access to relational databases using JDBC 4.0-compliant JDBC drivers. The following table shows the tested DBMSs and their corresponding JDBC driver filenames:

Tested DBMS Versions	JDBC 4.0 Compliant Drivers
DB2 LUW 9.5 DB2 LUW 9.7 DB2 LUW 10.1 DB2 LUW 10.5	`db2jcc4.jar` (and `db2jcc_license_cu.jar`)
Oracle 11.1, 11.2	`ojdbc6.zip`[1]

Tested DBMS Versions	JDBC 4.0 Compliant Drivers
Oracle 12.1	`ojdbc7.zip`[1]
Microsoft SQL Server 2008 R2	`sqljdbc4.jar`[2]
Microsoft SQL Server 2012	
Microsoft SQL Server 2014	
PostgreSQL 9.4	

[1]Some Oracle JDBC drivers are distributed as `.zip` rather than `.jar` files.

[2] On Windows platforms, if you are not using Windows authentication, no additional resources are required. However, if you are using Kerberos authentication with a driver version of 4.0 or later, although integrated authentication is not required, you might need to follow additional configuration steps as described in the driver documentation. No additional resources are required for UNIX platforms.

To use JDBC DataSource Objects, you must also install and configure a JNDI server.

- If you are using a Java application server, it includes a JNDI server you can use to configure DataSource objects. This process is described in the Java documentation for the application server.
- If you are not using a Java application server, or if you require a standalone JNDI server to configure DataSource objects for initial evaluation and development, see the *To install and configure Simple-JNDI* topic in this documentation set for instructions on downloading, installing, and configuring the open source JNDI server Simple-JNDI for this purpose.

Testing

For this version, OpenESQL was tested with:

- Oracle 11.1, 11.2 and 12.1
- DB2 LUW 9.5, 9.7,10.1,10.5
- SQL Server 2008 R2, 2012, 2014
- PostgreSQL 9.4

Note: Micro Focus provides compatibility for PostgreSQL but does not directly contribute to or support the PostgreSQL open source project. Any issues relating to PostgreSQL functionality should be addressed through an open source support vendor.

Database Access - HCO for DB2 LUW

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Availability

Feature/ Platform	Native COBOL 32-bit	Native COBOL 64-bit	PL/I 32-bit	PL/I 64-bit
x86-64 running Windows	X	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 DB2 Connect - Personal, Enterprise, Application Server or Unlimited Edition • IBM DB2 LUW - Workgroup or Enterprise Server Editions including Advanced versions • IBM DB2 LUW - Express or Express-C Edition • IBM Data Server Client (assumes installation of a remote DB2 LUW Server product)
Testing	For this version, HCO for DB2 LUW was tested with DB2 LUW 9.5, 9.7, 10.1, and 10.5.

HCO for SQL Server (HCOSS)

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Microsoft SQL Server	SQL Server 2008 R2 or later, Developer or Enterprise Editions, including Microsoft SQL Server Management Studio.	
Database Migration	• Microsoft .NET Framework 4.0 • Microsoft OLE DB Provider for DB2, available in the SQL Server 2008 R2 or later Feature Pack  **Note:** Be sure to configure the OLE DB Provider to connect to the mainframe. See your Microsoft documentation for details. • Mainframe DB2  **Note:** • We support only the mainframe DB2 versions that are currently under IBM support. • 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 SQL Server 2014 connectivity, you can install Microsoft ODBC Driver 11.0 for SQL Server. For information on configuring a deployment machine, see the section *Deploying Native Applications* below.	
Deploying Native Applications	**Development Machine**	• Enterprise Developer for Eclipse • If SQL Server 2008 R2 or 2012 is not installed, you must have Microsoft SQL Server 2008 R2 or 2012 Native Client installed. For SQL Server 2014, you must have Microsoft ODBC Driver 11.0 for SQL Server.

Development SQL Server Machine	SQL Server 2008 R2 or later **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 • If SQL Server 2008 R2 or 2012 is not installed, you must have Microsoft SQL Server 2008 R2 or 2012 Native Client installed. For SQL Server 2014, you must have Microsoft ODBC Driver 11.0 for SQL Server. If you want to bind your application from the deployment machine, install the following software in addition: • Microsoft .NET 3.5 framework, or later • SQL Server 2008 R2 or later System CLR Types • SQL Server 2008 R2 or later Shared Management Objects
Deployment SQL Server Machine	SQL Server 2008 R2 or later **Note:** This can be the same machine as the deployment machine, but is not required to be
Testing	For this version, HCO for SQL Server was tested with SQL Server 2008 R2, 2012, and 2014.

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.

Mainframe Access - Endevor Support

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- To use the Mainframe Access support for Endevor you must be using Endevor R14 or later. CA stabilized the Endevor API at R14, so if you upgrade from R14 to a later version you will not need to update the support module that Mainframe Access uses.

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.

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

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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	1.7	Servlets 2.5
JBoss 7.1.1	1.7	Servlets 2.5
WebLogic 12.1.1	1.7	Servlets 2.5
WebSphere 8.5	1.7	Servlets 2.5

Note:

- On AIX and zLinux, you need to have IBM's JDK. The earliest supported release of IBM's JDK 1.7 is 7.0 Service Refresh 8. You can get IBM's AIX JDK from *IBM's Web site*.
- On HP-UX, you need to have HP-UX JDK. The earliest supported release of HP-UX JDL 1.7 is Java 7.0.11. 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 1.7 is 1.7.027. You can download Oracle's JDK from *Oracle's Web site*.

Application server JCA support for 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 Java application servers are supported using the following JDKs:

Application Servers	JDK (vendor)	Java EE
JBoss 5.1.0	1.5/1.6 (Oracle)	5
JBoss 6.1.0	1.6 (Oracle)	6
JBoss 7.1.1	1.7 (Oracle)	6

Application Servers	JDK (vendor)	Java EE
Oracle WebLogic 10.3.5	1.5 (Oracle)	5
Oracle WebLogic 12.1.1	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 5.1.0	JBoss 6.1.0	JBoss 7.1.1	Websphere 7.0	Websphere 8.0	Websphere 8.5	Weblogic 10.3.5	Weblogic 12.1.1
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	32- and 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	32-bit
Red Hat EL 5.5 on AMD Opteron	32-bit	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	32- and 64-bit
Solaris 10 on SPARC	32- and 64-bit	32- and 64-bit	32- and 64-bit				32- and 64-bit	32- and 64-bit
SUSE SLES 11 SP1 on IBM390	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit
SUSE SLES 11 on AMD Opteron	32-bit	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.

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
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 (applies to UNIX environments only). You can find the script in the Micro Focus Knowledge Base article titled *Building and executing Pro*COBOL applications on UNIX*.

Testing

For this version, COBSQL was tested with Oracle 11.1, 11.2, and 12.1.

Database Access - OpenESQL

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Availability

Feature/ Platform	Native and JVM Managed COBOL 32-bit	Native and JVM Managed COBOL 64-bit	PL/I 32-bit	PL/I 64-bit
x86-64 running Red Hat Linux	X	X	X	X
x86-64 running SUSE Linux	X	X	X	X
IBM System p running AIX	X	X	X	
IBM System z running SUSE Linux	X	X		
Itanium running HP-UX	X	X		
x86-64 running Solaris	X	X		
SPARC running Solaris	X	X	X	X

XA Switch Module

The ODBC One-phase Commit switch module is provided and is available on the same platforms as are indicated in the *Availability* section above.

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

JVM Managed COBOL

OpenESQL supports access to relational databases using JDBC 4.0-compliant JDBC drivers. The following table shows the tested DBMSs and their corresponding JDBC driver filenames:

Tested DBMS Versions	JDBC 4.0 Compliant Drivers
DB2 LUW 9.5 DB2 LUW 9.7 DB2 LUW 10.1 DB2 LUW 10.5	`db2jcc4.jar` (and `db2jcc_license_cu.jar`)
Oracle 11.1, 11.2	`ojdbc6.zip`[1]
Oracle 12.1	`ojdbc7.zip`[1]
Microsoft SQL Server 2008 R2 Microsoft SQL Server 2012 Microsoft SQL Server 2014	`sqljdbc4.jar`
[1]Some Oracle JDBC drivers are distributed as `.zip` rather than `.jar` files.	

To use JDBC DataSource Objects, you must also install and configure a JNDI server.

- If you are using a Java application server, it includes a JNDI server you can use to configure DataSource objects. This process is described in the Java documentation for the application server.
- If you are not using a Java application server, or if you require a standalone JNDI server to configure DataSource objects for initial evaluation and development, see the *To install and configure Simple-JNDI* topic in this documentation set for instructions on downloading, installing, and configuring the open source JNDI server Simple-JNDI for this purpose.

Testing

For this version, OpenESQL was tested with:

- Oracle 11.1, 11.2 and 12.1
- DB2 LUW 9.5, 9.7,10.1,10.5
- SQL Server 2008 R2, 2012, 2014
- PostgreSQL 9.4 on the following platforms only:
  - x86-64 running Red Hat Linux
  - x86-64 running SUSE Linux

Note: Micro Focus provides compatibility for PostgreSQL but does not directly contribute to or support the PostgreSQL open source project. Any issues relating to PostgreSQL functionality should be addressed through an open source support vendor.

Database Access - HCO for DB2 LUW

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Availability

Feature/ Platform	Native COBOL 32-bit	Native COBOL 64-bit	PL/I 32-bit	PL/I 64-bit
x86-64 running Red Hat Linux	X	X	X	X
x86-64 running SUSE Linux	X	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	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
- On SPARC running Solaris, 64-bit is supported in IBM versions 10.1 or later

Host Compatibility Option (HCO)

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

- IBM DB2 Connect - Personal, Enterprise, Application Server or Unlimited Edition
- IBM DB2 LUW - Workgroup or Enterprise Server Editions including Advanced versions
- IBM DB2 LUW - Express or Express-C Edition

- IBM Data Server Client (assumes installation of a remote DB2 LUW Server product)

Testing	For this version, HCO for DB2 LUW was tested with DB2 LUW 9.5, 9.7, 10.1, and 10.5.

WebSphere MQ

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IBM WebSphere MQ version 7 and later.

Installation Restrictions and Requirements

Before starting the installation you should consider the following:

- 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) or a process (on UNIX) 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 Enterprise Developer for Eclipse

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.

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.

Installing and Licensing Micro Focus Rumba

The Enterprise Developer setup file includes Micro Focus Rumba 9.4 which you can install as an optional component. The license for Enterprise Developer also licenses all components of Rumba (for example, Rumba Office, Rumba for Mainframe, UNIX, AS400, and the TN3270 mainframe display within Enterprise Developer).

Note: Micro Focus Rumba versions 8.3 or later provide integration with Enterprise Developer where you can use a Rumba TN3270 Mainframe Display within the IDE in order to run applications.

Installation considerations:

- If you are installing Enterprise Developer onto a machine that does not have Rumba installed, it is recommended that you select the Rumba option when you start the installation. This installs all of the components of Rumba including the one you need to establish a mainframe 3270 connection (Rumba for Mainframe).
- Installing Rumba 9.4 as part of this release of Enterprise Developer will update any older version of Rumba installed and licensed on your machine.

  Note: Micro Focus recommends that you upgrade older versions of Rumba to the one installed with Enterprise Developer. However, if you want to keep an older version of Rumba, you can choose not to install Rumba when you start the Enterprise Developer installation. In this case, the TN3270 Mainframe Display will not be available for use from within Enterprise Developer.
- If a version of Rumba more recent than version 9.4 is installed and licensed on your machine, you can choose not to install Rumba as part of the Enterprise Developer installation. The TN3270 Mainframe Display provided with this version of Rumba may be supported within Enterprise Developer but might not have been tested.

Installing as an Upgrade

- This release will not upgrade previous versions of the product. Any previous releases and HotFixes of the product installed on your machine must be uninstalled before installing 2.3.
- If you have been using the mainframe components of Enterprise Developer for IBM zEnterprise, see *Installing z/Server as an Upgrade* for recommendations about how to upgrade your z/Server installation. Also, check *Backward Compatibility of AWM Models* for information about changes that affect your existing AWM models.
- 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 *System Requirements*. Also, check *Installing as an Upgrade*, if you have an earlier version of Enterprise Developer installed on your machine.
- This version of the product is a full install.
- The setup file installs Enterprise Developer and Eclipse 4.4.2. After the installation is completed, you can install Enterprise Developer into other versions of Eclipse such as version 4.2 or 4.3 for the 32-bit Eclipse only - see *Installing Enterprise Developer into other instances of Eclipse* for instructions.

These are the steps to install this product:

1. Run the `ede_23.exe` file and follow the wizard instructions to complete the installation.

By default, this installs Enterprise Developer in the `%ProgramFiles(x86)%\Micro Focus \Enterprise Developer` folder and installs a full version of Eclipse 4.4.2, with the Micro Focus plugins already installed, in the `C:\Users\Public\Micro Focus\`*`Product Name`*`\eclipse` directory. The setup file installs any missing prerequisite software as listed in the topic *Software Requirements*.

Note: If you have Java 7 installed on your machine and you do not want the setup file to install Java 8, you can install the product silently and use the `skipjre=1` command line option to skip installing Java 8. See *Installing Silently on Windows* for more details.

Installing Silently on Windows

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.

To install silently use the following command:

```
start /wait install-file.exe /q [parameters]
```

where *install-file* for the following products is as follows:

Enterprise Developer	`ede_23.exe`

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

```
install-file /help
```

See the *Examples* section further in this topic for examples of some of the parameters you can use.

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	For 32-bit Windows environments:
	`start /wait "" "C:\Program Files\Common Files\SafeNet Sentinel\Sentinel RMS License Manager\WinNT \cesadmintool" -term activate AuthorizationCode`
	For 64-bit Windows environments:
	`start /wait "" "C:\Program Files (x86)\Common Files \SafeNet Sentinel\Sentinel RMS License Manager\WinNT \cesadmintool" -term activate AuthorizationCode`

If you don't have access to the Internet but have a file from Micro Focus that contains the license string

For 32-bit Windows environments:

```
start /wait "" "C:\Program Files\Common Files\SafeNet Sentinel\Sentinel RMS License Manager\WinNT \cesadmintool" -term install -f FileName
```

For 64-bit Windows environments:

```
start /wait "" "C:\Program Files (x86)\Common Files \SafeNet Sentinel\Sentinel RMS License Manager\WinNT \cesadmintool" -term install -f FileName
```

where *FileName* is the name of the text file that contains all the license strings to be used.

Directory considerations

- You must have read and write access for every directory accessed during the installation.
- You can override the default installation folder using the INSTALLDIR parameter.

  If a path in a definition contains spaces, then the path must be preceded by a backslash and double quotation mark (\"). For example:

  ```
  INSTALLDIR=path
  INSTALLDIR=\"c:\MyProduct\"
  INSTALLDIR=\"c:\Program Files\Micro Focus\My Product\"
  ```

- Installing creates a group of log files prefixed `Micro_Focus_` in the `%temp%` folder, by default. To change the location or name, use the /l parameter on your Setup command line and specify the path and file name, for example:

  ```
  /l*v drive:\path\LogFilename
  ```

Examples

- To silently install Enterprise Developer into a directory other than the default:

  ```
  start /wait ede_23.exe /q InstallFolder=c:\DirectoryName
  ```

- If you want to silently install the Eclipse IDE in a location other than the default, execute:

  ```
  start /wait ede_23.exe /q InstallFolder2=c:\EclipseInstallDirectory
  ```

- To silently install Rumba during the silent install of Enterprise Developer:

  ```
  start /wait ede_23.exe /q RumbaCheckbox=1
  ```

- To skip the install of the JRE during the silent install of Enterprise Developer:

  ```
  start /wait ede_23.exe /q skipjre=1
  ```

Installing Enterprise Developer into other instances of Eclipse

Enterprise Developer ships with Eclipse 4.4.2. After installing Enterprise Developer, you can then also install it in other instances of Eclipse available on the same machine. The supported versions of Eclipse are 4.2, 4.3 and 4.4, only for the 32-bit Eclipse.

Note: Though Enterprise Developer does not support the 64-bit Eclipse, you can use the 32-bit Eclipse to create both 32-bit and 64-bit applications.

To assist you with automatically installing the Micro Focus plug-ins into other instances of Eclipse, Enterprise Developer provides an installation utility, `installeclipseplugins.bat` available in the `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\installer` folder.

To install Enterprise Developer into another instance of Eclipse:

1. Start an Enterprise Developer command prompt.
2. At the command prompt, navigate to the location of the install utility: `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\installer`.

3. Run the install utility from the command prompt using the following syntax:

```
installeclipseplugins -eclipse <EclipseInstallDir> -version <version> [-
cobdir <InstallDir>] [-nosplash]
```

Where:

- *EclipseInstallDir* - full path to the installation directory of the instance of Eclipse you are installing into.
- *version* - version number of the instance of Eclipse that you are installing into. The valid version numbers are 4.2, 4.3 and 4.4 and these also cover minor version numbers such as 4.3.1, 4.3.2 and 4.4.1.
- *InstallDir* - optional. The full path to the installation directory of Enterprise Developer. If this is not specified, the COBDIR environment variable is used.
- -nosplash - optional. If set, the installation will not replace the existing splash screen. A non-default Eclipse splash screen will not be replaced, regardless of this setting.

Note: The default COBDIR location, in Windows environments, `C:\Users\Public\Micro Focus\ProductName\eclipse`. Alternatively, the COBDIR can be specified on the command line.

Running the utility installs the Enterprise Developer plug-ins into the specified version of Eclipse and copies the Enterprise Developer `UpdateSite` folders into *`EclipseInstallDir`*`\eclipse\dropins`.

For example, to install Enterprise Developer into an instance of Eclipse 4.3 available in the `c:\eclipse` folder, run the install utility with the following parameters:

```
installeclipseplugins -eclipse c:\eclipse -version 4.3 -nosplash
```

Installing Micro Focus Enterprise Developer UNIX Components

Note: If you are installing on Solaris, please read *UNIX Installer Issues* first.

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_2.3_platform
```

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

```
./setup_entdev_2.3_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_2.3_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, `-ESadminID="esadm"`. The default user ID is the one that runs the installer.
-CASrtDir	Specifies the location were the Enterprise Server run-time system files are placed - for example, `-CASrtDir="/home/esuser/casrt/es"`. The default location is `/var/mfcobol/es`.

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_2.3_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 is installed, you can silently install the license as follows:

- If you have access to the Internet and an authorization code, execute the following commands:

  For 32-bit Windows environments:

  ```
  start /wait "" "C:\Program Files\Common Files\SafeNet Sentinel\Sentinel RMS
  License Manager\WinNT\cesadmintool" -term activate AuthorizationCode
  ```

  For 64-bit Windows environments:

  ```
  start /wait "" "C:\Program Files (x86)\Common Files\SafeNet Sentinel
  \Sentinel RMS License Manager\WinNT\cesadmintool" -term activate
  AuthorizationCode
  ```

- If you don't have access to the Internet but have a file from Micro Focus that contains the license string:

  For 32-bit Windows environments:

  ```
  start /wait "" "C:\Program Files\Common Files\SafeNet Sentinel\Sentinel RMS
  License Manager\WinNT\cesadmintool" -term install -f FileName
  ```

  For 64-bit Windows environments:

  ```
  start /wait "" "C:\Program Files (x86)\Common Files\SafeNet Sentinel
  \Sentinel RMS License Manager\WinNT\cesadmintool" -term install -f FileName
  ```

  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.

  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.

Configuring the Remote System Explorer Support

The remote development support from the Eclipse IDE relies upon Enterprise Developer running on the UNIX machine and handling all requests from the IDE for building and debugging programs. Enterprise Developer provides a UNIX daemon, the Remote Development Option (RDO) daemon, which initiates the RDO as Eclipse clients connect to it. Whichever environment is used to start the RDO daemon will be inherited for all servers and hence all build and debug sessions.

Configuring the Environment

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

Starting the Daemon

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

- a version of Perl
- a version of Java
- the `as` (assembler) and `ld` (linking) programs on the path, as specified by the PATH environment variable

To start the daemon on the default port (4075) as a background process, perform this command with superuser authority:

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

The daemon will now listen for any Eclipse client processes connecting to that machine on port 4075. If you want to use another port, specify another port number on the `startrdodaemon` command.

The daemon can also be configured to instantiate the servers on a specified port or range of ports. This is particularly relevant when you want to only open certain ports through a firewall. To do this, perform this command with superuser authority:

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

where:

- <*port*> is the port number the daemon should use to listen for connections from Eclipse on the client machine. If no value is given, it will be assigned a default value of 4075. This value matches the value assigned within the Eclipse installation.

  For example,

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

  This command will start a daemon listening on port 4999 and will use random server ports.
- <*low port*>-<*high port*> is the range of ports on which the servers (launched by the daemon) should use to communicate with Eclipse on the client machine.

  For example,

  ```
  $COBDIR/remotedev/startrdodaemon 4080 4090-4999
  ```

  This command will start a daemon listening on port 4080 and server ports will be in the range 4090 to 4999.

Stopping the Daemon

To stop the daemon, type the following command with superuser authority:

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

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 the Mainframe Components

Mainframe z/Server

The mainframe z/Server is a z/OS server that supports the Eclipse mainframe integration, and is provided with Enterprise Developer for IBM zEnterprise. Both Mainframe Access Server (MFA) and z/Server must be installed before you can create a connection from the AWM client to the host.

Refer to the *z/Server Installation Guide* further in this file and in your product Help for instructions on how to install Enterprise Developer's mainframe components.

To define default z/Server connections:

Enterprise Developer supports the configuration of default connections. Default connections can be defined by creating a file called `defaultZConnection.ini` in the Eclipse folder of your Enterprise Developer installation.

The contents of this file must follow these syntax rules:

- Every line must contain one attribute or start with # (Comment)
- Every connection must start with `>CONNECTION` and end with `>END_CONNECTION`
- Every connection must be defined with following attributes:

NAME	The name of the connection - this must be unique
HOST_ADDRESS	The physical address of the host (for example 192.168.1.1, localhost)
PORT	The port of the z/Server (scheduler)
DESCRIPTION	The description of the connection - this can be left blank

A sample file is included in the installation.

When Enterprise Developer successfully parses the `defaultZConnection` file, it creates a z/OS connection in the Remote Systems View for every configured default connection.

Important: Enterprise Developer reads the `defaultZConnection` file only once for each workspace. This means that any changes relating to default connections will not apply to existing workspaces that have already been used.

Assuming you have the appropriate Enterprise Developer for IBM zEnterprise license, after installing z/Server you should verify the connectivity.

To verify mainframe connectivity:

1. Start Eclipse.
2. Ensure the Team Developer perspective is loaded. If it is not visible, select **Window > Open Perspective > Other > <Team Developer>**.
3. Right-click in the Remote Systems view and select **New > Connection**.
4. Select "z/OS" from the connection list and click **Next**.
5. Enter the TCP/IP address or name of your mainframe system and enter a connection name that will be displayed in the view. Click **Next**.

6. Enter the correct connection port and the default encoding parameters. Ask your system administrator if you do not know the correct parameters.
7. Click **Finish**. The z/OS entry is added to the view.

To verify the client host connection:

1. Start Eclipse and switch to the Team Developer perspective.
2. Expand the z/OS connection entry in the Remote Systems view. If the z/OS entry is not shown in this view, verify the client installation process first.
3. Right-click on the MVS entry and verify, or customize, the port number of the z/Server server (the default is 1111).
4. Right-click on the MVS entry and select **Connect**.
5. Enter your mainframe user ID and password and click **OK**. After a successful connection the color of the icons changes to green.
6. Right-click again on the MVS entry and select **Disconnect** to disconnect from the host system.

Mainframe Access server (MFA)

Mainframe Access is the OS/390 and z/OS server for Micro Focus development environments. It is a common component providing access to host resources for environments. One installation of Mainframe Access can support all of these products, providing connectivity to any number of DB2, IMS, and CICS systems located anywhere in an enterprise. It can also provide access to JES facilities, VSAM data sets, non-VSAM data sets, and data controlled by external library management products such as Panvalet, Librarian and Endevor.

Features include:

- The Drag and Drop utility allows you to transfer files using drag and drop methods, between the mainframe and the PC environments.
- The Remote Job Step Execution (RJSE) facility enables execution of one or more steps of a job on a remote z/OS host. It automatically uploads and downloads required files as necessary with an end result the same as when all steps are executed locally.
- Compare and Synchronization Monitor allows you to compare mainframe data sets against workstation directories. Where differences occur, you can synchronize the information. This can occur in either direction, or both directions. Typically, you would download mainframe partitioned data sets to a workstation directory.
- You can use SourceConnect to map a PC drive to a mainframe dataset. You can then access mainframe files and resources from a PC, or from applications running on a PC.

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 must be authorized.

If you are upgrading Mainframe Access from a version of Enterprise Developer prior to 2.3 you will need to modify your production JCL procedures with reference to the supplied samples MFA, MFAS, and MFAAS. The modification is necessary because at Enterprise Developer 2.3 Mainframe Access changed to being built using the IBM XL/C compiler rather than the SAS/C compiler, so for each JCL procedure you need to change the STEPLIB DD statement and add a new one, CEEOPTS.

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.

Installing Application Workflow Manager into IBM Rational Developer for System z (RDz)

The Application Workflow Manager component provides all the capabilities and tools to develop and maintain Application Workflow models. These models allow you to integrate mainframe tools and processes directly into Enterprise Developer.

Before installing the Application Workflow Manager Update Site 2.3, check if an older Application Workflow Manager feature installation exists, and if so, un-install it.

1. Start the RDz product with administrator's privileges.
2. Open **Help** > **About IBM Rational Developer for Systemz**.
3. Click **Installation Details**.
4. If you see plugins "Application Workflow Manager" and "AWM RDz Integration" (version 2.2.*), select them and click **Uninstall...**.
5. Restart RDz if prompted to do so.

An Enterprise Developer Connect license enables you to install and use the Application Workflow Manager component in the RDz product. The following instructions show how you can do this:

1. Install Enterprise Developer and a license for Enterprise Developer Connect.
2. Copy the `AWMUpdateSite.zip` file from `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\installer` to a temporary folder.
3. Start the RDz product with administrator's privileges.
4. In the IDE, click **Help > Install New Software**.
5. On the **Install** dialog box, click **Add** on the row for the **Work with** field.
6. On the **Add Repository** dialog box, click **Archive**.
7. Navigate to the location of the `AWMUpdateSite.zip` file, select the file, click **Open** and then click **OK**.

   This loads the **Application Workflow Manager** component in the **Install** dialog box.
8. Under the **Application Workflow Manager** node, check the **Application Workflow Manager** and **AWM RDz Integration** items.

9. Click **Next** and follow the wizard instructions to complete the installation.
10. Restart RDz if prompted to do so.

Installing on Microsoft Terminal Server and Citrix

Note: This document is a work-in-progress. Check the documentation for Enterprise Developer in the *Product Documentation* section of the Enterprise Developer SupportLine Web site for its most recent version.

Microsoft Terminal Server and Citrix (TS/Citrix) are environments for running multiple instances of a single user product. They are not platforms where a single-user product can be made to perform as a multi-user product.

When running Enterprise Developer on TS/Citrix machine, there might be some implications to components of Enterprise Developer which could cause potential conflicts between a 'per-user session' compared to the standard 'per machine' setup. The following components of Enterprise Developer require special configuration:

- Eclipse workspaces and projects
- The Enterprise Server component - the Run-Time System product for JCL, CICS and IMS operations
- The database management service

You can use Enterprise Developer with TS or with any Citrix version certified for use with Eclipse; however, a separate end-user license is required for each user who accesses Enterprise Developer, even if it is running on a single machine. See your *End User License Agreement* for clarification.

Note: Micro Focus Enterprise Developer does not officially support TS/Citrix. However, it will run on any prerequisite Operating System that is supported under TS/Citrix.

Capacity planning

Multi-user capacity planning for TS/Citrix does not scale linearly, and the calculations required for this planning are not directly related or specific) to any Micro Focus technology. Micro Focus recommends that you consult with Microsoft or Citrix Systems, respectively, about the server sizing and capacity planning, based on hosting the required number of "rich" Windows 7 or Windows 8 desktops (e.g. using a singleton desktop build as a baseline).

Installing Enterprise Developer

To install Enterprise Developer for use with TS/Citrix:

1. Log on to the physical terminal or Citrix server with a user ID that has administrator privileges.
2. Use the download links in your Electronic Product Delivery email.
3. Follow the links for the installation instructions and the End User License Agreement.

Configuring Enterprise Developer components

Further configuration is required for the following Enterprise Developer components:

Using Eclipse IDE under TS/Citrix

For considerations about how to use Eclipse under TS/Citrix refer to the *Eclipse product help*.

Micro Focus recommends you set up Enterprise Developer for Eclipse so that each user has their own configuration area and you make the `configuration` folder within the Eclipse installation read-only. (Enterprise Developer for Eclipse is installed on the TS/Citrix machine into `C:\Program Files (x86)\Micro Focus\Enterprise Developer` with the Eclipse installation stored in `C:\Users\Public\Micro Focus\Enterprise Developer\eclipse`.)

To ensure that each user will have their own configuration area, you need to set up Eclipse as follows:

1. On the TS/Citrix machine, start Enterprise Developer once, make any required customizations to the IDE and then close it.
2. Using Windows Explorer, navigate to `C:\Users\Public\Micro Focus\Enterprise Developer \eclipse` and open the `eclipse.ini` file with an editor.
3. Add the following code before the `-vmargs` entry:

   ```
   -configuration
   @user.home\EclipseConfig
   ```
4. Using Windows Explorer, navigate to the Eclipse installation folder and from the folder properties make the `configuration` folder **Read Only** for the group that will work with Enterprise Developer for Eclipse.

This ensures that each user that starts Enterprise Developer for Eclipse under TS/Citrix can only see their own workspaces and that they have their own `EclipseConfig` folder specified by the `eclipse.ini` file.

Eclipse workspaces

An Eclipse workspace is a folder on the disk where the project and application files are stored. The default location for an Eclipse workspace is in the user's area (for example, `c:\users\`*`username`*`\`). It is not possible to share workspaces so each user must have their own.

We suggest that you create Eclipse workspaces in an area on a shared network drive, naming each workspace folder with an individual user ID.

Also provide a startup script that maps the drive dynamically using share names derived from the user ID.

Tip: Use the `net use` command to connect to, remove and configure the connections to the mapped drives.

Projects

Create and configure template projects to distribute among your users. Templates must not include fully qualified paths. You can store the projects in a source control system and make them available so that individual users can import them into their own workspace.

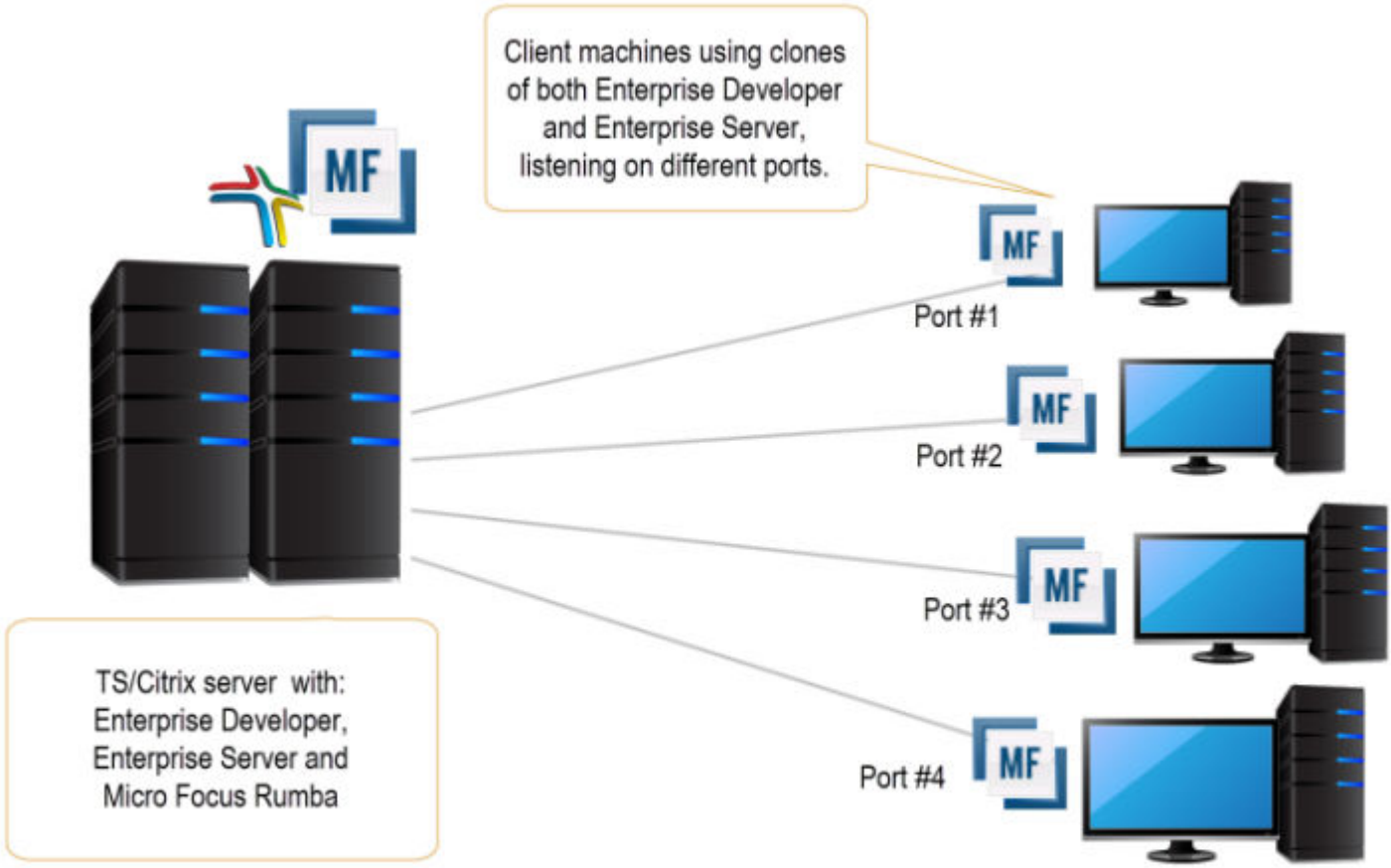
Enterprise Server Installation Options

When you install Enterprise Developer, the setup file also installs the Enterprise Server component on the same machine. There are different ways in which you can configure and use Enterprise Server regions in TS/Citrix environments. This topic outlines two of the methods and explains what the implications of choosing them are:

- **Use the Enterprise Server component as part of Enterprise Developer installed on the TS/Citrix machine**

  On the client machines, the developers each use a clone of Enterprise Developer. They also use a clone of Enterprise Server to create and manage multiple server instances as required.

  While this option provides the greatest flexibility, it also consumes the largest footprint per user.



TS/Citrix environment providing application streaming (virtualization) on demand

- **Install Enterprise Server or Enterprise Test Server on a separate server**

  You can install Enterprise Server[1] or Enterprise Test Server[2] on a separate server that does not have TS/Citrix installed. By default, Enterprise Server installs and runs as a single-instance product and, within an Enterprise Server, you can operate a number of server instances. Each server provides session and state management for COBOL applications, as well as optionally interfacing with external resource managers to coordinate resource updates.

  There are two ways to provide server instances to the developers using Enterprise Developer on the TS/Citrix machine:

  - Configure and configure one server instance per developer by specifying different ports. We recommend defining five-digit port numbers where digits one through three identify the developer and four through five identify a unique port. For example: port number 10123 defines a TN3270 listener for developer 1, and port number 10223 defines a TN3270 listener for developer 2.

    This option provides a dedicated enterprise server for testing purposes for each developer, but restricts each developer to that one enterprise serve instance.

---

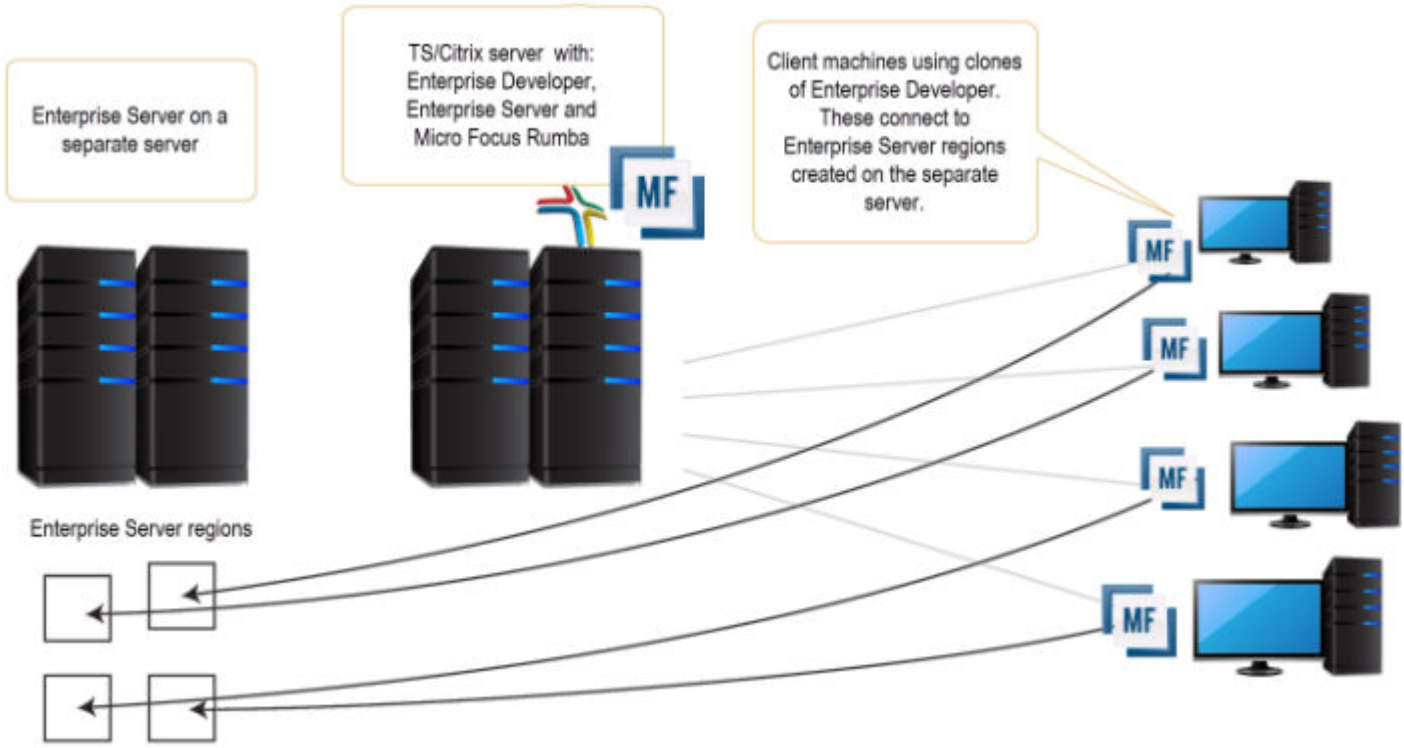
[1] Micro Focus Enterprise Server provides full application server support for COBOL applications that require high-performance and mainframe subsystem emulation. Enterprise Server is designed as a multi-user environment.

[2] Micro Focus Enterprise Test Server is an IBM mainframe application test execution environment on Windows. Enterprise Test Server enables mainframe IT organizations to perform a variety of pre-production testing on low cost commodity hardware, avoiding unnecessary cost and delay. Built on proven technology, Enterprise Test Server exponentially expands the test capacity and enables testing to scale up easily to meet delivery timelines and quality standards driven by today's business requirements.

This scenario creates the largest footprint per developer.

Or:

- Create and configure one server instance per application for use by a single development team. Use a different port number for each instance as explained above, using the first three digits to differentiate between applications.



Micro Focus Rumba

To use Micro Focus Rumba on a TS/Citrix machine, ensure you install a license for this type of environment. Contact Micro Focus Sales for more information.

ViewNow Installation

To use ViewNow on a TS/Citrix machine, ensure you install a license for this type of environment. Contact Micro Focus Sales for more information.

After Installing

If you have used Eclipse from the same workspace before, the Eclipse perspective settings are not reset after installing any Micro Focus product. To pick up any new features, you must reset the COBOL perspective after installation:

1. Open the existing workspace with this product.

   You may receive some warnings or errors which you can ignore.
2. Make sure you are in the COBOL perspective by clicking **Window > Open Perspective > COBOL**.
3. Click **Window > Reset Perspective**.
4. Click **OK**.
5. Reapply any customizations.

Note:

For applications created with earlier Micro Focus products, note the following:

Application Workflow Manager

There are significant structural changes to Application Worklflow Manager (AWM) and to z/Server in Enterprise Developer 2.3. See *Backward Compatibility of AWM Models* for details about how this affects existing AWM models.

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 Eclipse* in the product Help.

Open PL/I Compiler

Important: If you are installing this release as an upgrade to Enterprise Developer 2.2 Update 1, after the upgrade you must rebuild any applications that are compiled using the –zp1 option.

The behavior of the –zp1 option has been reverted to that of versions of Enterprise Developer earlier than 2.2 Update 1, with an additional correction relating to Char Varying data items.

The behavior has been restored to that in Enterprise Developer versions earlier than 2.2 where, when compiling with –zp1, all parameters are treated as unaligned. (In Enterprise Developer 2.2 Update 1, the behavior when compiling with –zp1 was to not treat parameters as if unaligned).

When using the –zp1 compiler option, all Character Varying data items are now treated as if unaligned. In previous versions of Open PL/I, for Character Varying data items, the –zp1 unaligned requirement was applied only to structure members and parameters.

To illustrate the change, consider the following example:

```
zptest: proc options(main);

   dcl 1 st1,
     2 c char,
     2 x(4) char(7) var init ('a', 'xx', 'yyy', 'zzzz');

   dcl y(4) char(7) var init ('a', 'xx', 'yyy', 'zzzz');

   dcl sub entry ((4) char(7) var);

   call sub (x);

   call sub (y);

end;

sub: proc (z);

   dcl z(4) char(7) var;

   dcl i fixed bin(31);

  do i = 1 to hbound(z);
      z(i)  = 'x';
  end;

end;
```

Where:

- For `x` and `z`, each `char (7) var` item is 7 plus 2 bytes which equals 9 and then multiplied by 4 equals 36.

- If y were aligned on half-word by default, each array element is half-word aligned and each equals 10 bytes (9 + 1 pad byte), and the total size equals 40 bytes.
- At `call sub (x)`, the calling argument and parameter are matched.
- At the `call sub (y)`, the y element size (10 bytes) is mismatched against the parameter z element size (9 bytes) due to –zp1. This is incorrect and causes unexpected program behavior.

Due to this correction of treating all Char Varying data items as if unaligned when using –zp1, the size of CHAR VARYING arrays now differs from previous versions of Open-PL/I. For example:

```
   dcl X(4) char(7) var;

   Put skip list (size(X))  /* size is 36 bytes vs. 40 bytes in
previous versions of Open-PL1 */
```

Product Help

Check the *Product Documentation* section of the *Micro Focus SupportLine Web site* and the *Micro Focus Infocenter* for any updates to the documentation which might have been uploaded.

Installing X Windows on Windows

Some features of Enterprise Developer for Eclipse on Windows require an X Windows installation, hence Micro Focus ViewNowX is provided with the product. To install, run the file `ViewNow_X_Server.exe` in your Enterprise Developer installation. By default this will be in the `%ProgramFiles(x86)%\Micro Focus\Enterprise Developer\ViewNowX` folder.

ViewNowX requires that your client machine has Microsoft Visual C++ 2008 SP1 Redistributable Package (x86) installed. If it is missing from your machine, the ViewNowX installation will offer a link to download the package.

Repairing

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

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

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

Uninstalling

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.

Important: The installer creates separate installations for Micro Focus Enterprise Developer and Micro Focus License Administration. Uninstalling only Enterprise Developer does not automatically uninstall the Micro Focus License Administration or any of the prerequisite software.

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.

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
```

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_EnterpriseDeveloper2.3.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.

z/Server Installation Guide

Introduction

z/Server V2R3 consists of mainframe components which have to be installed in a z/OS environment.

This document is intended for system programmers installing and configuring the z/Server software on their z/OS host system.

z/Server overview

z/Server supports the execution of mainframe programs called from a client via TCP/IP requests.

Therefore z/Server provides:

- A multi-tasking scheduling server (called scheduler)
- An initialized LE environment
- Automatic code page translation
- Task level security
- XML support
- User servers running an ISPF environment
- Command support
- MVS catalog and dataset access
- JESx access

The z/Server configuration file

XML configuration file

z/Server uses an XML configuration file to store all of the configuration and properties that control how z/Server operates. It's these parameters that you will need to review before you can get your z/Server running.

Because the configuration is written in XML you can apply an XML Schema Definition (XSD) to the XML and validate the configuration before you even start z/Server with this configuration. This means that you can get the necessary information required for configuration from your Systems Programmer and create a working XML configuration file that has been validated to be correct well before setting up z/Server on your mainframe.

To make configuring z/Server easier there is a Technical Preview utility that provides a web-based interface for configuring and validating z/Server. With this utility you can create a new XML configuration file, edit it and then upload it to the mainframe ready for use with z/Server. You can also edit existing XML configuration files. This utility is available from the **Product Updates** section of the *Micro Focus SupportLine site*. To download the utility, once you have logged in to the SupportLine site, navigate to the latest version of Enterprise Developer and select **z/Server Configuration Utility**.

Alternatively, you can edit the XML configuration file yourself, and because Enterprise Developer for IBM zEnterprise includes the matching XSD (in hlq.ZSERVER.CONFIG(IVPSCHEM)), you can use an XML editor to validate your XML configuration file against the XSD. There are also a number of web sites offering XML validation services for free where you can upload the XML configuration file and schema, or alternatively simply paste in the contents of the XML configuration file and schema. These provide instant feedback on the validity of your XML configuration file.

Legacy configuration files

Legacy configuration files are still supported. If you want to continue to use them, full details of their use are contained in the version of the *z/Server Installation Guide* that accompanied Enterprise Developer for IBM zEnterprise 2.2 Update 2, available from the Micro Focus Product Documentation web pages.

To continue using the legacy configuration files or to optionally switch back to it you simply need to perform the following steps:

For the holder (TAURHLD):

- Comment out, or otherwise disable, the CONFXML and CONFOSR DD statements.
- Reinstate the CONFIG DD statement in the JCL.

For schedulers and user servers (TAURISPF, IVPUSRT, CEASCHED and CEAPROC):

- Reinstate the IPCONFIG DD statement in the JCL.

You must only have the relevant DD statements active for the configuration file type you want to use. If you try to start z/Server with both types of configuration DD statement, the holder will fail to start and you will see the following error message in the MAINTASK DD:

```
ZCF0059E 11:08:45.603 Definition of old and new
configuration is not allowed.
```

Instructions in the rest of this documentation assume that you are using the XML configuration file. Refer to the version of the *z/Server Installation Guide* that accompanied Enterprise Developer 2.2 Update 2 if want to continue to use the legacy configuration files.

Technical preview of CEA Launched address space

This release of z/Server lets you start a z/Server user server as CEA-launched TSO address space, as a technical preview. A CEA-launched TSO address space is comparable to a TSO foreground session.

To use this functionality, the CEA system address space must be configured and running as a full function address space on the system.

The technical preview requires the JSON support for CEA under z/OS, which is available only from z/OS 1.13 and later.

In the current zServer release, CEA-launched address spaces are only supported under z/OS 1.13.

Program materials

z/Server is distributed as a downloadable product. A link to the electronic distribution internet address is provided when purchasing or evaluating the product.

The downloadable materials contain the z/Server software components (machine-readable material).

Migration information

There have been some changes in the way that z/Server is configured and works.

One change is that the z/Server client now uses technology from Micro Focus Mainframe Access (MFA) Server, so you must install MFA Server on the host before you can install and use z/Server. See *Installing Mainframe Access Server* and *Configuring and Administering the Mainframe* for more information.

If you are upgrading from z/Server V2R2M02 or earlier you will also have to make changes to several JCL members and customize a single REXX procedure.

The migration that you need to perform depends on whether you want to continue to use your legacy configuration files or switch to use the XML configuration file. If you want to continue using your legacy configuration files you only need to perform the steps described in *Basic migration*. If you want to switch to use the XML configuration file, perform the steps described in *Basic migration* as well as those in *Additional migration to use the XML configuration file*.

Basic migration

If your z/Server installation is currently working as required and you do not want to use the XML configuration file, you only need perform the steps in the following sections.

Basic migration of the holder address space JCL (TAURHLD)

Below is an example of the holder JCL. The changes required are highlighted in bold:

```
//TAURHOLD PROC P1=
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
//*-----------------------------------------------------------------*
//*- RUN ZSERVER HOLDER TASK                                       -*
//*-----------------------------------------------------------------*
//TAURHOLD EXEC PGM=TAURHOLD,TIME=NOLIMIT,PARM='/&P1'
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..AUTHLIB
//SYSEXEC  DD DISP=SHR,DSN=&TAURHLQ..REXX
//CONFIG   DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPHOLD)
//*CONFXML  DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPXML)
//*CONFOSR  DD DISP=SHR,DSN=&TAURHLQ..OSR(IVPOSR)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//DSPPRT   DD SYSOUT=*,LRECL=255
//SYSTSIN  DD DUMMY
//        PEND
```

The TAURHOLD procedure statement has been changed and now defines one new parameter, which is used in the TAURHOLD exec statement:

- P1 is used to specify if tracing should be enabled while reading the XML configuration file. Do not change this unless asked to do so by a member of Micro Focus SupportLine staff.

The CONFXML and CONFOSR DD statements are only required if you want to use the new XML configuration file. If you want to use your existing configuration files, these can be commented out or otherwise disabled.

The CONFXML DD statement points to the XML configuration member. Information on how to configure z/Server using XML can be found in *Configuring z/Server*.

The CONFOSR DD statement points to the Optimized Schema Representation (OSR) that is used to validate the XML configuration file.

There is also an additional final PEND statement.

Basic migration of the STC scheduler address space JCL (TAURISPF)

Below is an example of the STC scheduler JCL. The changes required are highlighted in bold:

```
//TAURISPF PROC
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*SYSABEND DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSUDUMP DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//SYSTSIN  DD  DUMMY
//ZCOTSIN  DD  DUMMY
//IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPISPFJ)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//*MAILHDR  DD  DISP=SHR,DSN=&TAURHLQ..SAMPLIB(IVPMHDR)
```

The TCPDATA is used by the SYSTCPD DD statement to specify the TCPIP settings for use in the LE environment.

Basic migration of the STC user server address space JCL (IVPUSRT)

Below is an example of the STC user server JCL. The changes required are highlighted in bold:

```
//TAURHLQ  SET TAURHLQ=HLQ.ZSERVER
//ISPFHLQ  SET ISPFHLQ=ISP
//TCPDATA  SET TCPDATA=TCPIP.TCPDATA
//*****************************************************************
//*    START TSO/E-ISPF-SESSION AS STARTED JOB
//*****************************************************************
//*  SET ACEE FOR USER
//*****************************************************************
//TAURSJOB EXEC PGM=TAURSJOB
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPACEE)
//*****************************************************************
//*    START TSO/E-ISPF-SESSION BATCH
//*    MOVE TEMP ALLOCATIONS TO IVPINIT1 RPI 611619
//*****************************************************************
//IVPISPF  EXEC PGM=IKJEFT1B,PARM='%IVPINIT1',
//            DYNAMNBR=200,REGION=0M,TIME=NOLIMIT,COND=(4,LT)
//STEPLIB  DD DSN=&TAURHLQ..LOADLIB,DISP=SHR
//IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPUSR)
//SYSTCPD  DD DISP=SHR,DSN=&TCPDATA
```

```
//SYSEXEC  DD DSN=&TAURHLQ..EXEC,DISP=SHR
//         DD DSN=&TAURHLQ..REXX,DISP=SHR
//ISPPLIB  DD DSN=&TAURHLQ..PANELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPPENU,DISP=SHR
//         DD DSN=ISF.SISFPLIB,DISP=SHR
//ISPSLIB  DD DSN=&TAURHLQ..SKELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPSENU,DISP=SHR
//         DD DSN=ISF.SISFSLIB,DISP=SHR
//ISPMLIB  DD DSN=&ISPFHLQ..SISPMENU,DISP=SHR
//         DD DSN=ISF.SISFMLIB,DISP=SHR
//ISPTLIB  DD DSN=&ISPFHLQ..SISPTENU,DISP=SHR
//         DD DSN=ISF.SISFTLIB,DISP=SHR
//ISPLOG   DD SYSOUT=*,DCB=(RECFM=VA,LRECL=125)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//ZCOTSPRT DD SYSOUT=*
//SYSTSIN  DD DUMMY
//ZCOTSIN  DD DUMMY
//SYSOUT   DD SYSOUT=*
//CEEAPI03 DD SYSOUT=*
//CEEREX30 DD SYSOUT=*
//ISPDPTRC DD SYSOUT=*
//         PEND
```

The TCPDATA is used by the SYSTCPD DD statement to specify the TCPIP settings for use in the LE environment.

The allocation statements for the following temporary data sets listed below have been moved from this JCL to the IVPINIT1 REXX procedure: ISPCTL0, ISPCTL1, ISPCTL2, ISPWRK0, ISPWRK1, ISPWRK2, ISPLST1 and ISPLST2. This is because under certain system conditions (RACF class TEMPDSN defined) the allocation of the temporary ISPF data sets in the user server JCL will cause RACF violations.

There is also an additional final PEND statement.

Basic migration of the CEA scheduler address space JCL (CEASCHED) - optional

Below is an example of the CEA scheduler JCL. The changes required are highlighted in bold:

```
//TAURCEA  PROC
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSIN  DD  DUMMY
//SYSTSIN  DD  DUMMY
//IPCONFIG DD  DISP=SHR,DSN=&TAURHLQ..CONFIG(CEASCHED)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//         PEND
```

The TCPDATA is used by the SYSTCPD DD statement to specify the TCPIP settings for use in the LE environment.

There is also an additional final PEND statement.

Basic migration of the CEA user server address space JCL (CEAPROC) - optional

Below is an example of the CEA user server JCL. The changes required are highlighted in bold:

```
//CEAPROC  PROC P1=TRACE,P2=TAURSERV,P3=CEAPROC
//CEAPROC  EXEC PGM=IKJEFT01,DYNAMNBR=175,
```

```
//             PARM='%CEALOGON &P1 &P2 &P3',TIME=120
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//*****************************************************************
//* Z/SERVER
//*****************************************************************
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPCEAU)
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//CEEREX30 DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//CEATSPRT DD SYSOUT=*
//ZCOTSPRT DD TERM=TS
//ZCOTSIN  DD TERM=TS
//READER   DD  SYSOUT=(*,INTRDR)
//MAINTASK DD SYSOUT=*
//T0000001 DD SYSOUT=*
//CMDTASK  DD SYSOUT=*
//SRVTASK  DD SYSOUT=*
//CEATASK  DD SYSOUT=*
//CEAISPF  DD SYSOUT=*
//LISTENER DD  SYSOUT=*
//*****************************************************************
//*      ADD YOUR OWN LOGON PROCEDURE HERE
//*      BUT KEEP ALL &TAURHLQ DATA SETS IN THE RIGHT PLACES
//*****************************************************************
//SYSUADS  DD  DISP=SHR,DSN=SYS1.UADS
//SYSLBC   DD  DISP=SHR,DSN=SYS1.BRODCAST
//SYSPROC  DD  DISP=SHR,DSN=ISP.SISPCLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSCLI0
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//         DD  DISP=SHR,DSN=ISP.SISPEXEC
//SYSHELP  DD  DISP=SHR,DSN=SYS1.HELP
//         DD  DISP=SHR,DSN=ISP.SISPHELP
//ISPMLIB  DD  DISP=SHR,DSN=ISP.SISPMENU
//         DD  DISP=SHR,DSN=SYS1.SBLSMSG0
//         DD  DISP=SHR,DSN=ISF.SISFMLIB
//         DD  DISP=SHR,DSN=&TAURHLQ..MSGS
//ISPEXEC  DD  DISP=SHR,DSN=ISP.SISPEXEC
//ISPLLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//ISPPLIB  DD  DISP=SHR,DSN=ISP.SISPPENU
//         DD  DISP=SHR,DSN=&TAURHLQ..PANELS
//         DD  DISP=SHR,DSN=SYS1.SBLSPNL0
//         DD  DISP=SHR,DSN=ISF.SISFPLIB
//ISPSLIB  DD  DISP=SHR,DSN=&TAURHLQ..SKELS
//         DD  DISP=SHR,DSN=ISP.SISPSLIB
//         DD  DISP=SHR,DSN=ISP.SISPSENU
//         DD  DISP=SHR,DSN=ISF.SISFSLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSKEL0
//ISPTLIB  DD  DISP=SHR,DSN=ISP.SISPTENU
//         DD  DISP=SHR,DSN=SYS1.SBLSTBL0
//         DD  DISP=SHR,DSN=ISF.SISFTLIB
//         DD  DISP=SHR,DSN=SYS1.SMP.OTABLES
//ISPCTL1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPCTL2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPLST1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//ISPLST2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//SDSFMENU DD  DSN=ISF.SISFPLIB,DISP=SHR
```

```
//ISPTABL  DD  DSN=SYS1.SMP.OTABLES,DISP=SHR
//         PEND
```

The CEAPROC procedure statement has been added and now defines three new parameters, which are used in the CEAPROC EXEC statement:

- P1 specifies if tracing should be enabled whilst reading the XML configuration file. Do not change this unless asked to do so by a member of Micro Focus SupportLine staff.
- P2 is the DSP_TOKEN that the CEA user server should use. This must match the DSP_TOKEN specified in the XML configuration file.
- P3 is an internal parameter that the CEA user server uses. This must match the CEA_LOGONPROC of the CEA user server.

The TCPDATA is used by the SYSTCPD DD statement to specify the TCPIP settings for use in the LE environment.

There is also an additional final PEND statement.

Migration for the initial user server REXX procedure (IVPINIT1)

There have been extensive changes to the IVPINIT1 REXX procedure and you need to customize this new REXX procedure to fit your installation. See *Optional customization* for more information.

Note: IVPINIT1 is a sample exec that should be merged with any local exec, if it exists. Some allocations which previously were made in the user server are now made in the IVPINIT1 REXX procedure. If the new IVPINIT1 REXX is used, the allocations of the ISPF temporary dataset and ISPTLIB must be removed from the user server's JCL. If you need to allocate temporary datasets when starting the user server, this has to be done in IVPINIT1 and not in the user server's JCL. Micro Focus strongly recommends that you use the new IVPINIT1 as using the old IVPINIT1 could result in unforeseen data corruption in certain situations.

Additional migration to use the XML configuration file

If you want to use the XML configuration file you need to make some changes in addition to those described in *Basic migration*. You also need to create and configure a new XML configuration file (IVPXML).

The changes can be summarized as:

For the holder (TAURHLD):

- Add CONFXML and CONFOSR DD statements in the JCL, where CONFXML points to the XML configuration member and CONFOSR points to the Optimized Schema Representation (OSR).
- Comment out, or otherwise disable, the CONFIG DD statement in the JCL.

For schedulers and user servers (TAURISPF, IVPUSRT, CEASCHED, and CEAPROC):

- Comment out, or otherwise disable, the IPCONFIG DD statement in the JCL.

Additional migration of the holder address space JCL (TAURHLD)

If you want to use the new XML configuration file, in addition to the changes outlined in *Basic migration of the holder address space JCL (TAURHLD)* you need to make the following changes in bold below:

```
//TAURHOLD PROC P1=
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
//*-----------------------------------------------------------------*
//*- RUN ZSERVER HOLDER TASK                                       -*
//*-----------------------------------------------------------------*
//TAURHOLD EXEC PGM=TAURHOLD,TIME=NOLIMIT, PARM='/&P1'
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..AUTHLIB
//SYSEXEC  DD DISP=SHR,DSN=&TAURHLQ..REXX
//*CONFIG   DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPHOLD)
//CONFXML  DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPXML)
```

```
//CONFOSR  DD DISP=SHR,DSN=&TAURHLQ..OSR(IVPOSR)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//DSPPRT   DD SYSOUT=*,LRECL=255
//SYSTSIN  DD DUMMY
```

To enable the new XML configuration file you simply need to comment out the CONFIG DD statement and uncomment the CONFXML and CONFOSR DD statements.

You must not mix the DD statements for the XML configuration file with the DD statements for the old configuration files as the holder will not start and you will see this message:

```
ZCF0059E 11:08:45.603 Definition of old and new configuration is not allowed.
```

Additional migration of the STC scheduler address space JCL (TAURISPF)

If you want to use the new XML configuration file, in addition to the changes outlined in *Basic migration of the STC scheduler address space JCL (TAURISPF)* you need to make the following changes in bold below:

```
//TAURISPF PROC
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*SYSABEND DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSUDUMP DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//SYSTSIN  DD  DUMMY
//ZCOTSIN  DD  DUMMY
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPISPFJ)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//*MAILHDR  DD  DISP=SHR,DSN=&TAURHLQ..SAMPLIB(IVPMHDR)
```

The IPCONFIG DD statement must be commented out or otherwise disabled.

Additional migration of the STC user server address space JCL (IVPUSRT)

If you want to use the new XML configuration file, in addition to the changes outlined in *Basic migration of the STC user server address space JCL (IVPUSRT)* you need to make the following changes in bold below:

```
//TAURHLQ  SET TAURHLQ=HLQ.ZSERVER
//ISPFHLQ  SET ISPFHLQ=ISP
//TCPDATA  SET TCPDATA=TCPIP.TCPDATA
//*****************************************************************
//*    START TSO/E-ISPF-SESSION AS STARTED JOB
//*****************************************************************
//*  SET ACEE FOR USER
//*****************************************************************
//TAURSJOB EXEC PGM=TAURSJOB
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPACEE)
//*****************************************************************
//*    START TSO/E-ISPF-SESSION BATCH
//*    MOVE TEMP ALLOCATIONS TO IVPINIT1 RPI 611619
//*****************************************************************
//IVPISPF  EXEC PGM=IKJEFT1B,PARM='%IVPINIT1',
//            DYNAMNBR=200,REGION=0M,TIME=NOLIMIT,COND=(4,LT)
```

```
//STEPLIB  DD DSN=&TAURHLQ..LOADLIB,DISP=SHR
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPUSR)
//SYSTCPD  DD DISP=SHR,DSN=&TCPDATA
//SYSEXEC  DD DSN=&TAURHLQ..EXEC,DISP=SHR
//         DD DSN=&TAURHLQ..REXX,DISP=SHR
//ISPPLIB  DD DSN=&TAURHLQ..PANELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPPENU,DISP=SHR
//         DD DSN=ISF.SISFPLIB,DISP=SHR
//ISPSLIB  DD DSN=&TAURHLQ..SKELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPSENU,DISP=SHR
//         DD DSN=ISF.SISFSLIB,DISP=SHR
//ISPMLIB  DD DSN=&ISPFHLQ..SISPMENU,DISP=SHR
//         DD DSN=ISF.SISFMLIB,DISP=SHR
//ISPTLIB  DD DSN=&ISPFHLQ..SISPTENU,DISP=SHR
//         DD DSN=ISF.SISFTLIB,DISP=SHR
//ISPLOG   DD SYSOUT=*,DCB=(RECFM=VA,LRECL=125)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//ZCOTSPRT DD SYSOUT=*
//SYSTSIN  DD DUMMY
//ZCOTSIN  DD DUMMY
//SYSOUT   DD SYSOUT=*
//CEEAPI03 DD SYSOUT=*
//CEEREX30 DD SYSOUT=*
//ISPDPTRC DD SYSOUT=*
//         PEND
```

The two IPCONFIG DD statements must be commented out or otherwise disabled.

Additional migration of the CEA scheduler address space JCL (CEASCHED) - optional

If you want to use the new XML configuration file, in addition to the changes outlined in *Basic migration of the CEA scheduler address space JCL (CEASCHED) - optional* you need to make the following changes in bold below:

```
//TAURCEA  PROC
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSIN  DD  DUMMY
//SYSTSIN  DD  DUMMY
//*IPCONFIG DD  DISP=SHR,DSN=&TAURHLQ..CONFIG(CEASCHED)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//         PEND
```

The IPCONFIG DD statement must be commented out or otherwise disabled.

Additional migration of the CEA user server address space JCL (CEAPROC) - optional

If you want to use the new XML configuration file, in addition to the changes outlined in *Basic migration of the CEA user server address space JCL (CEAPROC) - optional* you need to make the following changes in bold below:

```
//CEAPROC  PROC P1=TRACE,P2=TAURSERV,P3=CEAPROC
//CEAPROC  EXEC PGM=IKJEFT01,DYNAMNBR=175,
//             PARM='%CEALOGON &P1 &P2 &P3',TIME=120
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
```

```
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//*****************************************************************
//* Z/SERVER
//*****************************************************************
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPCEAU)
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//CEEREX30 DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//CEATSPRT DD SYSOUT=*
//ZCOTSPRT DD TERM=TS
//ZCOTSIN  DD TERM=TS
//READER   DD  SYSOUT=(*,INTRDR)
//MAINTASK DD SYSOUT=*
//T0000001 DD SYSOUT=*
//CMDTASK  DD SYSOUT=*
//SRVTASK  DD SYSOUT=*
//CEATASK  DD SYSOUT=*
//CEAISPF  DD SYSOUT=*
//LISTENER DD  SYSOUT=*
//*****************************************************************
//*      ADD YOUR OWN LOGON PROCEDURE HERE
//*      BUT KEEP ALL &TAURHLQ DATA SETS IN THE RIGHT PLACES
//*****************************************************************
//SYSUADS  DD  DISP=SHR,DSN=SYS1.UADS
//SYSLBC   DD  DISP=SHR,DSN=SYS1.BRODCAST
//SYSPROC  DD  DISP=SHR,DSN=ISP.SISPCLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSCLI0
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//         DD  DISP=SHR,DSN=ISP.SISPEXEC
//SYSHELP  DD  DISP=SHR,DSN=SYS1.HELP
//         DD  DISP=SHR,DSN=ISP.SISPHELP
//ISPMLIB  DD  DISP=SHR,DSN=ISP.SISPMENU
//         DD  DISP=SHR,DSN=SYS1.SBLSMSG0
//         DD  DISP=SHR,DSN=ISF.SISFMLIB
//         DD  DISP=SHR,DSN=&TAURHLQ..MSGS
//ISPEXEC  DD  DISP=SHR,DSN=ISP.SISPEXEC
//ISPLLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//ISPPLIB  DD  DISP=SHR,DSN=ISP.SISPPENU
//         DD  DISP=SHR,DSN=&TAURHLQ..PANELS
//         DD  DISP=SHR,DSN=SYS1.SBLSPNL0
//         DD  DISP=SHR,DSN=ISF.SISFPLIB
//ISPSLIB  DD  DISP=SHR,DSN=&TAURHLQ..SKELS
//         DD  DISP=SHR,DSN=ISP.SISPSLIB
//         DD  DISP=SHR,DSN=ISP.SISPSENU
//         DD  DISP=SHR,DSN=ISF.SISFSLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSKEL0
//ISPTLIB  DD  DISP=SHR,DSN=ISP.SISPTENU
//         DD  DISP=SHR,DSN=SYS1.SBLSTBL0
//         DD  DISP=SHR,DSN=ISF.SISFTLIB
//         DD  DISP=SHR,DSN=SYS1.SMP.OTABLES
//ISPCTL1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPCTL2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPLST1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//ISPLST2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//SDSFMENU DD  DSN=ISF.SISFPLIB,DISP=SHR
//ISPTABL  DD  DSN=SYS1.SMP.OTABLES,DISP=SHR
//         PEND
```

The IPCONFIG DD statement must be commented out or otherwise disabled.

Using the USS Explorer with older configuration files

To retain your existing configuration files and take advantage of the new USS Explorer, you must update the LICENCE_KEY parameter in the scheduler and in the user server configuration files. The new license key is used in the following configuration members in `hlq.ZSERVER.CONFIG`:

- CEASCHED
- CEAUSER
- IVPISPFJ
- IVPUSR

Important: For the USS Explorer to work correctly, you must update the LICENCE_KEY parameter in all relevant configuration files.

Installation requirements

Machine requirements

IBM mainframe model z9 or later is required for installing and using z/Server. z/Server will not install on earlier hardware models.

Software requirements

A current version of Micro Focus Mainframe Access (MFA) Server installed. See *Installing Mainframe Access Server* and *Configuring and Administering the Mainframe* for more information.

An IBM supported operating system z/OS (V1.13 or later) is required, with the following components installed:

- ISPF
- Binder
- High Level Assembler
- Language Environment
- RACF or an equivalent product
- z/OS Communications Server - IP Services
- IBM REXX Library

To run user applications requested via TCP/IP client calls, there may be additional optional software requirements depending on the application. Typical optional requirements are:

- IBM Enterprise COBOL for z/OS
- IBM Enterprise PL/I
- IBM DB2 for z/OS

Support for Error Feedback (displaying compiler error messages in an Enterprise Developer error view) requires the following additional compiler options:

- For COBOL: EXIT(ADEXIT('/N 100 /W 50',TAURTOCX)), ADATA
- For PL/I: XINFO(XML)
- For Assembler: EXIT(ADEXIT(TAURTOAX('/N 100 /W 25'))),ADATA

To compile CICS applications, a compiler supporting the CICS Transaction Server 2.1 or later is required:

- COBOL applications compiled using any of:
  - IBM® COBOL for OS/390® &VM, Version 2 Release 2, program number 5648-A25, with APAR PQ49375 applied.

    - IBM Enterprise COBOL for z/OS and OS/390, Version 3 Release 1, program number 5655-G53, and later COBOL releases.
- PL/I applications compiled using any of:
    - IBM VisualAge PL/I for OS/390 Version 2 Release 2.1, program number 5655-B22, with APAR PQ45562 applied.
    - IBM Enterprise PL/I for z/OS and OS/390, Version 3 Release 1, program number 5655-H31, and later PL/I releases.

To use the integrated CICS translator for COBOL, you must specify the compiler options CICS, LIB, NODYNAM, and RENT. To use the integrated CICS translator for PL/I, you must specify the compiler option SYSTEM(CICS).

To compile DB2 applications, a compiler supporting the DB2 integrated pre-processor is required. It can be used with DB2 V10 and above with:

- C/C++ C/C++ (without Debug Tool).
- COBOL Enterprise COBOL for z/OS Version 3 Release 4, program number 5655-G53, or Enterprise COBOL Version 4 Release 1, program number 5655-S71, or later.
- PL/I Enterprise PL/I for z/OS Version 4 Release 1, program number 5655-W67, or Enterprise PL/I for z/OS Version 3 Release 7, program number 5655-H31, or later.

This installation guide applies to V2R2U2 of z/Server. For this modification level, you need to run all address spaces at the same software level. Mixing this level with lower modification levels is not supported.

To run modeled ISPF applications using the AWM client successfully, the Language Environment run-time option NORTEREUS must be set as a system-wide default. z/Server does not support modeled applications when RTEREUS (instead of NORTEREUS) is explicitly set in CEEDOPT.

If running z/Server on a z/OS release prior to 1.13, correct behavior is not guaranteed. As a minimum, the ptfs for PK90754 with all its prerequisites must be applied (Prerequisite inside LE).

Recommended versions of z/Server for Enterprise Developer

The following table shows the versions of z/Server delivered with the different Enterprise Developer releases. These are also the recommended version of z/Server to use with a particular Enterprise Developer release.

Enterprise Developer Version	z/Server Version	Date Released
2.1	z/Server V2R0M06 and V2R0M07 (including performance testing)	October 2012
2.1.1	z/Server V2R0M07	April 2013
2.2	z/Server V2R2M00	October 2013
2.2 Update 1	z/Server V2R2M02	May 2014
2.3	z/Server V2R3	September 2015

Important: Older versions of Enterprise Developer can communicate with a more recent version of z/Server but not vice versa. For example, Enterprise Developer 2.1.1 can communicate with z/Server delivered with Enterprise Developer 2.3.

Installation overview

To install z/Server with a minimum of customization, use the following guidelines:

1. Install, configure, and verify the installation of Mainframe Access (MFA) Server. See *Installing Mainframe Access Server* and *Configuring and Administering the Mainframe* for more information.

2. Upload z/Server software as an XMIT file and receive all installation datasets.
3. Define the necessary started tasks:
    - A z/Server holder address space
    - A z/Server scheduler address space
    - User server address spaces (batch TSO address space)
    - Optional: An additional z/Server CEA scheduler address space
    - Optional: User server address spaces (CEA-launched TSO address spaces)
4. Optional: Define a logon procedure for user servers as CEA-launched TSO address spaces.
5. Before z/Server address spaces can be started, you must customize a minimum configuration that consists of:
    - The holder task configuration:
        - Specify the SVC number (default 238)
        - Specify the data space token (default TAURSERV)
        - Specify the name of the IP stack used for processing (default TCPIP)
    - The STC scheduler configuration:
        - Specify the general listener port (default 1200)
        - Specify the user server port range (default 1201-1249)
        - Specify the name of the user server started tasks (default IVPUSRT)
    - Optional: The CEA scheduler configuration:
        - Specify the general listener port (default 1250)
        - Specify the user server port range (default 1251-1299)
        - Specify the name of the logton procedure (default CEAPROC)
        - Specify the name of the initial command REXX procedure (default ZCEAICMD)
6. Start the z/Server holder address space, which in turn will start the scheduler address space(s).
7. Run the installation verification procedure hlq.ZSERVER.JCL(IVPVERI) for both the STC scheduler and optionally the CEA scheduler.
8. Run the TAU REXX procedure to verify user server startup. This is limited to support of port numbers up to a length of four characters.
9. Edit the master model configuration file hlq.ZSERVER.MASTER:
    - Enter a unique system name after "System:", for example, LPAR1.
    - Customize the dataset names pointing to the models after "Conf:".
10. Edit the REXX procedure hlq.ZSERVER.EXEC(TAUZCAPP) and specify the correct name of the master model configuration file hlq.ZSERVER.MASTER after “sysdsn=”.

Installing z/Server as an Upgrade

Enterprise Developer 2.3 requires an installation of z/Server version 2.3 (V2R3) or higher.

Before upgrading an existing installation of z/Server of a version earlier than version 2.3, Micro Focus recommends that you install z/Server 2.3 on separate ports, and test this with AWM in Enterprise Developer 2.3:

1. Install z/Server 2.3 on ports separate from your current installation of z/Server. Keep the existing z/Server as the productive server installation.
2. Install Enterprise Developer 2.3 and ensure that all server connections point to the z/Server 2.3 installation.
3. Test your remote AWM models against the server. For example:
    - Test whether you expanding your defined data set filters works in MVS Explorer.
    - Try to duplicate and delete a member in a PO data set.
    - Edit and save a sequential MVS file or a member of a PO data set from the MVS Explorer.

4. After all tests have successfully passed, roll out Enterprise Developer 2.3 across your organization.

   AWM in all installations should point to the z/Server 2.3 installation.
5. When all Enterprise Developer installations have been upgraded successfully, the tasks started by the earlier version of z/Server can be deactivated or uninstalled.

Host Installation

Preparing the Installation

SVC Routine

z/Server requires a type-3 SVC routine for all authorized commands. You need to call this routine TAURAUTH and reserve a number for it. 238 is the default specified in the configuration files that come with z/Server.

Dataset Names

Determine a dataset prefix that matches the naming conventions at your company. This publication uses the prefix hlq.ZSERVER to denote dataset names.

Address spaces

There are different types of address spaces that come with z/Server:

- Holder address space (STC).
- One or more STC scheduler address spaces (STC).
- One or more STC user server address spaces per TSO user/ Eclipse client (STC).

If you want to use the CEA-launched address space you will also need the following address spaces:

- One or more CEA scheduler address spaces (STC).
- One or more CEA user server address spaces per TSO user/Eclipse client (TSO address space).

They need an associated user ID:

- STC scheduler and holder always use the assigned user ID.
- STC user servers start out with the assigned user ID, which is then switched to the user ID of the client that requested execution of some application via TCPIP and started them.

If you want to use the CEA-launched address space you will also need the following:

- CEA schedulers always use the assigned user ID.
- CEA user servers are started with the TSO user ID of the client.

The holder address space is responsible for starting and stopping schedulers, which in turn start user servers. Because of this, the holder address space does not need to have any ports allocated to it.

The scheduler address space defines a LISTENER_PORT that listens for incoming requests from the client, and a further port range (defined by FIRST_PORT through LAST_PORT) that will be assigned to different user servers as required. The combination of ports specified by the scheduler (both LISTENER_PORT and the range specified by FIRST_PORT through LAST_PORT) must be opened in the firewall protecting the z/OS host system. These ports should not be assigned to the scheduler. Instead, if desired, an appropriate RACF profile in the SERVAUTH needs to be defined. Please refer to IBM's TCPIP documentation. The default port range specified by the configuration file that comes with z/Server is 1200 to 1249.

User servers use the port assigned to them by the scheduler, to listen for incoming requests.

Installation procedure

Upload the software

z/Server is available as an XMIT file. Upload the file install.xmit in binary format to a sequential dataset with LRECL 80 and BLKSIZE 3120. It is easiest to preallocate the dataset using the batch job below.

Optionally add a valid VOLSER and/or change the UNIT parameter. hlq will be the high level qualifier you have chosen for the installation. Add a job card before submitting, if necessary.

```
//ALLOC1 EXEC PGM=IEFBR14
//FTPALLOC DD DSN=hlq.INSTALL.XMIT, DISP=(NEW,CATLG,DELETE),
//            DSORG=PS,RECFM=FB,LRECL=80,BLKSIZE=3120,
//*           VOL=SER=vvvvvv,UNIT=SYSALLDA,
//            SPACE=(CYL,(30,5))
```

You can use FTP to upload the file. In the sample dialog below, commands and other information entered by the user are shown bold:

```
C:\>ftp mvsipaddr
Connected to mvsipaddr.
220-FTPD1 IBM FTP CS V1R13 at custom.com, 12:03:32 on 2011-08-02.
220 Connection will close if idle for more than 5 minutes.
User (mvsipaddr:(none)): tsouid
331 Send password please.
Password: tsopw
230 tsouid is logged on. Working directory is "tsouid.".
ftp> bin
200 Representation type is Image
ftp> put install.xmit 'hlq.install.xmit'
200 Port request OK.
125 Storing dataset hlq.INSTALL.XMIT
250 Transfer completed successfully.
FTP: 2675840 bytes sent in 37,91 seconds 70,59 KB/sec
```

Receive the software

Use the TSO RECEIVE command to create the installation dataset from the compressed XMIT dataset. As noted before, hlq.ZSERVER is assumed to be the installation prefix.

```
Enter TSO or Workstation commands
below:
===> receive indsn('hlq.INSTALL.XMIT')
```

When prompted, enter:

```
INMR906A Enter restore parameters or 'DELETE' or 'END' +
restore dsn('hlq.ZSERVER.XMIT’)
```

You should receive the following messages:

```
COPY INDD=((SYS00011,R)),OUTDD=SYS00010
IEB1013I COPYING FROM PDSU  INDD=SYS00011 VOL=VVVVVV
DSN=SYS13193.T095517.RA000.userid.R0103870
IEB1014I           TO PDS  OUTDD=SYS00010 VOL=SMS004 DSN=hlq.ZSERVER.XMIT
IEB167I FOLLOWING MEMBER(S) LOADED FROM INPUT DATA SET REFERENCED BY
SYS00011
IEB154I AUTHLIB  HAS BEEN SUCCESSFULLY LOADED
IEB154I CONFIG   HAS BEEN SUCCESSFULLY LOADED
IEB154I DATA     HAS BEEN SUCCESSFULLY LOADED
IEB154I EXEC     HAS BEEN SUCCESSFULLY LOADED
IEB154I IVPRECE  HAS BEEN SUCCESSFULLY LOADED
IEB154I JCL      HAS BEEN SUCCESSFULLY LOADED
IEB154I LOADLIB  HAS BEEN SUCCESSFULLY LOADED
IEB154I MASTER   HAS BEEN SUCCESSFULLY LOADED
IEB154I MSGS     HAS BEEN SUCCESSFULLY LOADED
IEB154I OSR      HAS BEEN SUCCESSFULLY LOADED
IEB154I PANELS   HAS BEEN SUCCESSFULLY LOADED
IEB154I REXX     HAS BEEN SUCCESSFULLY LOADED
IEB154I SAMPLIB  HAS BEEN SUCCESSFULLY LOADED
```

```
IEB154I SKELS    HAS BEEN SUCCESSFULLY LOADED
IEB154I XML      HAS BEEN SUCCESSFULLY LOADED
IEB1098I 15 OF 15 MEMBERS LOADED FROM INPUT DATA SET REFERENCED BY SYS00011
IEB144I THERE ARE 102 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY SYS00010
IEB149I THERE ARE 5 UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
INMR001I Restore successful to dataset 'hlq.ZSERVER.XMIT'
```

The result is a partitioned dataset with 15 members. Each member except IVPRECE is a dataset in transmit format. You need to execute TSO RECEIVE commands on the datasets to create the z/Server datasets.

Member	Description	Received to
AUTHLIB	Load library that needs to be APF authorized.	hlq.ZSERVER.AUTHLIB
CONFIG	Default configuration members and XML schema.	hlq.ZSERVER.CONFIG
DATA	XML sample documents.	hlq.ZSERVER.DATA
EXEC	REXX procedures run as ISPF applications called from a client via TCP/IP.	hlq.ZSERVER.EXEC
IVPRECE	JCL to receive all other members.	
JCL	JCL samples.	hlq.ZSERVER.JCL
LOADLIB	z/Server load library.	hlq.ZSERVER.LOADLIB
MASTER	Master configuration file.	hlq.ZSERVER.MASTER
MSGS	ISPF message library belonging to the ISPF applications in EXEC.	hlq.ZSERVER.MSGS
OSR	Optimized schema representation used for internal XML validation.	hlq.ZSERVER.OSR
PANELS	ISPF panel library belonging to the ISPF applications in EXEC.	hlq.ZSERVER.PANELS
REXX	z/Server REXX procedures and REXX samples.	hlq.ZSERVER.REXX
SAMPLIB	Sample programs.	hlq.ZSERVER.SAMPLIB
SKELS	ISPF skeleton library belonging to the ISPF applications in EXEC.	hlq.ZSERVER.SKELS
XML	Sample models (PDS Explorer).	hlq.ZSERVER.XML

Member IVPRECE contains a sample batch job to do this. Again, hlq.ZSERVER is assumed to be the installation prefix:

```
//STEP1    EXEC PGM=IKJEFT01
//SYSPRINT DD   SYSOUT=*
//SYSTSPRT DD   SYSOUT=*
//SYSTSIN  DD   *
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(AUTHLIB)') NONAMES
DATASET('hlq.ZSERVER.AUTHLIB')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(CONFIG)') NONAMES
DATASET('hlq.ZSERVER.CONFIG')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(DATA)') NONAMES
DATASET('hlq.ZSERVER.DATA')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(EXEC)') NONAMES
DATASET('hlq.ZSERVER.EXEC')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(JCL)') NONAMES
DATASET('hlq.ZSERVER.JCL')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(LOADLIB)') NONAMES
```

```
DATASET('hlq.ZSERVER.LOADLIB')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(MSGS)') NONAMES
DATASET('hlq.ZSERVER.MSGS')
RECEIVE  INDSNAME('HLQ.ZSERVER.XMIT(OSR)') NONAMES
DATASET('HLQ.ZSERVER.OSR')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(PANELS)') NONAMES
DATASET('hlq.ZSERVER.PANELS')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(REXX)') NONAMES
DATASET('hlq.ZSERVER.REXX')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(SAMPLIB)') NONAMES
DATASET('hlq.ZSERVER.SAMPLIB')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(SKELS)') NONAMES
DATASET('hlq.ZSERVER.SKELS')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(MASTER)') NONAMES
DATASET('hlq.ZSERVER.MASTER')
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(XML)') NONAMES
DATASET('hlq.ZSERVER.XML')
/*
```

Submit IVPRECE and verify that each RECEIVE has been successfully processed. For example, the SYSTSPRT output from the batch job should show the following messages ending with "Restore successful" for each of the members listed in the table above (excluding IVPRECE):

```
RECEIVE  INDSNAME('hlq.ZSERVER.XMIT(AUTHLIB)')
NONAMES
INMR901I Dataset dataset.DDNAME.INFILE from USERID on
NODENAME
INMR154I The incoming dataset is a 'PROGRAM
LIBRARY'.
INMR906A Enter restore parameters or 'DELETE' or 'END'
+
INMR908A The input file attributes are: DSORG=PARTITIONED, RECFM=U,
BLKSIZE=4096
INMR909A You may enter DSNAME, SPACE, UNIT, VOL, OLD/NEW, or RESTORE/COPY/
DELETE
INMR001I Restore successful to dataset
'hlq.ZSERVER.AUTHLIB'
```

Steps to activate z/Server

A running z/Server consists of at least two started tasks:

- z/Server holder address space (TAURHLD)
- z/Server STC scheduler address space (TAURISPF)
- Zero or more z/Server STC user server address spaces (wtsouid, with "w" a configurable prefix and tsouid the TSO user ID of the client). See *TSOE_JOBCHAR* for more information on this configuration. They are started as IVPUSRT by the scheduler address space
- Optional: z/Server CEA scheduler address space for CEA-launched TSO user address spaces (TAURCEA)
- Optional: Zero or more CEA-launched TSO user address spaces (TSO user id)

The holder address space TAURHLD provides the necessary infrastructure and user administration control structures using a common access data space. It is non-swappable. It is also used to start and stop the scheduler and the user server address spaces.

The scheduler address space provides the requested client services or starts other z/Server user server address spaces to run a user specific ISPF application. There can be more than one scheduler running under the umbrella of the same holder address space.

A user server address space is started first to download the master configuration file to the Eclipse client and whenever the Eclipse client requests a specific REXX exec to be run. Each client can have more than one user server running for that TSO user ID.

A z/Server scheduler address space for CEA-launched TSO user address spaces (CEA scheduler in short) provides the services to start a TSO user address space. It is started when the Eclipse client calls the

action “Launch ISPF” from zExplorer’s context menu in Remote Systems View, provided the port specified in the MVS Explorer settings under “ISPF launcher port” maps the parameter PORT specified in the CEA scheduler (CEASCHED) configuration.

The CEA-launched TSO user address space runs like any TSO address space under the user id of the connected user. The client communicates with this address space using the CEA scheduler and a z/OS USS message queue.

Define Started Tasks to z/OS

Define started tasks to RACF and ACF2

Each of the started tasks needs to be defined to the security product. We recommend that you run all z/Server STCs using the same ID. Work done for the client is run using the TSO user ID credentials of the client (task level security). All user IDs to be used with z/Server need a valid OMVS segment (required by TCP/IP).

READ access to the z/Server datasets is needed.

Depending on your installation, there may be more authorization needed (see *User authorizations*).

Assuming that RACF is the security product, the definitions could look like this:

```
AU usrname DATA('z/SERVER Userid') NOPASSWORD DFLTGRP(grpname) OWNER(grpname)
OMVS(AUTOUID HOME('/u/usrname'))


ALU usrname NOPASSPHRASE
RDEF STARTED TAURHLD.* STDATA(USER(usrname)) OWNER(grpname)
RDEF STARTED TAURISPF.* STDATA(USER(usrname)) OWNER(grpname)
RDEF STARTED IVPUSRT.* STDATA(USER(usrname)) OWNER(grpname)
SETR RACLIST(STARTED) REFRESH
ADDSD 'hlq.ZSERVER.**' OWNER(grpname) UACC(NONE)
PE 'hlq.ZSERVER.**' ACCESS(READ) CLASS(DATASET) ID(usrname)
```

The RACF definitions for a CEA scheduler could look like this:

```
RDEFINE TSOPROC CEAPROC OWNER(SYS1) UACC(NONE)
PE CEAPROC CLASS(TSOPROC) ACCESS(READ) ID(all-required-groups)
SETROPTS RACLIST(TSOPROC) REFRESH
```

If ACF2 is the security product, to allow READ access to the z/Server datasets, the equivalent definitions for class STARTED could look like this:

```
SET CONTROL(GSO)
INSERT STC.TAURHLD  LOGONID(usrname)
INSERT STC.TAURISPF LOGONID(usrname)
INSERT STC.IVPUSRT  LOGONID(usrname)  STCID(********)
F ACF2,REFRESH(ALL)
```

The holder address space administers the port range to be used for the scheduler and the user servers, but does not use them. The default port range specified in the configuration files that come with z/Server is 1100 to 1200. This port range needs to be opened in the firewall protecting the z/OS host system.

The scheduler address space listens for incoming requests from clients on the port designated as PORT in the scheduler configuration file. PORT=1111 is set as default. The scheduler assigns ports to different user servers from the port range defined for that scheduler (TSOE_FIRST_PORT .. TSOE_LAST_PORT).

Since the holder address space starts and stops the scheduler and stops user servers, and the scheduler address space starts and stops user servers, the associated user ID needs the appropriate access rights in the OPERCMDS class to these system commands.

Add started tasks to Start Up/Shut down procedures

Either add start commands for the servers to your parmlib concatenation (e.g. SYS1.PARMLIB(COMMANDxx)) to start them automatically at the next IPL, or define the new started tasks

to your automation product. Once the address spaces are defined and configured, they can be started dynamically with the following console command:

```
S TAURHLD
```

The holder address space TAURHLD will automatically start the configured scheduler address space(s). TAURHLD is dependent on the availability of the TCP/IP stack configured for use.

The started tasks are stopped using the STOP command.

```
P TAURHLD
```

The holder address space TAURHLD will automatically terminate all address spaces using its services. That means that the holder first terminates all user servers that are still running and then all scheduler address spaces.

Scheduler address spaces can be started and stopped via the holder. See *Starting and stopping a scheduler address space* for more information.

User servers cannot be started manually. They will detect that they were not started by a scheduler address space and terminate accordingly.

Note: TAURISPF must be stopped before TAURHLD. To ensure that no user servers are orphaned, either set TSOE_CLEANUP in hlq.ZSERVER.CONFIG(IVPISPFJ) or issue the appropriate stop command before stopping TAURISPF. Setting TSOE_CLEANUP requires a defined pattern for TSOE_JOBSEARCH.

APF authorizations

The dataset hlq.ZSERVER.AUTHLIB must be APF authorized in the PARMLIB concatenation (e.g. SYS1.PARMLIB(PROGxx)).

Note: APF authorizations can be set dynamically with the following console command:

```
SETPROG APF,ADD,DSN=hlq.ZSERVER.AUTHLIB,SMS
```

or, if it is not an SMS managed dataset:

```
SETPROG APF,ADD,DSN=hlq.ZSERVER.AUTHLIB,VOL=volser
```

Define started tasks to WLM

As a server, the importance of the holder address space TAURHLD should be set below TCPIP but above the scheduler address space TAURISPF. This setting comes into play when TAURHLD starts up and terminates or when commands are executed against the holder address space.

The scheduler and the user server address spaces should have the same importance, with the user servers classified like any TSO user address space using the response time goal of TSO. All transactions executing within scheduler and user server are TSO transactions.

Keep in mind that these address spaces are STCs, so the classification must be done under the STC subsystem.

Customizing the holder address space JCL (TAURHLD)

The holder address space TAURHLD is used to install the SVC routine and to set up a common access data space that contains user administration control structures needed for communication.

The type 3 SVC routine is installed whenever the address space starts, and is deleted from the system SVC table when it is stopped.

Customize the sample JCL procedure that is used to start the holder. This is located in hlq.ZSERVER.JCL(IVPHOLD) and needs to be copied to the PROCLIB concatenation.

Outlined below is the content of IVPHOLD. Verify and customize the high level qualifier defined for TAURHLQ:

```
//TAURHOLD PROC P1=
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
```

```
//*-------------------------------------------------------------------*
//*- RUN ZSERVER HOLDER TASK                                         -*
//*-------------------------------------------------------------------*
//TAURHOLD EXEC PGM=TAURHOLD,TIME=NOLIMIT,PARM='/&P1'
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..AUTHLIB
//SYSEXEC  DD DISP=SHR,DSN=&TAURHLQ..REXX
//*CONFIG   DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPHOLD)
//CONFXML  DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPXML)
//CONFOSR  DD DISP=SHR,DSN=&TAURHLQ..OSR(IVPOSR)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//DSPPRT   DD SYSOUT=*,LRECL=255
//SYSTSIN  DD DUMMY
```

The TAURHOLD procedure statement has been changed and now defines one new parameter, which is used in the TAURHOLD exec statement:

- P1 is used to specify if tracing should be enabled while reading the XML configuration file. Do not change this unless asked to do so by a member of Micro Focus SupportLine staff.

The CONFXML and CONFOSR DD statements have been added to support the new XML configuration file. CONFXML defines the XML configuration member to use, which you can customize, and CONFOSR defines the OSR (Optimized Schema Representation), which is used to validate the XML configuration file; this must not be changed.

The CONFIG DD statement has been commented out as this was used for the legacy configuration files. If you have both the legacy and new configuration file DD statements active, the holder will not start and you will see the following error message in the MAINTASK DD:

```
ZCF0059E 11:08:45.603 Definition of old and new configuration is not allowed.
```

Customizing an STC scheduler address space JCL (TAURISPF)

The z/Server scheduler task TAURISPF is responsible for the communication with a client and listens for incoming client requests on the port designated as LISTENER_PORT in the scheduler configuration file. The scheduler also defines a range of ports that are used, as needed, when a user server is started, and routes some of the incoming work to the appropriate user server address space. It is essentially a batch TSO address space. Configuring these ports is covered in *Configuring z/Server*.

Customize the sample hlq.ZSERVER.JCL(IVPISPFJ) and copy it to the PROCLIB concatenation.

Verify and customize the high level qualifier defined for TAURHLQ, and also TCPDATA to make sure it specifies the correct TCPIP configuration data set:

```
//TAURISPF PROC
//TAURHLQ  SET  TAURHLQ=hlq.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*SYSABEND DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSUDUMP DD  SYSOUT=*,DSN=&&SYSUDUMP
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//SYSTSIN  DD  DUMMY
//ZCOTSIN  DD  DUMMY
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPISPFJ)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//*MAILHDR  DD  DISP=SHR,DSN=&TAURHLQ..SAMPLIB(IVPMHDR)
```

Note: Notice that the IPCONFIG DD statement is commented out. This must not be enabled if you are using the new XML configuration file.

The SYSTCPD DD statement has been added to provide information about the IP stack on your host to the started task.

DD statement MAILHDR names the sample dataset from which to copy the pattern for email notification addressees if email notification is configured. Email notification is intended to send an email to predefined recipients in case of an error situation. It requires that an SMTP server is available which forwards the generated emails.

Customizing a user server address space JCL (IVPUSRT)

A z/Server STC user server IVPUSRT is started by the scheduler address space to execute REXX execs or ISPF applications. It is essentially a two-step batch TSO address space. The first step executes under the general z/Server user ID and switches the security environment to the user ID of the client that had requested the user server to be started. The second step (the actual batch TSO address space) then uses this specific TSO user ID.

Customize the sample hlq.ZSERVER.JCL(IVPUSRT) and copy it to the PROCLIB concatenation.

Verify and customize the high level qualifier defined for both TAURHLQ and ISPFHLQ, and also TCPDATA to make sure it specifies the correct TCPIP configuration data set. Make sure that the ISPF high level qualifier is ISF. Similar to a logon procedure, add all required libraries for things such as panels, messages, and REXX execs that are necessary to run the user's required ISPF applications.

The initial REXX procedure IVPINIT1 must be located in the z/Server REXX dataset. This REXX exec should be customized by the installation to fit the installation's needs (see *Optional customization*).

Note: The dataset hlq.ZSERVER.REXX must be allocated using DDNAME SYSEXEC (not SYSPROC).

```
//TAURHLQ  SET TAURHLQ=HLQ.ZSERVER
//ISPFHLQ  SET ISPFHLQ=ISP
//TCPDATA  SET TCPDATA=TCPIP.TCPDATA
//*****************************************************************
//*    START TSO/E-ISPF-SESSION AS STARTED JOB
//*****************************************************************
//*  SET ACEE FOR USER
//*****************************************************************
//TAURSJOB EXEC PGM=TAURSJOB
//STEPLIB  DD DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPACEE)
//*****************************************************************
//*    START TSO/E-ISPF-SESSION BATCH
//*    MOVE TEMP ALLOCATIONS TO IVPINIT1 RPI 611619
//*****************************************************************
//IVPISPF  EXEC PGM=IKJEFT1B,PARM='%IVPINIT1',
//            DYNAMNBR=200,REGION=0M,TIME=NOLIMIT,COND=(4,LT)
//STEPLIB  DD DSN=&TAURHLQ..LOADLIB,DISP=SHR
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPUSR)
//SYSTCPD  DD DISP=SHR,DSN=&TCPDATA
//SYSEXEC  DD DSN=&TAURHLQ..EXEC,DISP=SHR
//         DD DSN=&TAURHLQ..REXX,DISP=SHR
//ISPPLIB  DD DSN=&TAURHLQ..PANELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPPENU,DISP=SHR
//         DD DSN=ISF.SISFPLIB,DISP=SHR
//ISPSLIB  DD DSN=&TAURHLQ..SKELS,DISP=SHR
//         DD DSN=&ISPFHLQ..SISPSENU,DISP=SHR
//         DD DSN=ISF.SISFSLIB,DISP=SHR
//ISPMLIB  DD DSN=&ISPFHLQ..SISPMENU,DISP=SHR
//         DD DSN=ISF.SISFMLIB,DISP=SHR
//ISPTLIB  DD DSN=&ISPFHLQ..SISPTENU,DISP=SHR
```

```
//         DD DSN=ISF.SISFTLIB,DISP=SHR
//ISPLOG   DD SYSOUT=*,DCB=(RECFM=VA,LRECL=125)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//ZCOTSPRT DD SYSOUT=*
//SYSTSIN  DD DUMMY
//ZCOTSIN  DD DUMMY
//SYSOUT   DD SYSOUT=*
//CEEAPI03 DD SYSOUT=*
//CEEREX30 DD SYSOUT=*
//ISPDPTRC DD SYSOUT=*
//         PEND
```

Temporary data set references have been removed from the above JCL and can now be found in the IVPINIT1 REXX procedure.

Note: Notice that the IPCONFIG DD statement is commented out. This must not be enabled if you are using the new XML configuration file.

The SYSTCPD DD statement has been added to provide information about the IP stack on your host to the started task.

Optional: Customizing a CEA scheduler address space JCL (CEASCHED)

A z/Server CEA scheduler task CEASCHED provides the services to start and communicate with a CEA-launched TSO user address space. The communication is handled using a z/OS USS message queue.

Customize the sample hlq.ZSERVER.JCL(CEASCHED) and copy it to the PROCLIB concatenation.

Verify and customize the high level qualifier defined for TAURHLQ, and also TCPDATA to make sure it specifies the correct TCPIP configuration data set:

```
//TAURCEA  PROC
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//IVPISPF  EXEC PGM=IKJEFT01,PARM='TAURIP',
//       DYNAMNBR=200,REGION=0M,TIME=NOLIMIT
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//SYSPRINT DD  SYSOUT=*,DSN=&&SYSPRINT
//SYSTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSPRT DD  SYSOUT=*,DSN=&&SYSTSPRT
//ZCOTSIN  DD  DUMMY
//SYSTSIN  DD  DUMMY
//*IPCONFIG DD  DISP=SHR,DSN=&TAURHLQ..CONFIG(CEASCHED)
//READER   DD  SYSOUT=(*,INTRDR)
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//         PEND
```

Note: Notice that the IPCONFIG DD statement is commented out. This must not be enabled if you are using the new XML configuration file.

The SYSTCPD DD statement has been added to provide information about the IP stack on your host to the started task.

Optional: Customizing a CEA-launched TSO user address space JCL (CEAPROC)

A z/Server user server started as a CEA-launched TSO user address space CEAPROC is started by the z/Server CEA scheduler address space. It behaves like a foreground TSO address space running with the TSO user ID of the client user who requested the start of the user server. Terminal input and screen output is read from and written to the associated USS message queue.

Customize the sample hlq.ZSERVER.JCL(CEAPROC) and copy it to the PROCLIB concatenation.

Verify and customize the high level qualifier defined for TAURHLQ, and also TCPDATA to make sure it specifies the correct TCPIP configuration data set. Similar to a logon procedure, add all required libraries

for things such as panels, messages, and REXX execs that are necessary to run the user's required ISPF applications.

The initial REXX procedure CEALOGON must be located in the z/Server REXX dataset.

Note: The dataset hlq.ZSERVER.REXX has to be allocated using DDNAME SYSEXEC (not SYSPROC).

```
//CEAPROC  PROC P1=TRACE,P2=TAURSERV,P3=CEAPROC
//CEAPROC  EXEC PGM=IKJEFT01,DYNAMNBR=175,
//             PARM='%CEALOGON &P1 &P2 &P3',TIME=120
//TAURHLQ  SET  TAURHLQ=HLQ.ZSERVER
//TCPDATA  SET  TCPDATA=TCPIP.TCPDATA
//*********************************************************************
//* Z/SERVER
//*********************************************************************
//STEPLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*IPCONFIG DD DISP=SHR,DSN=&TAURHLQ..CONFIG(IVPCEAU)
//SYSTCPD  DD  DISP=SHR,DSN=&TCPDATA
//CEEREX30 DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//CEATSPRT DD SYSOUT=*
//ZCOTSPRT DD TERM=TS
//ZCOTSIN  DD TERM=TS
//READER   DD  SYSOUT=(*,INTRDR)
//MAINTASK DD SYSOUT=*
//T0000001 DD SYSOUT=*
//CMDTASK  DD SYSOUT=*
//SRVTASK  DD SYSOUT=*
//CEATASK  DD SYSOUT=*
//CEAISPF  DD SYSOUT=*
//LISTENER DD  SYSOUT=*
//*********************************************************************
//*      ADD YOUR OWN LOGON PROCEDURE HERE
//*      BUT KEEP ALL &TAURHLQ DATA SETS IN THE RIGHT PLACES
//*********************************************************************
//SYSUADS  DD  DISP=SHR,DSN=SYS1.UADS
//SYSLBC   DD  DISP=SHR,DSN=SYS1.BRODCAST
//SYSPROC  DD  DISP=SHR,DSN=ISP.SISPCLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSCLI0
//SYSEXEC  DD  DISP=SHR,DSN=&TAURHLQ..EXEC
//         DD  DISP=SHR,DSN=&TAURHLQ..REXX
//         DD  DISP=SHR,DSN=ISP.SISPEXEC
//SYSHELP  DD  DISP=SHR,DSN=SYS1.HELP
//         DD  DISP=SHR,DSN=ISP.SISPHELP
//ISPMLIB  DD  DISP=SHR,DSN=ISP.SISPMENU
//         DD  DISP=SHR,DSN=SYS1.SBLSMSG0
//         DD  DISP=SHR,DSN=ISF.SISFMLIB
//         DD  DISP=SHR,DSN=&TAURHLQ..MSGS
//ISPEXEC  DD  DISP=SHR,DSN=ISP.SISPEXEC
//ISPLLIB  DD  DISP=SHR,DSN=&TAURHLQ..LOADLIB
//ISPPLIB  DD  DISP=SHR,DSN=ISP.SISPPENU
//         DD  DISP=SHR,DSN=&TAURHLQ..PANELS
//         DD  DISP=SHR,DSN=SYS1.SBLSPNL0
//         DD  DISP=SHR,DSN=ISF.SISFPLIB
//ISPSLIB  DD  DISP=SHR,DSN=&TAURHLQ..SKELS
//         DD  DISP=SHR,DSN=ISP.SISPSLIB
//         DD  DISP=SHR,DSN=ISP.SISPSENU
//         DD  DISP=SHR,DSN=ISF.SISFSLIB
//         DD  DISP=SHR,DSN=SYS1.SBLSKEL0
//ISPTLIB  DD  DISP=SHR,DSN=ISP.SISPTENU
//         DD  DISP=SHR,DSN=SYS1.SBLSTBL0
//         DD  DISP=SHR,DSN=ISF.SISFTLIB
//         DD  DISP=SHR,DSN=SYS1.SMP.OTABLES
```

```
//ISPCTL1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPCTL2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
//ISPLST1  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//ISPLST2  DD  DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//             DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
//SDSFMENU DD  DSN=ISF.SISFPLIB,DISP=SHR
//ISPTABL  DD  DSN=SYS1.SMP.OTABLES,DISP=SHR
//         PEND
```

Parameters P1, P2 and P3 have been added to support parameters required for startup to the CEA user server:

- P1 specifies if tracing should be enabled while reading the XML configuration file. Do not change this unless asked to do so by a member of Micro Focus SupportLine staff.
- P2 is the DSP_TOKEN the CEA user server should use. This must match the DSP_TOKEN specified in the XML configuration file.
- P3 is an internal parameter the CEA user server uses. This must match the CEA_LOGONPROC of the CEA user server.

Note: Notice that the IPCONFIG DD statement is commented out. This must not be enabled if you are using the new XML configuration file.

The SYSTCPD DD statement has been added to provide information about the IP stack on your host to the started task.

Configuring z/Server

Once you have reviewed and modified all of the JCL you can move on to configuring z/Server itself. The configuration for z/Server is stored in XML format and is in hlq.ZSERVER.CONFIG(IVPXML).

```
<Configuration SVC_NO="NNN" DSP_TOKEN="TAURSERV" IPSTACK="TCPIP" >
    <STCScheduler
        SCHEDULER_NAME="TAURISPF" LISTENER_PORT="1200" FIRST_PORT="1201"
        LAST_PORT="1249" USER_SERVER_JOBNAME="IVPUSRT" CCSID="037"
    >
       <UserServer CCSID="037" />
    </STCScheduler>
</Configuration>
```

The aspects of z/Server's behavior that you want to modify determine the parts of the XML that you need to edit.

General configuration

Use the following general configuration parameters:

SVC_NO	Change the SVC number from NNN to the required value for your host. The default is 238.
IPSTACK	Specifies the name of the IP stack used for processing
DSP_TOKEN	If you are running multiple z/Server instances DSP_TOKEN must be different from any other token used by any other holder task. Make sure that the MAXCADS definition in the IEASYSxx member of the parmlib concatenation specifies a sufficiently high value to allow for the creation of that common access data space. Use the z/OS health checker to see how many common access data spaces are in use. If the value is too low, the

	data space creation will fail. The value in IEASYSxx can only be increased via IPL.

For a complete overview of all general configuration parameters see *Configuration reference*.

Scheduler configuration

The ports defined for the STC scheduler LISTENER_PORT and range defined by FIRST_PORT through LAST_PORT need to be opened in the firewall protecting the z/OS host system. These ports should not be assigned to the scheduler. Instead, if desired, an appropriate RACF profile in the SERVAUTH needs to be defined. Please refer to IBM's TCPIP documentation.

LISTENER_PORT	The IP port that the scheduler listens on for incoming work requests.
FIRST_PORT and LAST_PORT	The port range to be used for user servers. In the sample in *Configuring z/Server*, 48 user servers can be started simultaneously. Each user server will have a different port.
USER_SERVER_JOBNAME	The name of the procedure JCL that the scheduler address space uses to issue a start command for the user server address spaces.

The ports defined for the STC scheduler LISTENER_PORT and range defined by FIRST_PORT:LAST_PORT need to be opened in the firewall protecting the z/OS host system.

Optionally, if you have uncommented MAILHDR in the scheduler procedure, you will need to add the MAIL_NOTIFY="1" attribute to the scheduler section. For example:

```
<STCScheduler
        SCHEDULER_NAME="TAURISPF" LISTENER_PORT="1200" FIRST_PORT="1201"
        LAST_PORT="1249" USER_SERVER_JOBNAME="IVPUSRT" CCSID="037"
        MAIL_NOTIFY="1"
    >
       <UserServer CCSID="037" />
    </STCScheduler>
```

For a complete overview of all parameters for a scheduler address space see the parameters listed in *Configuration reference* as applying to schedulers.

CEA scheduler configuration (optional)

If you want to configure a CEA scheduler address space you need to add a new CEAScheduler section to your XML file. This section should be added inside the <Configuration /> XML tags. For example:

```
<Configuration SVC_NO="238" DSP_TOKEN="TAURSERV">
    <STCScheduler
        SCHEDULER_NAME="TAURISPF" LISTENER_PORT="1200" FIRST_PORT="1201"
        LAST_PORT="1249" USER_SERVER_JOBNAME="IVPUSRT" CCSID="037"
    >
       <UserServer CCSID="037" />
    </STCScheduler>
    <CEAScheduler
        SCHEDULER_NAME="CEASCHED" LISTENER_PORT="1250" FIRST_PORT="1251"
        LAST_PORT="1299" CEA_LOGONPROC="CEAPROC" CEA_ACCOUNT="ACCT#"
    >
       <UserServer CCSID="37" />
    </CEAScheduler>
</Configuration>
```

Use the following parameters to configure a CEA scheduler:

LISTENER_PORT	Names the IP port that the scheduler listens on for incoming work requests.
FIRST_PORT and LAST_PORT	The port range to be used for user servers. In the sample in *Configuring z/Server*, 48 TSO address spaces can be started simultaneously, each address space will use a different port. These ports must be in the same range that the associated holder address space has defined. Note that IBM imposes a technical limit: up to ten CEA-launched TSO user address spaces can be started for the same TSO user and up to 50 CEA-launched TSO user address spaces can be started in any z/OS lpar. This limit includes TSO address spaces used by z/OSMF, for instance.
CEA_LOGONPROC	Points to the logon procedure to be used when a CEA-launched TSO user address space is started. See *Optional: Customizing a CEA-Launched TSO user address space (CEAPROC)* for information on how to configure this logon procedure.
CEA_ACCOUNT	Must be set to a valid accounting number that all TSO users that will use this scheduler have access to. The accounting number used must be defined in general resource class ACCTNUM. All TSO users that will access services of this scheduler must share this accounting number.

The ports defined for the CEA scheduler LISTENER_PORT and range defined by FIRST_PORT:LAST_PORT need to be opened in the firewall protecting the z/OS host system.

Optionally, if you have uncommented MAILHDR in the scheduler procedure, you will need to add the MAIL_NOTIFY="1" attribute to the scheduler section. For example:

```
<CEAScheduler
        SCHEDULER_NAME="CEASCHED" LISTENER_PORT="1250" FIRST_PORT="1251"
        LAST_PORT="1299" CEA_LOGONPROC="CEAPROCD" CEA_ACCOUNT="ACCT#"
        MAIL_NOTIFY="1"
    >
       <UserServer CCSID="37" />
    </CEAScheduler>
```

For a complete overview of all possible parameters for a scheduler address space, see *Scheduler and user server configuration*.

For a complete overview of all parameters for a CEA scheduler address space see the parameters listed in *Configuration reference* as applying to CEA schedulers.

Troubleshooting the z/Server configuration

You can use the following diagnostic tools and information to troubleshoot issues with the z/Server configuration:

z/Server Configuration Utility (Technical Preview)

The z/Server Configuration Utility (Technical Preview) makes it easier to download, validate and edit a configuration file. This utility is available from the **Product Updates** section of the *Micro Focus SupportLine site*. To download the utility, once you have logged in to the SupportLine site, navigate to the latest version of Enterprise Developer and select **z/Server Configuration Utility**.

Error messages

Use the information in any error messages to determine what the possible issues might be.

For example, trying to start the holder process with an invalid XML results in the holder failing to start and you receive a message indicating there is a problem with the XML validation - for example:

```
XCO0021E  10:50:59.846 XML Validation has failed. Reason = 8800. Error offset
into XML document = 00000020.
```

Such messages include a reason code and an error offset:

Reason The `Reason` code indicates a specific problem with the XML code - check the section *Reason codes listed by value* in IBM's "z/OS V2R1.0 XML System Services User's Guide and Reference" (SA38-0681).

Error offset The location in hexadecimal from the start of the XML document where the error occurred.

The error message quoted earlier is caused by the following invalid XML code:

```
<Configuration SVC_NO="NNN" DSP_TOKEN="TAURSERV" IPSTACK="TCPIP">
    <STCScheduler
        SCHEDULER_NAME="TAURISPF" LISTENER_PORT="1200" FIRST_PORT="1201"
        LAST_PORT="1249" USER_SERVER_JOBNAME="IVPUSRT" CCSID="037"
    >
       <UserServer CCSID="037" />
    </STCScheduler>
</Configuration>
```

Use the reason code and the offset shown in this message to determine the cause of the error. In this example, the offset points to a location in the first line of the XML configuration file. Here there is an invalid attribute value in the `<Configuration>` section - `SVC_NO="NNN"` is invalid because `SVC_NO` must be a numeric value.

XML validation tools

You can use any third-party XML validation tool to check the XML configuration file against the XML schema file available in `hlq.ZSERVER.CONFIG(IVPSCHEM)`.

Customizing GTF tracing

If SupportLine asks for a GTF trace of z/Server and your installation doesn't have its own customized procedure, then customize the hlq.ZSERVER.JCL(IVPGTF) and copy it to the PROCLIB concatenation. z/Server writes GTF trace user records with number 3E8.

```
//TAUGTF  PROC M=IVPGTF,
//             CYL=100,
//             PROG=AHLGTF
//IEFPROC EXEC PGM=&PROG,
//             PARM='MODE=EXT,DEBUG=NO,TIME=YES,NOPROMPT',
//             REGION=0M
//IEFRDER DD   DSNAME=HLQ.GTFTRACE.&M..D&LYYMMDD..T&LHHMMSS,
//             SPACE=(CYL,(&CYL),,CONTIG),
//             RECFM=VB,
//             DISP=(NEW,CATLG)
//SYSLIB  DD   DSNAME=HLQ.ZSERVER.DATA(&M),DISP=SHR
```

Make sure that the IEFRDER dataset can be allocated without RACF errors.

Activation of GTF for user record 3E8 alters the way z/Server writes messages. There is no need to set a specific trace level; all events are now traced. The trace output is written to a GTF trace dataset, no longer to the JESx job log. Also, not all messages from trace level 0 will appear in the JESx job log.

Note: If more than one z/Server is running, starting GTF trace for user record 3E8 will automatically set the trace level to full tracing for all servers that are running. To avoid JESx spool problems, the trace level of the unaffected address spaces should be reduced to the desired value x using the operator command

```
F <holder|scheduler|userserver>,TRACE,LEVEL=x
```

User authorizations

As stated above, all users need an OMVS segment for TCPIP to work correctly. In addition, the scheduler task and the holder task must be authorized in class OPERCMDS to issue the following operator commands:

Function/Configuration Parameter	Type	Command
START/STOP/CANCEL	MVS command	START <scheduler>
		START <userserver>
		STOP <scheduler>
		STOP <userserver>
		CANCEL <scheduler>
		CANCEL <userserver>
PORTCHECK=1 (Port check function)	MVS command	DISPLAY TCPIP
TSOE_CLEANUP=1	JESx command	JES2: $C
		JES3: *F

Note: If the configuration parameters listed above are not in use (which means they are set to 0), the appropriate commands are not executed and do not need to be authorized.

If the JESSPOOL RACF class is active, a RACF general resource profile of the following format must be defined for each user:

```
<NODENAME>.<STCUSR>.<USERSERVER>.**
```

where:

<NODENAME>	is the installation's node name
<STCUSR>	is the started task user ID of the user server
<USERSERVER>	is the job name of the user server (TSO user ID plus TSOE_JOBPREFIX)

Every TSO user must have UPDATE access to this profile allowing every TSO user to allocate spool datasets that begin with a high level qualifier equal to the STC user ID.

Example: Assuming the node id is NODE, the user ID of the z/Server started tasks is TAUUSR, TSOE_JOBPREFIX is Z, and the user ID is USR123, then the RACF general resource profile should be defined as follows:

```
NODE.TAUUSR.ZUSR123.**
```

If the installation protects the use of Extended MCS consoles, then every scheduler address space must be authorized to activate an EMCS console. The naming convention for these consoles is aaaaxxxx with aaaa the first to fourth character of the system name and xxxx the address space ID of the address space establishing the EMCS console in hexadecimal notation.

Enable model configuration

Using an Eclipse client, ISPF applications can be modeled. For more information, see *Attaching ISPF tools* in the *Workflow Manager Configuration Guide*. To enable modeling, the master configuration dataset hlq.ZSERVER.MASTER must be customized:

```
************************************************************
* System and Application Workflow Model Definitions
* Do not change the key words:
*    System:
*    Appl:
*    Conf:
*    Version:
*    INFO:
```

```
*    User:
*
* Enter an unique logical name for this mainframe system
*
System: XXXXXXXXXX
*
* PDS EXPLORER EXAMPLE APPLICATION
*
User:
* application name
Appl: PDS Explorer
* location of the application configuration file
Conf: mvs:'hlq.ZSERVER.XML(PDSECONF)'
* application version number
Version: 1.4
* process information
INFO:
* end of application definition. do not delete this line
EndAppl:
EndUser:
*
* AWM dialog sample application
*
User:
* application name
Appl: ISPF Dialogs
* location of the application configuration file
Conf: MVS:'hlq.zserver.XML(TAUDIALG)'
* application version number
Version: 1.4
* process information
INFO:
* end of application definition. do not delete this line
EndAppl:
EndUser:
```

Specify a system name after "System:", i.e. LPAR1. Replace every occurrence of hlq.zserver after "Conf:" with the high level qualifier chosen for the installation.

There is a REXX exec in hlq.ZSERVER.EXEC named TAUZCAPP which reads the master configuration dataset and sends the content to the client in formatted form. Replace hlq.ZSERVER after "sysdsn=" with the high level qualifier chosen for the installation.

When a client logs on using a new connection for the first time, the master configuration is sent from z/Server to the client and shows up in the Team Developer Tree View. This is done in the background, and a user server address space is started to send this master configuration. On subsequent logons (when the master configuration is already available), no user server is started. A user server address space is only started when a client request requires an ISPF environment (e.g. when an AWM ISPF tool is called).

Optional customization

ISPF user profile

z/Server allows more than one user server per TSO user to be run in parallel. Each user server needs its own exclusive ISPF environment. This implies the allocation of an ISPF user profile dataset. The allocation of the user profile dataset is done in the sample REXX exec IVPINIT1 and should be customized to adhere to the installation's standards.

ISPF user profile allocation is done as follows:

- DD statement ISPPROF is allocated to a temporary dataset. If a z/Server ISPF profile dataset named userid.TAUZCISP.PROFILE already exists for the TSO user, the content of this ISPF profile is copied using IEBGENER to a temporary dataset allocated under the ISPPROF DD statement.

- ISPF is started and control is passed to REXX exec IVPINIT2.
- When the ISPF session terminates, control returns to REXX exec IVPINIT1, and the temporary ISPF profile is copied back to z/Server profile dataset userid.TAUZCISP.PROFILE.
- The temporary ISPF profile dataset is deleted.

We recommend that you allocate the temporary ISPF profile dataset to an SMS managed temporary dataset pool, which is automatically deleted according to installations' standards. In that case, the deletion of the temporary ISPF profile dataset in the REXX IVPINIT1 can be omitted.

Usage in a parallel sysplex

z/Server itself does not use any sysplex services. It relies on the ability to connect to an IP address specified using a TCPIP header. This is normally done under the covers by an Eclipse client:

1. The Eclipse client asks for "Connect" to an IP address (or symbolic name) using a port specified in the client. This port corresponds to the PORT parameter that the scheduler address space listens on. As a response, z/Server sends back the IP address of the system that this particular scheduler address space runs on.
2. The next transaction initiated from the client (which includes the TCPIP function connect - different from the function "Connect" in 1.) uses this IP address for further communication and (IP-)connection.
3. As long as the network is set up in such a way that usage of this IP address will guarantee connection to the same host system, the first connection used (from the Eclipse function "Connect") z/Server functions without problems.

Note that it is mandatory to have a one-to-one relation between the IP address and the system name. A configuration where an IP address can resolve to different systems (for load balancing, for instance) is not supported. (See also *VIPA*).

z/Server startup and installation verification

Now you can start z/Server. By issuing the start holder command, z/Server begins to start and automatically starts any schedulers defined in the XML configuration file.

Example starting the holder task:

```
S TAURHLD
```

By default, during holder startup z/Server automatically starts any schedulers defined in the XML configuration file. If you want to disable this and start the schedulers independently of the holder, add the AUTOSTART="0" XML attribute to the <Configuration /> section of your XML configuration file.

Verifying holder startup

In addition to the regular JESx DD statements, the job log of a running holder address space contains the DD names MAINTASK and SYSTSPRT.

DD MAINTASK shows if the data space was created correctly and the SVC routine installed. The holder address space TAURHLD initializes correctly when HLD0002I is the last message.

```
HLD0001I  10:47:41.757 zServer holder task 02030000 startup
HLD0009I  10:47:41.876 TSO-Environment successful created
                       A(Command-Processor-Parameter-List) : 008D1CD0
HLD0078I  10:47:41.893 Read   of NT-Pair E9E2D9E500F96100404040404040404040
ended with RC 00000004 (hex).
ZCF0058I
================================================================================
         Completing configuration TAURISPF

================================================================================
ZCF0024W  10:47:42.138 Server is limited server due to specification of
TSOE_STCID
ZCF0025W  10:47:42.138 The following configuration parameters are not used
due to specification of TSOE_STCID
```

```
                        TSOE_CLEANUP
                        TSOE_JOBPREFIX
                        TSOE_JOBSEARCH
ZCF0058I
================================================================================
         Completing configuration IVPUSR

================================================================================
ZCF0024W  10:47:42.139 Server is limited server due to specification of
TSOE_STCID
ZCF0025W  10:47:42.139 The following configuration parameters are not used
due to specification of TSOE_STCID
                        TSOE_CLEANUP
                        TSOE_JOBPREFIX
                        TSOE_JOBSEARCH
HLD0069I  10:47:42.140 Holder task configuration
                        Size data space specified....:       262144      Blocks
                        Size data space required.....:          165      Blocks
                        Delay .......................:          500     seconds
                        Trace level..................:            0
                        Modify limit.................:            1
                        Size RESTAB in blocks........:          160
                        Max. # of entries in RESTAB..:         5120
                        Reply........................: YES
HLD0018I
--------------------------------------------------------------------------------
         Installing User-SVC 0238

--------------------------------------------------------------------------------
HLD0019I  10:47:42.153 User-SVC 0238 successfully installed.
                        Pgm : TAURAUTH EpAddr : 9CB5EDF0
HLD0021I
--------------------------------------------------------------------------------
         Creating Common-Dataspace TAURSERV

--------------------------------------------------------------------------------
HLD0003I  10:47:42.153 Creating Dataspace
                        Dataspace-Name    :  TAURSERV
                        Dataspace-Size    :        262144 Blocks
                        Dataspace-StgKey  :  90
HLD0025I  10:47:42.155 Function Create Dataspace     ended successful
HLD0025I  10:47:42.155 Function Create Alet          ended successful
HLD0025I  10:47:42.155 Function Create Name/Token    ended successful
HLD0004I  10:47:42.156 Writing Name/Token-Pair TAURSERV
                        DSPALET    :  01FF001B
                        DSPORIGIN  :  00000000
                        DSPBLOCK   :  00040000
                        DSPFLAGS   :  00000000
HLD0033I  10:47:42.156 Server Information
                        Lowest  port over all Servers   :         1200
                        Highest port over all Servers   :         1249
                        Maximum numbers of    Servers   :            1
HLD0035I  10:47:42.157 Initializing data space for user administration
HLD0076I  10:47:42.158 Resource table size increased to         5120 entries
HLD0048I
--------------------------------------------------------------------------------
         Starting Server

--------------------------------------------------------------------------------
HLD0049I  10:47:42.200 Starting server TAURISPF
HLD0002I  10:47:42.208 zServer holder task ready for commands
```

Verifying scheduler startup

If the holder has successfully started it will also have started your scheduler. You can now verify that the scheduler has started correctly.

In addition to the regular JESx DD statements and SYSTSPRT/ZCOTSPRT, the job log of a running scheduler address space should contain the following DD names:

DD Name	Function
MAINTASK	(LE) Messages from MAINTASK.
LISTENER	(LE) Listener for client requests.
CMDTASK	(LE) Messages from CMDTASK; contains command output.
SRVTASK	(LE) Messages from SRVTASK.
MSGTASK	(LE) Task to queue messages to a USS message queue.
T000000x, x=1..NUMTCB	(LE) Messages from T000000x, the worker tasks.
MAILBOX	If email notification is configured.

A number of messages reference these DD statements as "LE message files".

A scheduler address space has started successfully when the hardcopy log shows:

```
+TAU0067I  zServer startup completed for TAURISPF  for JESx and ASID nnnn
```

To verify that the scheduler is responding to work requests you can customize and submit the verification job hlq.ZSERVER.JCL(IVPVERI):

```
//TAURHLQ  SET TAURHLQ=hlq.ZSERVER
//JOBLIB   DD DISP=SHR,DSN=&TAURHLQ..LOADLIB
//*-------------------------------------------------------------------*
//*- Install Verification Job                                        -*
//*-                                                                 -*
//*- Valid Selects                                                   -*
//*- ============================================================   -*
//*- 1                    EXEC REXX IVPREXXE  (echo rexx)           -*
//*-------------------------------------------------------------------*
//TAURIVP  EXEC PGM=TAURIVP
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//SYSIN    DD *
IVP_SELECT = 1
IVP_Server = 'nnn.nnn.nnn.nnn'
IVP_Port   = 1200;
IVP_COMPAT = 2
IVP_IPNAME = 'TCPIP'
;
/*
```

You need to do the following to customize hlq.ZSERVER.JCL(IVPVERI):

- Add a valid job card.
- Specify the dataset prefix defined (TAURHLQ).
- Specify the correct IP address of the host system (IVP_Server).
- Specify the port the scheduler address space is listening on (IVP_Port).
- Specify the name of the IP stack used (IVP_IPNAME).

The IVPVERI output should look like this:

```
IVP0002I Selection code for IVP was :   1
         EXEC IVPREXXI (echo REXX)
IVP0003I call to zServer ended with  RC :       0
```

```
================================================================
Answer from zServer is       203 Bytes long.
================================================================
00000000   000000CB 4CD4E2C7 40C6C1C3 C9C47E7F   *    <MSG FACID="*
00000010   D3C9C37F 40D4E2C7 D5D67E7F F0F0F1F0   *LIC" MSGNO="0010*
00000020   7F40E2C5 E5C5D9C9 E3E87E7F C57F6E40   *" SEVERITY="E"> *
00000030   F0F97AF4 F87AF3F7 4BF0F8F9 40D38983   *09:48:37.089 Lic*
00000040   85958385 40A58996 9381A389 96957A40   *ence violation: *
00000050   E38889A2 40A28599 A5859940 83819540   *This server can *
00000060   969593A8 40828540 A4A28584 40A38899   *only be used thr*
00000070   96A48788 40819540 E3C1E4D9 E4E24083   *ough a licenced *
00000080   93898595 A34B4040 40404040 40404040   *client.         *
00000090   40404040 40404040 40404040 40404040   *                *
000000A0   40404040 40404040 40404040 40404040   *                *
000000B0   40404040 40404040 40404040 40404040   *                *
000000C0   40404040 404C61D4 E2C76E00 00000000   *     </MSG>     *
```

If you receive a return code of 49 in message IVP0003I, check if numbering was inadvertently turned on in the member from which this job was submitted. If it was, turn off numbering.

Make sure that this job is run for both the STC scheduler and the CEA scheduler (if one is configured).

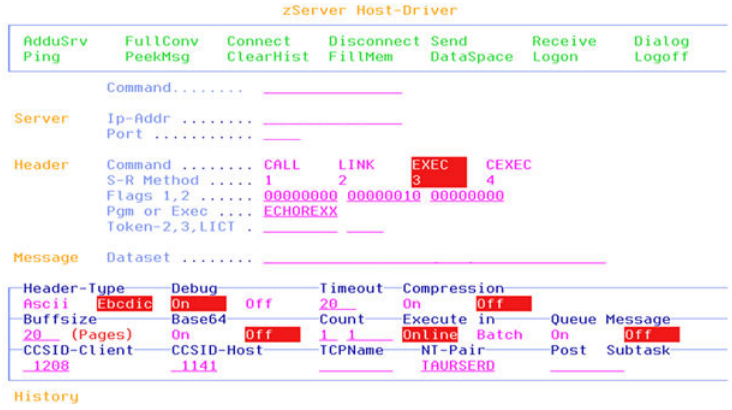
Verifying user server startup

To verify the user server startup you must start a user server, as these are only started on demand. Instructions on starting a user server are below.

We strongly recommended that you execute the following installation verification procedure for a z/Server user server before trying to connect from an Eclipse client. This procedure verifies that the configuration in the z/OS system is correct, without possible added complications from the network configuration.

The start of a z/Server user server can be tested by executing the REXX procedure TAU located in the REXX library. This is limited to support of port numbers up to a length of four characters.

Type EX in front of member TAU to execute the REXX exec. The "zServer Host -Driver" panel should open:



Verify that the IP stack used is TCPIP. If it is not, change the name in the last line under TCPName to the correct IP stack name. Press Enter. A message will confirm that another IP stack name is now used.

Set the IP address (IP-Addr) to the "home" IP address of the IP stack used.

Set the field Port to the listener port configured in the configuration dataset of the z/Server scheduler task.

Type "addusrv" (without the quotes) in the line named Command or select the point and shoot field AdduSrv in the panel header. A popup panel is shown prompting for the TSO password of the TSO user ID used. After entering the correct password and submitting the information, a z/Server user server should be started. Address space creation takes some time, so after a while, a response like the following is displayed:

```
Answer from Server for Message   1 is       204 Bytes long.
================================================================
```

```
00000000   000000CC 4CD4E2C7 40C6C1C3 C9C47E7F   *...¦<MSG FACID="*
00000010   E2D3D97F 40D4E2C7 D5D67E7F F0F0F2F3   *SLR" MSGNO="0023*
00000020   7F40E2C5 E5C5D9C9 E3E87E7F C97F6E40   *" SEVERITY="I"> *
00000030   F1F27AF1 F37AF0F1 4BF0F7F8 40E3E2D6   *12:13:01.078 TSO*
00000040   61C540A2 8599A585 9940E9E2 D6C6D1D2   */E server Wxxxxx*
00000050   404040A6 89A38840 D1D6C2C9 C440E2E3   *   with JOBID ST*
00000060   C3F0F8F3 F6F14086 969940A4 A2859940   *C08361 for user *
00000070   E2D6C6D1 D2404040 40A2A482 9489A3A3   *xxxxx    submitt*
00000080   85844B40 40404040 40404040 40404040   *ed.             *
00000090   40404040 40404040 40404040 40404040   *                *
000000A0   40404040 40404040 40404040 40404040   *                *
000000B0   40404040 40404040 40404040 40404040   *                *
000000C0   40404040 40404C61 D4E2C76E            *      </MSG>    *
```

If the response is not as shown above, then something went wrong during the start of the user server and you need to determine what that was:

- Check the JCL of the user server started task (IVPUSRT). There may be a JCL error in this procedure (e.g. a mistyped dataset name).
- Check for RACF problems in the hardcopy log.
- Check the MAINTASK DD statement in the user server joblog for problems and act accordingly.

Now you can confirm that the user server has started correctly. The joblogs can be found under the JOB names defined, by default, as the character W prefixed to your TSO userid. In addition to the regular JESx DD statements and SYSTSPRT/ZCOTSPRT, the job log of a running scheduler address space should contain the following DD names. Note that a user server address space has two MAINTASK JESx DD statements, one for each step in the user server startup process:

DD Name	Function
MAINTASK	(LE) Messages from MAINTASK from step one of user server startup.
MAINTASK	(LE) Messages from MAINTASK from step two of user server startup.
LISTENER	(LE) Listener for client requests.
CMDTASK	(LE) Messages from CMDTASK; contains command output.
SRVTASK	(LE) Messages from SRVTASK.
T0000001	(LE) Messages from T0000001, the worker task.
ISPLOG	(ISPF) Log file.

A number of messages reference these DD statements as "LE message files".

A scheduler address space has started successfully when the hardcopy log shows the following, where XXXX is your TSO user ID:

```
+TAU0067I  zServer startup completed for WXXXX  for JESx and ASID 005E
```

If the user server was started successfully, a "Logoff" command should be sent afterwards to stop the user server again. Type "logoff" on the command line or select the point and shoot field Logoff in the panel header. The password is prompted for again. When the request is submitted with the correct password, a response like this should be displayed:

```
Answer from Server for Message   1 is       124 Bytes long.
================================================================

00000000   0000007C 4CD4E2C7 40C6C1C3 C9C47E7F   *...§<MSG FACID="*
00000010   E2D3D97F 40D4E2C7 D5D67E7F F0F0F2F6   *SLR" MSGNO="0026*
00000020   7F40E2C5 E5C5D9C9 E3E87E7F C97F6E40   *" SEVERITY="I"> *
```

```
00000030   F1F77AF0 F57AF5F3 4BF8F4F1 40E2A396   *17:05:53.841 Sto*
00000040   97408396 94948195 84408696 9940A4A2   *p command for us*
00000050   859940E2 D6C6D1D2 40404040 81838385   *er xxxxx    acce*
00000060   97A38584 4B404040 40404040 40404040   *pted.           *
00000070   40404040 40404C61 D4E2C76E            *      </MSG>    *
```

Verifying CEA user servers (optional)

Make sure you also test the start of a CEA-launched TSO address space by changing the field Port to the listener port of the CEA scheduler and repeating the procedure for verifying a user server. Output similar to the one below in the hardcopy log indicates successful initialization of the CEA-launched TSO user server. Make sure the user server is terminated again using the logoff command as before.

```
$HASP373 userid    STARTED
IEF125I userid - LOGGED ON - TIME=16.01.44
+ISPWB000  Client requested ISPF session initialization 585
           Userid: userid   ASIDX: 006D
           Message Queue: 0000655407 CCSID: 00037
+TAU0001I  zServer userid    02030000  startup Tuesday   , 11 Mar 2014
16:01:49.04
+TAU0067I  zServer startup completed for userid    for JES2 and ASID 006D
```

If this message does not appear in hardcopy log, problem determination will become very difficult. Use the logon procedure specified by CEA_LOGONPROC and attempt to logon to TSO to make sure there are no JCL or ISPF errors during dataset allocation. The initial REXX exec CEALOGON is not executed, so no ISPF profile dataset is available. At the TSO READY prompt, use the following command to allocate the ISPF profile (with the correct naming conventions for the installation):

```
alloc dd(ISPPROF) dsn(userid.ISPF.ISPPROF)
```

Then call ISPF. If the logon procedure is correct, the ISPF primary option menu will be shown. Otherwise, correct any errors and repeat.

Console commands

Starting and stopping z/Server address spaces

While the z/Server holder and scheduler address spaces can be started and stopped using normal z/OS commands, z/Server is strongly recommended to be administrated using MODIFY commands to the holder address space to start and stop the individual schedulers and user servers. Administration is easiest when all scheduler address spaces belonging to a holder address space are named in the configuration dataset and started automatically. Stopping the holder address space will automatically terminate all user servers and scheduler address spaces belonging to that holder.

Individual schedulers and user servers can be started and stopped using the following commands:

Starting and stopping a scheduler address space

```
F <holder>,{START|STOP},SCHED=<scheduler>
```

With the keyword START, a scheduler address space is started. It does not need to be defined in the holder configuration dataset. The character string "scheduler" is used as the name of an address space to be started.

Keyword STOP terminates the named scheduler by first terminating all active user servers belonging to that scheduler and then the scheduler task itself.

Stopping a specific user server address space

To stop a specific user server address space, the port that user server listens to must be known. The port can be determined by using the command:

```
F <scheduler>,TSO,DISPLAY,USER=ALL
```

The command response in CMDTASK will have one line with message SLR0036I for every user that is currently using scheduler services. The last column shows the port nnnnn the address space listens on. Then the user server address space can be terminated:

```
F <holder>,STOP,PORT=nnnnn
```

Stopping all user servers for a Specific user ID

```
F <holder>,STOP,USER=<tsouid>
```

All user servers for that TSOUID will be stopped across all schedulers.

Keep in mind that the name of the user server address space is prefixed by TSOE_JOBPREFIX while this command requires only the TSO user ID to be specified.

Stopping all user servers for a Specific Scheduler address space

```
F <holder>,STOP,SCHED=<scheduler>,USERONLY
```

All user server address spaces for the named scheduler will be terminated.

Display commands for Scheduler/User server information

To get information about either a scheduler address space or user server address spaces, address the address space concerned with the keyword DISPLAY:

```
F <scheduler|userserver>,DISPLAY,{STATS|VSM|GRS[,qname=abc[*]]}
```

The STATS parameter of the DISPLAY command shows detailed statistics of actions done in response to client requests and names the client requests.

The VSM parameter of the DISPLAY command shows a display of virtual storage in the named address space.

The GRS parameter of the DISPLAY command shows ENQ information for resources held by the named address space.

Display address space statistics

```
F <scheduler|userserver>,DISPLAY,STATS
```

results in the following output in the CMDTASK DD statement of the named address space. Statistics are always printed when a scheduler or user server is stopped.

```
------------------------------------------------------------------------------
--
                                    z/
Server

Statistics
                         Run-date 15-07-2013,
12:22:17
------------------------------------------------------------------------------
--




------------------------------------------------------------------------------
--
```

```
                                Subtask-
Information
Task       Use    Attach   Receive     Write      Peek  Compress
Expand
-------------------------------------------------------------------------------
--
   1        31         1        32        32        63         0
0
   2         0         1         0         0         0         0
0
   3         0         1         0         0         0         0
0
   4         0         1         0         0         0         0
0
   5         0         1         0         0         0         0
0
-------------------------------------------------------------------------------
--
Sum:        31         5        32        32        63         0
0



Task    Bytes received     Bytes written  Bytes
compressed
-------------------------------------------------------------------------------
--
   1             7.214 9.954.559.781.007
0
   2                 0                 0
0
   3                 0                 0
0
   4                 0                 0
0
   5                 0                 0
0
-------------------------------------------------------------------------------
--
Sum:             7.214 9.954.559.781.007
0




-------------------------------------------------------------------------------
--
                              Scheduler-
Information
-------------------------------------------------------------------------------
--
ROUTEMSG.:      1   LISTCAT..:      0   LISTDSI..:      3   LISTMEM..:
3
GETDATA..:      2   FINDMEM..:      0   PUTDATA..:      0   PUTJCL...:
0
GETBD....:      0   GETBT....:      0   JSTATUS..:      0   JDDLIST..:
0
JDDGET...:      0   JBROWSE..:      0   JDELETE..:      0   JCANCEL..:
0
JSTOP....:      0   IDCAMS...:      0   ALLOC....:      0   FREE.....:
0
CONCAT...:      0   RECALL...:      0   DEQUEUE..:      0   SUBMIT...:
0
```

```
DELAY....:      0   ABEND....:      0   PUTREX...:      0   XMLEXIT..:
0
GETPORT..:      7   LOGOFF...:      7   LOGON....:      0   ADDUSRV..:
0
SLAVE....:      0   KILL.....:      0   RESTART..:      0   VERIFY...:
7
USRENQ...:      7   USRDEQ...:      0   CHGPSWD..:      0   IBMUTIL..:
0
USSLDIR..:      0   USSGFILE.:      0   USSMINFO.:      0   USSLINFO.:
0
USSDDENT.:      0   USSDDIR..:      0   USSMKDIR.:      0   USSPFILE.:
0
NOP......:      0   USSWMSGQ.:      0   USSRMSGQ.:      0   USSCMSGQ.:
0
USSQMSGQ.:      0   USSDMSGQ.:      0   FTP......:
0




-------------------------------------------------------------------------
--
                          User-Adminstration-
Information
-------------------------------------------------------------------------
--
Delete  Server.......:      0   Init    Storage......:
0
Add     Sever........:      0   Find    User.........:
15
Add     User.........:      7   Modify  User.........:
8
Delete  User.........:      0   Display Users........:
0
Info    Ports........:      7   Count   UserSrv......:
1
Clear   User.........:      7   Set     User Timeout.:
7
Find    Port.........:      7   Set     Maintask RDY.:
0
Get     Flags........:      4   Set     User EnQueue.:
7
Set     User DeQueue.:      0   Set     Subtask  RDY.:
0
Set     STOP Server..:      0   Find    Scheduler....:
0
Get     Sched.-List..:      0   Set     Port locked..:
0
Set     Port unlock..:      0   Get     Port-List....:
0
Lock    Scheduler....:      0   Unlock  Scheduler....:
0
Find    ASID.........:
0
```

The first part with the heading 'Subtask Information' shows all worker tasks (as defined by NUMTCB) and number of the IP function calls that were issued under each task. In an environment that is not very active with concurrent users, it is normal that only the first task shows activity at all.

The second part under the heading 'Scheduler Information' names individual functions that a client can use. For an Eclipse client, these functions are hidden in the client programming.

The last part under the heading 'User Administration Information' shows how many and which functions were executed against the user administration control structures.

Display Virtual Storage

```
F <scheduler|userserver>,DISPLAY,VSM
```

results in the following output in the CMDTASK DD statement of the named address space.

```
Virtual Storage Map :

V=R Central (real) address range (non pagable)


        Area   Start(hex)-End(Hex)    Size(K)     Size(M)    Used(K)
   PSA/System    00000000  00000000        0K       .0M
   Region V=R    00000000  FFFFFFFF        0K       .0M
   Region V=V    00006000  008FFFFF     9192K      8.9M
         CSA     00900000  00CAFFFF     3776K      3.6M         219K
        MLPA     00000000  00000000        0K       .0M
        FLPA     00000000  00000000        0K       .0M
        PLPA     00CB0000  00E54FFF     1684K      1.6M
         SQA     00E55000  00FD3FFF     1532K      1.4M         186K
     Nucleus     00FD4000  00FFFFFF      176K       .1M
      16M- line ------------------------------------
   Nucl. Ext.    01000000  01ADBFFF    11120K     10.8M
     SAQ Ext.    01ADC000  02958FFF    14836K     14.4M        7437K
    PLPA Ext.    02959000  05F70FFF    55392K     54.0M
    FLPA Ext.    05F71000  05F73FFF       12K       .0M
    MLPA Ext.    00000000  00000000        0K       .0M
     CSA Ext.    05F74000  1E6FFFFF   400944K    391.5M       28094K
    Reg. Ext.    1E700000  7FFFFFFF  1598464K   1561.0M
      WHM        ------------------------------------
     SQA HWM                           771K       .7M
    ESQA HWM                          7681K      7.5M
     CSA HWM                           576K       .5M
    ECSA HWM                         29731K     29.0M

 CSA space converted into SQA             0K       .0M
 Common Area Space available           4832K      4.7M (CSA/SQA)
 Size of private region                 9192K      8.9M
 Addr current top of user region         728K       .7M
 Maximum size of user region            9192K      8.9M
 Total bytes allocated to user regn      704K       .6M
 Total bytes allocated                   340K       .3M LSQA/SWA/229/230
 Addr start ext. user region          498688K    487.0M
 Size extended user region           1598464K   1561.0M
 Addr current top ext. user region    812116K    793.0M
 Max. size extended user region      1598464K   1561.0M
 Total bytes allocated ext. user reg  313420K    306.0M
 Total bytes allocated                 12112K     11.8M LSQA/SWA/229/230
```

The hardcopy log shows

```
+IPC0098I  hh:mm:ss.ttt Current Virtual-Storage-Map for server scheduler
printed to ddname CMDTASK.
```

Display contention information

```
F <scheduler|userserver>,DISPLAY,GRS,QNAME=SPF*
```

results in the following output in the CMDTASK DD statement of the named address space:

```
IPC0094I S= SYSTEMS  SPFEDIT  dataset.number.no1
FAPCOB02
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
IPC0096I    system   schedulr 0050 008BD968    EXCLUSIVE  OWN
IPC0094I S= SYSTEMS  SPFEDIT  dataset.number.no2
FAPCICS
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
```

```
IPC0096I    system   schedulr 0050 008BD968    EXCLUSIVE  OWN
IPC0094I S= SYSTEMS  SPFEDIT  dataset.number.no3
SCLMWART
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
IPC0096I    system   schedulr 0050 008BD968    EXCLUSIVE  OWN
```

Note: The ENQ locking a member of a partitioned dataset against simultaneous access using 3270 access to ISPF is always held by the CMDTASK of a scheduler address space. If the client that locked the member for editing doesn't finish its processing (for instance when the IP connection to the scheduler is interrupted), that ENQ will still be held by the scheduler address space and must be released manually (see *Releasing the SPFEDIT serialization ENQ*).

When the ENQ name is not known, the command

```
F <scheduler|userserver>,DISPLAY,GRS
```

shows all ENQs held by the addressed scheduler or user server.

```
IPC0094I S= SYSTEM   SYSDSN   dataset.number.no1
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
IPC0096I    system   schedulr 0032 008FF890    SHARE      OWN
IPC0094I S= SYSTEM   SYSZJES2 SJB.1CE686A8
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
IPC0096I    system   schedulr 0032 008FF890    EXCLUSIVE  OWN
IPC0094I S= SYSTEM   SYSDSN   hlq.ZSERVER.CONFIG
IPC0095I    SysName  JobName  Asid TCBAddr     EXC/SHR    Status
IPC0096I    system   schedulr 0032 008FF890    SHARE      OWN
```

Display commands for TSO information

To get information about TSO users address the scheduler address space with the keywords TSO and DISPLAY:

```
F <scheduler>,TSO,DISPLAY,{ STATS|VPOOL}
```

The STATS parameter of the DISPLAY command shows statistics of actions done in response to client requests.

The VPOOL parameter of the DISPLAY command shows the variable pool contents.

Display TSO statistics

```
F <scheduler>,TSO,DISPLAY,STATS
```

results in the following output in the CMDTASK DD statement of the scheduler address space:

```
SLR0040I ============================================
         Server Statistics
         ============================================
SLR0041I Submit      Count .........             0 times
         Stop        Count .........             7 times
         Communicate Count .........             1 times
         Error       Count .........             0 times
```

The lines in SLR0041I have the following meaning:

Column	Meaning
Submit count	Number of times any user server address space was started.
Stop count	Number of times any user server address space was stopped.
Communicate count	Number of IP messages scheduled to the user server address space for processing (i.e. number of client requests handled in that user server).

Column	Meaning
Error	Number of errors during processing.

Display VPOOL

```
F <scheduler>,TSO,DISPLAY,VPOOL
```

results in the following output in the CMDTASK DD statement of the scheduler address space:

```
SPR0011I Pool-Address      : 2FB7EF00
         Pool-Size         :         4096
         Pool-Freespace    :         3973 Bytes
         No of Variables   :            5 Bytes
         Variable-Pool-Information
=========================== Pool Content ============================
         Var-Typ     Var-Name    Var-Content
=====================================================================
SPR0013I  SYS         CLASS      0
SPR0013I  SYS         JPREFIX    W
SPR0013I  SYS         SCMSPATH   1
SPR0013I  SYS         SCMSTAT    X
SPR0013I  SYS         SCMSREXX   MX0RSC01
```

Diagnostic commands

To get information about special areas in either a scheduler address space or user server address spaces, address the address space concerned with the keyword DUMP:

```
F <scheduler|userserver>,DUMP,{CONFIG|SVCD|AREA=ALL|ADDR=<addr>,LEN=<length>}
```

The CONFIG parameter of the DUMP command enables you to see the current configuration of the address space.

The SVCD parameter of the DUMP produces an SVC dump of the address space titled "zServer SVCDUMP".

Certain or all areas of an address space are dumped using the parameter AREA.

Configuration Dump

```
F <scheduler|userserver>,DUMP,CONFIG
```

writes the current configuration to the CMDTASK DD statement.

SVC Dump

```
F <scheduler|userserver>,DUMP,SVCD
```

writes a standard SVCD dump. Such a dump could also be taken using a regular MVS DUMP command.

Important storage areas

```
F <scheduler|userserver>,DUMP,AREA=ALL
```

writes all information z/Server deems relevant storage areas to DD statement CMDTASK of the address space. These areas include the TAUCA (the main z/Server control block) and control blocks named SUBTASK, one for each of the NUMTCB worker tasks.

Selected storage areas

```
F <scheduler|userserver>,DUMP,ADDR=xxxxxxxx,LEN=yyy
```

writes the storage content starting at address xxxxxxxx in length yyy to DD statement CMDTASK of the address space. Keep in mind that the only areas dumped are those that z/Server owns, in other words, this command cannot be used to show the content of all storage allocated in the address space.

Display data space information

The holder task allocates and manages a common access data space (CADS). The following command displays the information in this data space:

```
F <holder>,DISPLAY,DSP,{FORMAT|DUMP}
```

In order to use this command, the holder task must contain DD statement

```
//DSPPRT   DD  SYSOUT=*,LRECL=255
```

The output for this display command is written to DSPPRT. If necessary, one needs to scroll to the extreme right to see the full output.

Sub parameter DUMP writes the unformatted storage areas from the data space, when using the keyword FORMAT the information is written in human readable form. Below is one example user entry:

```
Userid   JobName  JobId    SYS  Port  L F1 F2 F3 F4 F5 JP  CRP
-------------------------------------------------------------
user1    Vuser1   STCTIMEO syst 01215 M 00 80 80 00 00 00 0006
user2    Vuser2   STC04711 syst 01216 M 00 60 80 00 00 00 0008

Ip-Addr-Client  Ip/Port Scheduler     Creator  ClientId Asid
-----------------------------------------------------------------
nnn.nnn.nnn.nnn nnn.nnn.nnn.nnn  1111 TAURISPF 00000003 004C
nnn.nnn.nnn.nnn nnn.nnn.nnn.nnn  1111 TAURISPF 00000006 0037

Start-Time     LastCmd LastCmd-Time   Last Timeout
---------------------------------------------------
mm/dd hh:mm:ss Modify  07/22 hh:mm:ss mm/dd hh:mm:ss
mm/dd hh:mm:ss Modify  07/22 hh:mm:ss mm/dd hh:mm:ss
```

Column JOBID contains a valid JESx job ID when a user server is running and listening on the port specified in column PORT. The (not valid) JESx job ID of STCTIMEO is set either when a user server had terminated (for instance due to inactivity - timeout) or when a client logged on but did not need to start a user server yet. This is called deferred logon. Once the client requests a service that can only run in a user server, that user server is "restarted" using the indicated port.

Setting IPTRACE level

The IPTRACE level is set using the configuration parameter IPTRACE at startup. It is recommended to run at the lowest possible trace level. IPTRACE can be changed dynamically using the following command:

```
F <holder|scheduler|userserver>,TRACE,LEVEL=x
```

x is a positive integer between 0 and 6. Zero denotes no tracing, 6 is full tracing. Every subsequent trace level includes all lower trace levels.

DD statement CMDTASK (for scheduler and user server) or MAINTASK (for the holder address space) show confirmation:

```
F <scheduler>,TRACE,LEVEL=4
IPC0066I  12:27:46.579 Trace level changed to           4
```

Full tracing in a highly loaded z/Server system can generate a large amount of output data and can lead to JESx spool problems.

Turn Off LE Error Handling

When a problem occurs, z/Server creates a dump in DD statement ZCOMDUMP. When z/Server relies on LE recovery, then LE might write a CEEDUMP. In severe cases an SVC dump is written.

The command

```
F <scheduler|userserver>,RECOVERY,{ON|OFF}
```

can be used to turn of LE error handling. If there is a SYSUDUMP/SYSABEND/SYSMDUMP DD statement in the JCL, such a dump would get written instead of a CEEDUMP.

Note: Switch off recovery only if requested by SupportLine.

REXX commands

When a REXX exec is executing in either a user server or a scheduler address space, the following REXX commands are available, addressing the REXX exec environment (see *SA22-7790-xx: TSO/E REXX Reference*):

```
f <scheduler|userserver>,REXX,{HI|HT|RT|TS},SUBTASK={x|ALL}
```

The abbreviations stand for

- HI = Halt Interpretation
- HT = Halt Typing
- RT = Resume Typing
- TS = Trace Start

Parameter subtask specifies the number of the worker task (T000000x). There are at most NUMTCB worker tasks. Specifying ALL would address all worker tasks simultaneously.

Administrative commands

The following administrative commands are available for day-to-day operations:

```
F <scheduler>,TSO,DELETE,USER=user
F <scheduler|userserver>,SPFDEQ,DSN=<datasetname>[,mem=<member>]
F <holder|scheduler|userserver>,TRACE,LEVEL=x
F <scheduler|userserver>,RECOVERY,{ON|OFF}
F <holder>,DISPLAY,DSP,{FORMAT|DUMP}
F <scheduler|userserver>,REFRESH,PGM=nn
```

They are mostly used in error scenarios.

Delete a TSO User in user administration

It is possible that a user server address space terminated without first doing clean-up in the user administration control structures. This can happen if the address space was forced (MVS FORCE command) and no address space related clean-up ran. In this case the command:

```
F <scheduler>,TSO,DELETE,USER=userid
```

enables unconditional removal of the TSO user ID from the user administration control structures to free the entries and the port the user server address space was listening on. The CMDTASK DD statement of the scheduler address space shows:

```
SLR0039W  13:53:19.557 User USERID  deleted.
```

If the specified user is not found in the user administration control structures, the following message is issued:

```
F <scheduler>,TSO,DELETE,USER=ALL
SLR0038W  13:53:08.239 User ALL      not found. Delete command ignored.
```

Note: This command will unconditionally remove the specified user ID from the control structures, even if the client is currently working normally and no problem had occurred before. That means that the client/user server cannot work further without causing other problems. The user server address space also cannot terminate anymore without manual intervention (it must be cancelled):

```
+SLR0092E  14:11:40.508 User servers with Timeout_Action=STOP must be
started with POLICY=1 (Started Jobs). Timeout is ignored.
```

Releasing the SPFEDIT serialization ENQ

When a client starts to edit a member of a partitioned dataset, z/Server locks that member against simultaneous edit from a 3270 TSO user by serializing against the resource SPFEDIT/

data_set_name(member_name). That ENQ is held by the command task of the scheduler address space the user server belongs to.

If for some reason the client does not finish the edit process, the member stays locked. In the past another client used the Dequeue function from the context menu for the dataset member to release someone else's serialization. To reduce the integrity exposure of this (client) function, the following command can be used:

```
F <scheduler|userserver>,SPFDEQ,DSN=<datasetname>,MEM=<member>
```

It will release the ENQ that protects against parallel updates of the same dataset / member by different users. The CMDTASK DD statement will contain the following messages acknowledging deletion of the resource:

```
F <scheduler>,SPFDEQ,DSN=DATASET.NAME,MEM=MEMBER
SLR0044I  08:46:21.693 Dequeue for Major-Name SPFEDIT  and Minor-Name
DATASET.NAME                                  MEMBER
SLR0046I  08:46:21.694 Dequeue
successful
```

Warning: Only use this command if you have made sure that the original owner will not edit the dataset or member any further. Otherwise you risk the data integrity of your datasets.

Port skip

When a user server address space had allocated a port and doesn't terminate properly or port ranges were invalidly defined, then it can happen that a port is not available to a newly started user server address space. If that port was the first in the range of the scheduler, this could mean that no user server could get started anymore. With port skip active (PORTCHECK="1" set in the scheduler configuration parameters), z/Server tests the availability of the port. If it is already in use by someone, the message:

```
+SLR0055E  [001] Port [002] is not available.
```

is issued, followed by:

```
+SLR0135S  [001] Port [002] for z/Server scheduler [003] locked because port
was not available.
```

In this context, "port is not available" means that TCPIP returned a response of "the port is in use and has the state LISTEN". There is an entry in the user administration control structures of z/Server for every port defined to the scheduler. The entry that was not available is now marked as LOCKED and will not be used any longer to allocate conversations with a client. This can be displayed by using the command:

```
F <holder>,display,dsp,format
```

IN the DD named DSPPRT of the holder task the following output can be found:

```
-------------------------------------
Userid   JobName  JobId    SYS    Port
-------------------------------------
user     jobname  jobid    system nnnnn
```

If a user server has stalled and not terminated and hence still has the port allocated, it needs to get terminated, probably via an operator force arm or force command. That will make the port available for reuse. The port is still in a "locked" state in the user administration part of z/Server, however. It needs to be unlocked manually using the command

```
F <scheduler>,TSO,UNLOCK,PORT=nnnnn
```

This cleans up the LOCKED state of the port entry, and the port can be used again by the scheduler.

If the port was not allocated to a stalled user server, then the system administrator needs to determine who has the port allocated (i.e. netstat command). There is probably some sort of definition error in the port ranges for this scheduler/holder that needs to get corrected. If ports were defined incorrectly to the scheduler/holder, the scheduler/holder will need to be restarted with the corrected definitions.

If you only unlock the port in the user administration without first making sure that it really is available to be allocated again, port skip will immediately issue messages SLR0055E and SLR0135S again and relock the port in the user administration control structures.

Refresh a load module

If SupportLine provided a hot fix that would need a restart of z/Server, and customer support also specified that the load modules affected can be refreshed,

```
F <scheduler|userserver>,REFRESH,PGM=nn
```

with nn a positive integer between 02 and 99 allows reloading the load module and installing the hot fix without restarting z/Server.

Note: It is not possible to refresh all load modules running in a z/Server address space.

Configuration reference

You can configure many aspects of z/Server's behavior by using any of z/Server's configuration parameters.

Configuration parameters - quick reference

The following list shows all z/Server configuration parameters and for each parameter, indicates whether it applies to holders, schedulers, or user servers.

Parameter	General (Holder)	STC Scheduler	STC User Server	CEA Scheduler	CEA User Server
AUTOSTART	Y				
BUFFERSIZE		Y	Y	Y	Y
CCSID		Y	Y	Y	Y
CEA_ACCOUNT				Y	
CEA_CHARSET				Y	
CEA_CODEPAGE				Y	
CEA_INIT_CMD				Y	
CEA_LOGONPROC				Y	
CEA_REGION_SIZE				Y	
CEA_SCR_SIZE				Y	
DELAY	Y				
DIALOG_TIMEOUT			Y		Y
DSP_TOKEN	Y				
ECB_TIMEOUT		Y	Y	Y	Y
FIRST_PORT		Y		Y	
IPSTACK	Y				
IPTRACE	Y	Y	Y	Y	Y
ISPF_STATS		Y		Y	
JOBNAME		Y		Y	

Parameter	General (Holder)	STC Scheduler	STC User Server	CEA Scheduler	CEA User Server
LAST_PORT		Y		Y	
LISTENER_PORT		Y		Y	
LOGON_EXIT		Y	Y	Y	Y
MAIL_CLASS		Y	Y	Y	Y
MAIL_MSGCNT		Y	Y	Y	Y
MAIL_NOTIFY		Y	Y	Y	Y
MAIL_SEVERITY		Y	Y	Y	Y
MAIL_WRITER		Y	Y	Y	Y
MAXUSRV		Y		Y	
MSGCLASS		Y		Y	
MULTI_REXX_S		Y		Y	
MULTI_REXX_U			Y		Y
NOFTASK		Y	Y	Y	Y
NUMTCB		Y	Y	Y	Y
PORTCHECK		Y	Y	Y	Y
RACF_STATS		Y	Y	Y	Y
SCHEDULER_NAME		Y		Y	
SUBMIT_DELAY		Y		Y	
SVC_NO	Y				
TIMEOUT		Y	Y	Y	Y
TSOE_JOBCHAR		Y		Y	
TSOE_NOTIFY		Y			
USER_SERVER_JOBNAME		Y		Y	
USRSRV_TIMEOUT		Y		Y	
USS_DUBPROCESS		Y	Y	Y	Y
VIPA		Y		Y	
VPOOLSIZE		Y	Y	Y	Y

Configuration parameters - alphabetical list

AUTOSTART

Name	AUTOSTART
Summary	Specifies whether the holder address space will automatically start the scheduler address space(s) associated with it.
Default	1

Supported Values

Value	Description
0	The holder address space does not automatically start the scheduler address space(s) associated with it. Each scheduler address space must be started manually using an MVS START command.
1	The holder address space automatically starts the scheduler address space(s) associated with it.

Example AUTOSTART="0"

BUFFERSIZE

Name BUFFERSIZE

Summary Specifies the size of the IP send/receive buffer for each worker task in a scheduler or user server address space.

Default 10M

Minimum Value 2M (or 2048K)

Maximum Value 100M

Supported Values An integer followed by either the character "K" or "M". There must be no space between the integer and the character.

Additional Information The size of a message to or from a client cannot exceed the defined buffer size.

The buffers are used for dataset content to be edited or JESx data to be browsed and must be large enough to contain the associated data. For example, a 20.000 line source program requires a 1.6MB buffer. The buffers are allocated in LE heap storage (above the line).

The CMDTASK DD statement contains the confirmation of the buffer sizes: TAU0025I hh:mm:ss.ttt Inp-Msg-Area for subtask allocated at 29649028 Out-Msg-Area for subtask allocated at 2A04A028 Wrk-Msg-Area for subtask allocated at 2AA4B028 Each area is 10485760 Bytes long If the defined buffers are too small for an incoming or outgoing request message, TAU0050E is written to the LE message file: TAU0050E hh:mm:ss.ttt Input-Msg-Len with 00001030 Bytes is greater than ... Increase Buffer-Size and restart server !

Example BUFFERSIZE="15M"

CCSID

Name CCSID

Summary Specifies the code page used by z/Server (for example, 37 for US, or 1141 for German).

Default 37

Supported Values Any of the code pages supported by z/Server: 37, 273, 277, 278, 280, 284, 285, 297, 500, 871, 1047, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149

Example CCSID="1047"

CEA_ACCOUNT

Name	CEA_ACCOUNT
Summary	Specifies the name of the account to be used by all users of this scheduler.
Default	ACCT#
Supported Values	A character string with maximum length of 40 characters. The string can contain any alphanumeric characters or any special characters supported by the current codeset/codepage.
Additional Information	The account specified by CEA_ACCOUNT must be defined in general resource class TSOACCT, and all potential TSO users must have access to it. The configured default is ACCT#.
Example	CEA_ACCOUNT="ACCT#"

CEA_CHARSET

Name	CEA_CHARSET
Summary	Specifies the character set used for the caller's CEA-launched TSO address space.
Default	697
Supported Values	Any character set supported by z/OS.
Additional Information	The value specified by CEA_CHARSET is used by the applications running in the TSO/E address space to convert messages and responses from UTF-8 to EBCDIC.
Example	CEA_CHARSET="698"

CEA_CODEPAGE

Name	CEA_CODEPAGE
Summary	Specifies the codepage used for the caller's CEA-launched TSO address space.
Default	37
Supported Values	Any codepage supported by z/OS.
Additional Information	The value specified by CEA_CODEPAGE is used by applications running in the TSO/E address space to convert messages and responses from UTF-8 to EBCDIC.
Example	CEA_CODEPAGE="1141"

CEA_INIT_CMD

Name	CEA_INIT_CMD
Summary	Specifies the REXX exec used for a CEA initial request or split screen request.
Default	ZCEAICMD
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.
Additional Information	A CEA initial request should be the first application requested by a client after a CEA-launched TSO user address space is started.
Example	CEA_INIT_CMD="ZCEAIREX"

CEA_LOGONPROC

Name	CEA_LOGONPROC
Summary	Specifies the name of the TSO/E logon procedure used to start a CEA-launched TSO address space.
Default	CEAPROC
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.
Additional Information	The procedure specified by CEA_LOGONPROC must be defined to general resource class TSOPROC and potential TSO users must have access to it. If more than one CEA scheduler is run on a given system, every CEA scheduler needs its own logon procedure, because the IPCONFIG DD statement contained in this procedure will be different for every scheduler. The logon procedure should be tested like any TSO logon procedure before using it. When it is used outside of z/Server, the initial REXX exec CEALOGON will not have run, resulting in no ISPF profile, and the TSO user being returned to the TSO READY prompt. Use the following command to allocate the ISPF profile (with the correct naming conventions for the installation): `alloc dd(ISPPROF) dsn(userid.ISPF.ISPPROF)` Then call ISPF. If the logon procedure is correct, the ISPF primary option menu will be shown. Otherwise correct any errors. This is a mandatory parameter for CEA scheduler address spaces.
Example	CEA_LOGONPROC="CEAPROC"

CEA_REGION_SIZE

Name	CEA_REGION_SIZE
Summary	Specifies the region size used to start the CEA-launched TSO user address space.
Default	2047M
Minimum Value	150M
Maximum Value	2047M
Supported Values	An integer followed by the character "M". There must be no space between the integer and the "M".
Additional Information	Any specification provided in the JCL statement will be overwritten by this parameter.
Example	CEA_REGION_SIZE="1000000"

CEA_SCR_SIZE

Name	CEA_SCR_SIZE
Summary	Describes the screen characteristics for the ISPF session.
Default	24x80
Supported Values	24x80, 32x80, 43x80, 27x132, or 62x160

Additional Information	These screen sizes are usually set in a 3270 emulation and queried by VTAM at the start of a 3270 TSO session. The values specified here are used if the Eclipse client did not specify other screen sizes in the preferences section, which would then be used during the start of a CEA-launched TSO user address space.
Example	CEA_SCR_SIZE="62x160"

DELAY

Name	DELAY
Summary	Specifies the time, in seconds, that the holder task waits until canceling a user server/scheduler when the stop command didn't terminate the address space and the time between terminating the last scheduler task and the holder task itself.
Default	5
Minimum Value	5
Maximum Value	300
Additional Information	When specifying a value for DELAY, bear in mind that the time necessary to terminate an address space can vary with the CPU load on the system.
Example	DELAY="10"

DIALOG_TIMEOUT

Name	DIALOG_TIMEOUT
Summary	Specifies the timeout, in seconds, for dialog responses.
Default	3600
Minimum Value	20
Maximum Value	86400
Additional Information	A dialog response in this context is the time a user server address space waits for a client response. After the specified time expires, a running ISPF dialog (in a user server address space) receives an error message and must be restarted from the client. z/Server will cancel the user server address space that had encountered the timeout. When a scheduler address space does not get a timely response from a user server, the following message is issued: `SLR0084E hh:mm:ss.ttt User server [002] did not response for [003] seconds. Connection terminated due to timeout!`
Example	DIALOG_TIMEOUT="40"

DSP_TOKEN

Name	DSP_TOKEN
Summary	Specifies the token name that each address space for one z/Server uses to address the data space with the user administration control structures.
Default	TAURSERV

Supported Values	A character string with maximum length of 16 characters. The first character must be in the range "J" through "Z". The remaining characters must be alphanumeric. The first three characters of the string must not be "SYS".
Example	DSP_TOKEN="TAURSERV"

ECB_TIMEOUT

Name	ECB_TIMEOUT
Summary	Specifies, in seconds, how long the listener waits for the completion of the command and service task.
Default	30
Minimum Value	10
Maximum Value	120
Additional Information	If a timeout occurs, message TAU0174I is issued and the server startup terminates.

FIRST_PORT

Name	FIRST_PORT
Summary	Specifies the low end of the port range that the scheduler address space owns and assigns to a user server address space when the user server is started for IP communication.
Default	1201
Minimum Value	1
Maximum Value	65535
Additional Information	Specify the high end of the port range using LAST_PORT. The port range (LAST_PORT - FIRST_PORT) specifies the maximum number of user server address spaces that can run in parallel.
Example	FIRST_PORT="1240"

IPSTACK

Name	IPSTACK
Summary	Specifies the name of the IP stack used for processing.
Default	TCPIP
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.
Additional Information	This parameter is mandatory.
Example	IPSTACK="TCPIP"

IPTRACE

Name	IPTRACE
Summary	Specifies the level of tracing to use.
Default	0

Supported Values

Value	Description
0	Normal message traffic for best performance.
1	Warning, error and severe error messages are written.
2	Informational messages are also written.
3	All data sent and received using IP is traced.
4	Calls to EZASOCKET are traced.
5	Full trace.
6	Code page translation and BASE64 encode/decode are traced.

Additional Information

The IPTRACE level can be set at startup. The trace level can later be changed via operator command. A higher trace level includes all lower trace levels.

Note: A high trace level may cause JESx spool shortages due to the amount of output written to the JESx job log. Use higher trace levels with caution.

Example

IPTRACE="3"

ISPF_STATS

Name

ISPF_STATS

Summary

Specifies the level of ISPF statistics that z/Server returns.

Default

1

Supported Values

Value	Description
0	z/Server returns basic ISPF statistics on read requests to be displayed in the client.
1	z/Server returns basic ISPF statistics on read requests to be displayed in the client, and writes/updates basic ISPF statistics when writing/updating a member of a partitioned dataset.

Additional Information

Extended ISPF statistics are not supported. If an installation uses extended ISPF statistics, they will be replaced with basic ISPF statistics.

The STATS setting in the ISPF profile of the TSO user is ignored.

Example

ISPF_STATS="0"

JOBNAME

Name

JOBNAME

Summary

Specifies whether the JOBNAME of a user server consists of the user ID prefixed or suffixed with TSOE_JOBCHAR.

Default

PREFIX

Supported Values

PREFIX, SUFFIX

LAST_PORT

Name	LAST_PORT
Summary	Specifies the high end of the port range that the scheduler address space owns and assigns to a user server address space when the user server is started for IP communication.
Default	1249
Minimum Value	1
Maximum Value	65535
Additional Information	Specify the low end of the port range using FIRST_PORT. The port range (LAST_PORT - FIRST_PORT) specifies the maximum number of user server address spaces that can run in parallel.
Example	LAST_PORT="1270"

LISTENER_PORT

Name	LISTENER_PORT
Summary	Specifies the IP port that the scheduler listens on for incoming work requests.
Default	1200
Minimum Value	1
Maximum Value	65535

LOGON_EXIT

Name	LOGON_EXIT
Summary	Specifies the user exit that is invoked every time an ACEE for a user is created or deleted.
Default	SPACE
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.
Additional Information	The exit specified LOGON_EXIT can change or set the userid and password. The exit may also be used to generate a pass ticket for a given user ID.

MAIL_CLASS

Name	MAIL_CLASS
Summary	Specifies the JESx message class that the emails are forwarded to.
Default	F
Supported Values	A single-character string. The character must be alphanumeric.
Additional Information	The message class specified by MAIL_CLASS must match the message class that is configured as LOCALCLASS for the SMTP server.
Example	MAIL_CLASS="G"

MAIL_MSGCNT

Name	MAIL_MSGCNT
Summary	Specifies how many messages are to be combined into one email.
Default	20
Minimum Value	1
Maximum Value	100
Additional Information	At scheduler shutdown, any messages buffered are always sent when the server is shut down.
Example	MAIL_MSGCNT="25" This example results in the 26th message causing the previously accumulated 25 messages to be sent as one email.

MAIL_NOTIFY

Name	MAIL_NOTIFY
Summary	Specifies whether notification emails are to be sent about errors with a severity greater than or equal to the value specified using the MAIL_SEVERITY parameter.
Default	0

Supported Values

Value	Description
0	Email notifications are deactivated.
1	Email notifications are activated.

Example MAIL_NOTIFY="1"

MAIL_SEVERITY

Name	MAIL_SEVERITY
Summary	Specifies the severity of the messages that cause an email to be sent.
Default	2

Supported Values

Value	Severity
1	Warnings
2	Errors
3	Severe errors

Example MAIL_SEVERITY="3"

MAIL_WRITER

Name	MAIL_WRITER
Summary	Specifies the name of the z/OS task address space that emails are forwarded to.
Default	SMTP
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.

Example MAIL_WRITER="SMTP"

MAXUSRV

Name MAXUSRV

Summary Specifies the maximum number of user server address spaces that can be started for one TSO user or client.

Default 5

Minimum Value 1

Maximum Value 5000

Example MAXUSRV="5"

MSGCLASS

Name MSGCLASS

Summary Specifies the JESx message class to be used for the job log DD statements that are dynamically created.

Default X

Supported Values A single-character string. The character must be alphanumeric.

Example MSGCLASS="K"

MULTI_REXX_S

Name MULTI_REXX_S

Summary Specifies if re-entrant REXX environments are to be made available in addition to the non re-entrant REXX environment that is created by default.

Default 1

Supported Values

Value	Description
0	No re-entrant REXX environments are available. REXX execs executing in the default environment write their output to DD statement SYSTSPRT in JESx job log.
1	Each REXX exec is executed in its own REXX environment. Every z/Server subtask has both a non re-entrant and a re-entrant REXX environment available. REXX execs executing in the re-entrant environment write their output to DD statement ZCOTSPRT in JESx job log. This setting is recommended for scheduler address spaces.
2	CMDTASK and SRVTASK execute in a re-entrant REXX environment. All other subtasks share the default non re-entrant environment.

Example MULTI_REXX_S="2"

MULTI_REXX_U

Name MULTI_REXX_U

Summary Specifies if re-entrant REXX environments are to be made available in addition to the non re-entrant REXX environment that is created by default.

Default 2

Supported Values

Value	Description
0	No re-entrant REXX environments are available. REXX execs executing in the default environment write their output to DD statement SYSTSPRT in JESx job log.
1	Each REXX exec is executed in its own REXX environment. Every z/Server subtask has both a non re-entrant and a re-entrant REXX environment available. REXX execs executing in the re-entrant environment write their output to DD statement ZCOTSPRT in JESx job log.
2	CMDTASK and SRVTASK execute in a re-entrant REXX environment. All other subtasks share the default non re-entrant environment. This setting is recommended for a user server address space.

Example MULTI_REXX_U="1"

NOFTASK

Name NOFTASK

Summary Specifies the behavior of LISTENER task when no worker task is available to handle incoming client requests.

Default For CEA schedulers, M.

For STC schedulers, WM.

Supported Values

Value	Description
M	If no worker task is available, LISTENER returns message TAU0171E to the client. It does not wait for a worker task to become available.
W	If no worker task is available, LISTENER waits until one becomes available.
WM	If no worker task is available, LISTENER waits until one becomes available. Additionally, message TAU0009E is written to the hardcopy log.

Example NOFTASK="WM"

NUMTCB

Name NUMTCB

Summary Specifies how many worker tasks (TCBs) are started simultaneously to process incoming connections from a client.

Default For schedulers, 5.

For user servers, 1.

Minimum Value 1

Maximum Value 35

Additional Information Each worker task has its own DD statement Tnnnnnnn in the JESx job log. For every worker task started, the main task writes message TAU0010I to the MAINTASK DD statement:

```
TAU0010I 14:47:07.563 Subtask 1 started A(TCB) : 008B33B0
A(ECB) :
2236C0E0
TAU0010I 14:47:07.563 Subtask 2 started A(TCB) : 008B3120
A(ECB) :
2236C144
TAU0010I 14:47:07.563 Subtask 3 started A(TCB) : 0089EE78
A(ECB) : 2236C1A8
```

This message contains the address of the TCB (Task Control Block) and ECB (Event Control Block) for the worker task. When a worker task is posted for an incoming request, message TAU0011I is written to the MAINTASK DD statement:

```
TAU0011I 15:10:17.883 Subtask 1 posted A(TCB) : 008B33B0
A(ECB) : 2236C0E0
```

When all worker tasks are busy processing client requests and no worker task can be posted for a new client request, TAU0009E is written to the MAINTASK DD statement and the main task waits for one of the worker tasks to become available again:

```
TAU0009E 15:10:20.882 No free ECB available. Waiting for next
free ECB.
```

If this message appears too often, the number of worker tasks NUMTCB should be increased.

Note: Each subtask requires private storage to send and receive data (see *BUFFERSIZE*), and the storage required for the application. Storage is allocated when the worker task is established at scheduler address space startup.

The number of tasks is calculated by the formula: NUMTCB + 4 (CMDTASK + SRVTASK + MSGTASK + LISTENER).

Do not set NUMTCB higher than 33 (when using BUFFERSIZE="10M", as the size of the private region will be insufficient otherwise.

PORTCHECK

Name PORTCHECK

Summary Specifies whether the availability of a port should be tested before a user server address space is started.

Default 1

Supported Values

Value	Description
0	No checking is done.

Value	Description
1	z/Server issues the following command (visible in SYSTSPRT DD statement): `D TCPIP,,N,CONN,PORT` The command response can be found in the hardcopy log. When the port is not available, for instance, when it is in status LISTEN, TIMEWT, or FINWT2, the response to the DISPLAY command is useful for analysis.

Additional Information It is strongly recommended to set PORTCHECK="1" in the scheduler address space configuration.

Example PORTCHECK="1"

RACF_STATS

Name RACF_STATS

Summary Specifies whether message ICH70001I is suppressed.

Default 0

Supported Values

Value	Description
0	Message ICH70001I is not suppressed.
1	Message ICH70001I is suppressed for RACROUTE and RACINIT REQUEST=VERIFY

Additional Information Message ICH70001I is issued whenever a client connects a scheduler with a request for service.

Example RACF_STATS="0"

SCHEDULER_NAME

Name SCHEDULER_NAME

Summary Specifies the job start of the started task.

Default TAURISPF

Supported Values A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.

Example SCHEDULER_NAME="TAURISPF"

SUBMIT_DELAY

Name SUBMIT_DELAY

Summary Specifies the time, in seconds, until a scheduler address space checks if a just-started user server is ready to accept commands.

Default 5

Minimum Value 1

Maximum Value	30
Additional Information	The check is repeated 10 times before an error message similar to the following is issued: `SLR0131E hh:mm:ss.ttt User-Server did not signal READY after a wait period of 10 X [002] milliseconds. Command was not routed to the user server. Please wait a moment and retry` If address space creation on a system routinely takes longer than 10 seconds, SUBMIT_DELAY should be increased.
Example	SUBMIT_DELAY="25"

SVC_NO

Name	SVC_NO
Summary	Specifies the SVC number for the type-3 SVC routine to be dynamically installed at holder address space startup.
Default	238
Minimum Value	200
Maximum Value	255
Additional Information	This parameter is mandatory.
Example	SVC_NO="238"

TIMEOUT

Name	TIMEOUT
Summary	Specifies the length of time, in minutes, that the address space tolerates without IP activity before terminating.
Default	For user servers started as STC, 20. For all other servers, 0 (no timeout).
Minimum Value	0
Maximum Value	1440
Additional Information	This parameter has similar a similar effect to the JCL TIME parameter for CPU consumed.
Example	TIMEOUT="20"

TSOE_JOBCHAR

Name	TSOE_JOBCHAR
Summary	Specifies the job character for JOBNAME.
Default	W
Supported Values	A single-character string. The character must be alphabetic.

TSOE_NOTIFY

Name	TSOE_NOTIFY

Summary	Specifies whether a notify statement is generated in the start command for the STC user server.
Default	0

Supported Values

Value	Description
0	Do not generate a notify statement.
1	Generate a notify statement.

Example TSOE_NOTIFY="1"

USER_SERVER_JOBNAME

Name	USER_SERVER_JOBNAME
Summary	Specifies the name of the user server start procedure used in a z/OS start command.
Default	IVPUSRT
Supported Values	A character string with maximum length of 8 characters. The first character of the string must be alphabetic. The remaining characters must be alphanumeric.
Additional Information	The PROCLIB concatenation must contain a member with this name in order to start user server address spaces.
Example	USER_SERVER_JOBNAME="IVPUSRT"

USRSRV_TIMEOUT

Name	USRSRV_TIMEOUT
Summary	Specifies the timeout, in seconds, for a server.
Default	45
Minimum Value	45
Maximum Value	86400
Additional Information	If no input message is received by the specified idle time, the server will shutdown automatically.

USS_DUBPROCESS

Name	USS_DUBPROCESS
Summary	Specifies whether subtasks are dubbed as threads in a caller's process or as new processes.
Default	0

Supported Values

Value	Description
0	The subtask of the caller is dubbed as a thread in the caller's process when the subtask issues its first z/OS UNIX service call.

Value	Description
1	The subtask of the caller is dubbed as a new process when the subtask issues its first z/OS UNIX service call.

Additional Information

If USS commands such as FTP are to be executed, USS_DUBPROCESS must be set to 1, otherwise the following error will occur:

```
CEE5101C During initialization the callable service BPX1MSS
failed.
The system return code was 156, the reason code was 0D070200
```

Note: With USS_DUBPROCESS="1", a user server address space does not support ISPF dialogs.

VIPA

Name VIPA

Summary Specifies a symbolic name to use instead of z/Server's IP address when connecting to the client.

Default No default.

Supported Values Any valid DNS hostname.

Additional Information By default, during connection z/Server sends its own IP address back to the client, which is then used by the client for further communication. However, when the client connects through NAT'ed addresses, the IP address that the scheduler address space knows about might be completely different from the IP address that the client must use. In this case, the symbolic name provided by the VIPA parameter (and translated using a DNS server) should be specified to ensure communication.

Note: The VIPA parameter cannot be used when no fixed unique IP address is assigned to the symbolic name, for example, when VIPA is used for load distribution.

Example VIPA="custom.com"

VPOOLSIZE

Name VPOOLSIZE

Summary Specifies the size of the pool of variables processed with VGET, VPUT and VDEL services. This is similar to the ISPF profile pool.

Default 4K

Minimum Value 4K

Maximum Value 40K

Supported Values An integer followed by the character "K". There must be no space between the integer and the "K".

Additional Information The value specified for VPOOLSIZE must be a multiple of 4K.

Example VPOOLSIZE="16K"

Optional: Adaptations to the IBM Rational Developer for System z RSED installation

Customers who install the Micro Focus AWM feature into an IBM Rational Developer for System z (RDz) client have a technology choice between the previously described z/Server and IBM Rational Developer for System z RSED. The RSE daemon (RSED) is shipped with an RDz installation.

If RSED is used as server technology, the following changes have to be made to the RSED configuration.

ISPF Client Gateway

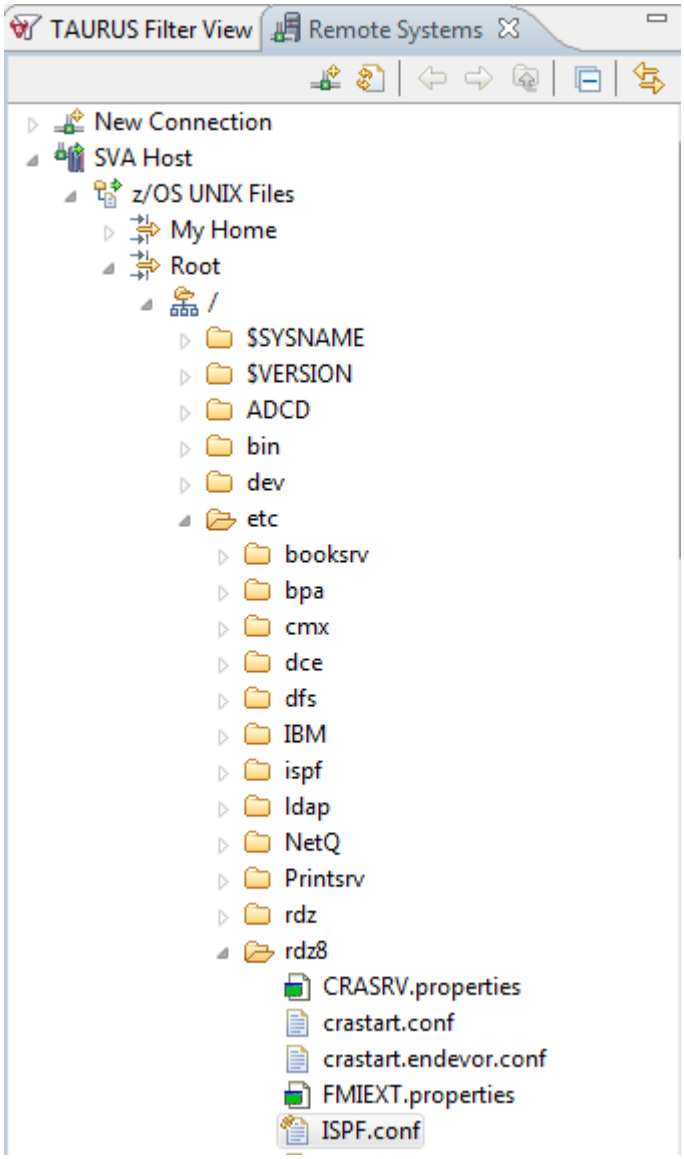
Allocate the REXX dataset delivered with z/Server V2R2M01 to the ISPF Client Gateway using DDNAME SYSEXEC or SYSPROC.

Allocate the SKELS dataset delivered with z/Server V2R2M01 to the ISPF Client Gateway using DDNAME ISPSLIB.

Detailed information on how to configure the ISPF.conf file can be found in the RDz Host Configuration Guide.

If new datasets are added to ISPF.conf, make sure that all users of the ISPF Client Gateway (RDz users) have at least READ access to the datasets allocated by the client gateway.

ISPF.conf is a USS file, e.g.:



ISPF.conf

```
* ISPF.conf - "TSO/ISPF Client Gateway" configuration file
* Note: This is a copy of ISPF's ISP.SISPSAMP(ISPZISPC)
*       with Developer for System z custumizations

ispmlib=ISP.SISPMENU
isptlib=ISP.SISPTENU
ispplib=ISP.SISPPENU
sysproc=MVSR.RDZ.V85.SFEKPROC,ISP.SISPCLIB
isplib=MVSR.RDZ.V85.SFEKLOAD,DSN910.SDSNLOAD
ispslib=TAURUS.V2R2.SKELS,ISP.SISPSLIB
sysexec=TAURUS.V2R2.EXEC,ISP.SISPEXEC
```

Master configuration

To work with AWM applications, a master configuration file must exist.

REXX procedure TAULAPPL must be customized to contain the dataset name of the master configuration dataset. The default name is hlq.SYSTEM.CONFIG.

The REXX TAULAPPL can be found on the installation EXEC library.

Please change the following line in TAULAPPL according to the high level qualifier used for the installation:

```
sysdsn= 'hlq.SYSTEM.CONFIG'                  /* master config file */
```

A sample master configuration dataset has been delivered as hlq.ZSERVER.MASTER. The contents of this master configuration dataset contain a sample application “PDS Explorer”:

```
*********************************************************************
*
* TAURUS System and Application Definition
*
* Do not change the key words:
*    System:
*    Appl:
*    Conf:
*    Version:
*    INFO:
*
* Change Activity:
*   date    name    comment
*
*********************************************************************
*
* TAURUS SYSTEM
*
* Enter a unique logical name for this mainframe system
*
System: TAURUS_Custom_System
*
* TAURUS PDS EXPLORER EXAMPLE APPLICATION
*
User:
* application name
Appl: PDS Explorer
* location of the application configuration file
Conf: mvs:'hlq.TAURUS.XML(PDSECONF)'
* application version number
Version: 1.4
* process information
INFO:
* end of application definition. do not delete this line
EndAppl:
EndUser:
```

Please customize the reference to the PDS Exlorer XML application model and enter a unique system name (e.g. your logical LPAR name).

An AWM user needs READ access to the master configuration file and to all XML files referenced; the AWM administrator needs UPDATE access.

Host installation verification

Access to the Master Configuration File

No AWM client installation is needed to verify the AWM host installation.

Call the REXX procedure TAULAPPL from the ISPF command menu:

```
TSO EX 'hlq.TAURUS.EXEC(TAULAPPL)
```

Or, if the TAURUS REXX library is allocated to SYSPROC or SYSEXEC

```
TSO TAULAPPL
```

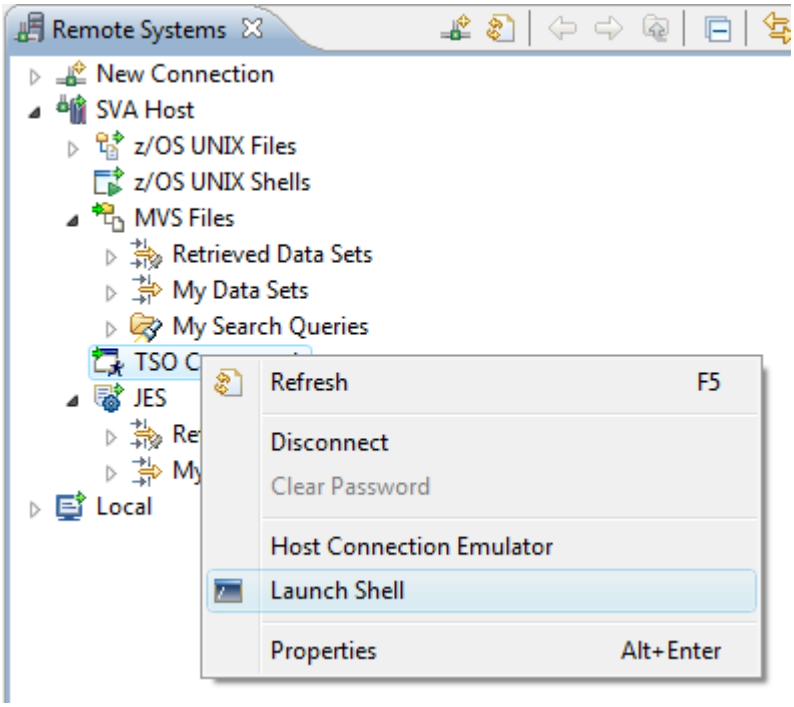
The terminal output looks like this:

```
TAU System: TAURUS_Custom_System
TAU Appl: PDS Explorer
TAU Conf: mvs: 'hlq.TAURUS.XML(PDSECONF)'
TAU Version: 1.4
TAU INFO:
TAU RC: 0
```

Verify ISPF Client Gateway

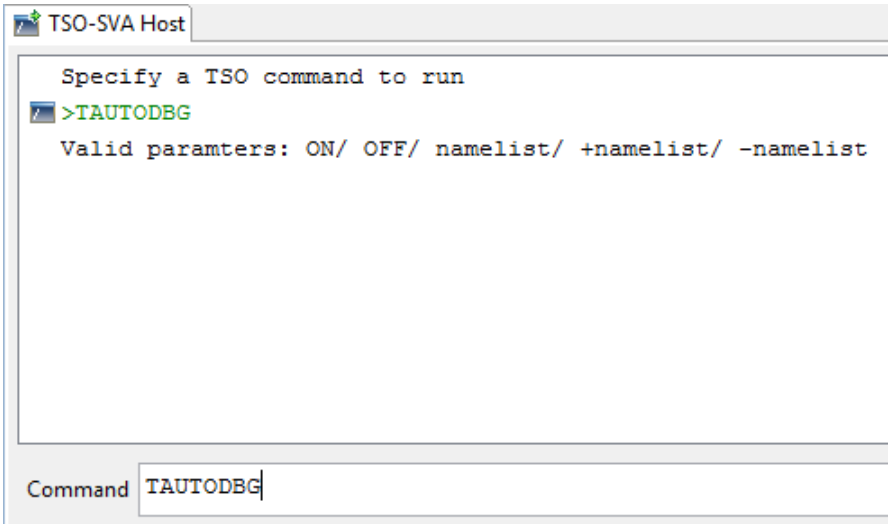
Start RDz and navigate to the “Remote projects perspective”.

Select **Launch TSO** in the context menu for the “MVS Files” entry:



The RDz TSO command window opens.

Enter TAUTODBG and press Enter. The following message can be seen:



Message “RC=20 invalid command” means that the REXX procedure TAUTODBG was not found. In this case verify that the AWM REXX procedures are allocated through the ISPF Client Gateway using the SYSPROC or SYSEXEC DDNAME.

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.
- 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

Windows

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.

UNIX

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

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

Installing licenses

If you have a license file

Windows

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 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 **Finish** to install the license.

UNIX

1. Start the Micro Focus License Administration tool and select the **Manual License Installation** option by entering `4`.
2. Enter the name and location of the license file.

If you have an authorization code

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.

Windows

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.

UNIX

1. Start Micro Focus License Administration.

2. Select the **Online Authorization** option by entering 1 and pressing **Enter**.
3. Enter your authorization code at the **Authorization Code** prompt and then press **Enter**.

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

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

This method of authorization is required if your machine does not have an Internet connection or if normal (automatic) authorization fails.

Windows

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**.

UNIX

In order to authorize your product you must have the following:

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

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

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

To obtain more licenses

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

New Features in Enterprise Developer 2.3

This release provides enhancements in the following areas:

Integration with the Eclipse IDE

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This release ships with Eclipse version 4.4.2.

Support for Eclipse versions 3.7 and 3.8 has been deprecated. This affects any applications that were created using an earlier version of Enterprise Developer that have a JVM COBOL part. Such applications must be rebuilt using Enterprise Developer 2.3 to avoid receiving errors during compilation or execution.

In addition, when Enterprise Developer is installed, you can optionally install the Enterprise Developer plugin in other instances of Eclipse installed on your machine (supported versions of Eclipse are 4.2, 4.3 and 4.4 for the 32-bit IDE).

See *Related Information* at the end of this topic.

General IDE enhancements - Eclipse

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- The **Variables** view now shows the file status of an internal file name.
- The **Find All References** and **Go To Definition** commands are now supported for JVM COBOL applications.
- Support is provided for the SOCKS5 proxy server for debugger communication over SSL.

Application Workflow Manager

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- IDE integration improvements:
  - The Team Developer perspective (TDP) is now the default perspective within Enterprise Developer. Some of the views supplied with TDP are:
    - a property view displaying main properties of a selected project entry.
    - a table view which displays project entries in a table format and allows column sorting.
    - a filter view which enables you to search projects and project entries based on specific search criteria.

    Using the Team Developer perspective for all kind of Enterprise Developer projects makes the User Interface fully customizable. As all COBOL and PLI projects are now based on an Application Workflow Manager model it is possible to adapt or extend the supplied functionality to the needs of the customers or to merge the functionality of various Application Workflow Manager application models.

    This supports an easy and seamless integration of all kind of Windows, Eclipse or mainframe tools necessary to support the client's development process.

    For example: combining SCM tools like Accurev, Starteam, SVN, Endevor, ChangeMan, SCLM with Micro Focus projects.
  - **Enterprise Development Projects** is provided as the Application Workflow Manager default application within the TDP. This application includes the functionality of the COBOL and the PL/I perspectives so that you can directly define and work with all kinds of Enterprise Developer projects using the TDP.
  - An Application Workflow Manager default configuration is used when starting Enterprise Developer. This configuration includes some initial settings and preconfigured file mappings which are visible in the file mappings view.

    You can extend the default configuration file with your preferred settings and deploy Enterprise Developer with some default configuration settings such as the correct predefined mainframe connection and file mappings which are used to map the your mainframe dataset naming standards to Eclipse file suffixes.
- The Application Workflow Manager model has been extended by introducing function packages.

  The Application Workflow Manager tool types are now grouped by the following function packages:
  - Application Workflow Manager function package - supports various modelling of Application Workflow Manager-specific tool types such as "Edit Opener".
  - Micro Focus Project function package (not supported in Enterprise Developer Connect) - supports modelling of Enterprise Developer project-specific tool types such as "Single Compile".

- Micro Focus Editor function package - supports modelling of editor-specific tool types such as "Reparse".
- Micro Focus Enterprise Server function package (not supported in Enterprise Developer Connect) - supports modelling of Enterprise Server-specific tool types such as "Submit to ES".
- Eclipse function package - supports a powerful set of tool types which enable modelling of standard Eclipse functions such as wizards, Eclipse projects, folders and file selection dialogs, icons and decorators, and the automatic synchronization of Eclipse project entries with Application Workflow Manager elements.
- MVS function package (requires Enterprise Developer Connect or Enterprise Developer for IBM zEnterprise) - supports the modelling of native MVS tool types which do not need an ISPF environment such as "Submit JCL", "Edit MVS file", and catalog services.
- USS function package (requires Enterprise Developer Connect or Enterprise Developer for IBM zEnterprise) - supports the modelling of USS tool types such as USS directory and file services, edit, and browse.
- ISPF (requires Enterprise Developer Connect or Enterprise Developer for IBM zEnterprise) - supports the modelling of tool types that require an ISPF environment such as calling REXX procedures in ISPF and ISPF dialog services.
- OS function package - supports the modelling of Windows tool types such as a command executor and a dialog to select folders or files from the Windows file system.
- RDz function package (requires RDz and Enterprise Developer Connect) - supports some RDz-specific tools.

You can develop and install your own custom function packages that have extra modelling capabilities. For example, they can enable you to support new tool types, linked properties and icons, extend the Application Workflow Manager model editor with new tool-specific attributes, support templates when defining a new tool type, extending the validation rules within the model editor or synchronize external objects with Application Workflow Manager-modelled elements.

- The Application Workflow Manager model now supports:
  - The modelling of password fields
  - A new attribute for enabling conditions that can be used to hide actions or dialog input fields if a condition is not true (instead of grey-out).
  - Modelling application actions - this enables you to model actions which are displayed on the context menu of the application entry.
  - An option to define bulk output parameters for a tool type during bulk processing.
- Application Workflow Manager client improvements:
  - The MVS Explorer now supports some additional MVS dataset properties (for example - VSAM properties).
  - It is now possible to edit MVS files that contain non-displayable characters. If such files are loaded into the Eclipse editor, the non-displayable characters are preserved when saving the file back to z/OS.
  - An extension point is supplied by which a third party vendor or a customer can integrate a tool to provide a pass ticket for mainframe login.
  - The Team Developer Job view now includes a Submit Time column for jobs submitted from a modelled application.
  - The Team Developer Error View now supports local or network file paths. If an error feedback file is returned from any of the non-mainframe tools (such that are running in an Enterprise Server environment), the Team Developer Error view is now able to display the entries, which do not point to mainframe file.
  - The Team Developer Table view now includes a new Find function which can be used to hide non-matching table rows.
- An improved integration into the mainframe source control management systems:

- Endevor - the Application Workflow Manager bulk processing is implemented so that multiple elements can be processed in a single step. This also supports long element names (where the names are longer than eight characters).
- ChangeMan - provides support for ZMF baseline versions and an improved user interface. You can now see some extra details such as date and time, or changes, and view any delta versions. An action to display the promotion history for a package is also available.
- SCLM - provides an improved user interface. When expanding members in the tree view or displaying members in the table view, you receive a dialog that enables you to specify a member filter or to use a hierarchy search.

- Application Workflow Manager remote precompiler:

  A support for the integration of mainframe COBOL precompilers is now available. This enables you to edit COBOL files in the precompiler format. Any errors that are reported refer to the lines of the precompiler source.

  This support is available for modelled applications in remote edit scenarios. Out-of-the box support is provided for all types of mainframe precompilers, as long as the standard ISPF comparison tool, which compares the pre-compiler input and output file, creates delta information that can be used in the COBOL editor. In case you are using some very complex precompilers, there is a special exit which can used to create more meaningful delta information.

  For customers who do not work with native COBOL on the mainframe but still need an additional mainframe precompiler that generates native COBOL code, such COBOL dialects are supported now when opening the file in the COBOL editor with remote edit. This enables you to use all the available powerful COBOL editor functions such as syntax checking, Content Assist, Outline view, Copybook Dependencies view with the COBOL code.
- z/Explorer Improvements:
  - The MVS Explorer now supports some additional MVS dataset properties (for example - VSAM properties) and enables you to browse data files using the Classic Data File Tools editor.
  - zExplorer in the Remote Systems view now provides a USS (UNIX System Services) Explorer. This provides some additional USS mainframe server-side functionality (such as rename, copy, move, search or set permissions) that enables the Application Workflow Manager client to take advantage of the new USS Explorer UI.

    The USS Explorer enables you to define filters to explore the z/OS USS file system and work with USS directories and files.
  - Embedded HEX values in the source code are preserved after the code is downloaded from or uploaded to mainframe.
- Security administration enhancements:
  - Calling ESF administration user exits - it is now possible to enable Security Manager "referential integrity" policies to be implemented and enforced using customizable ESF administration user exits. A sample exit is supplied.
  - A LISTREFERENCES ESF administration facility - enables you to determine any relationships among security objects and rules. This is available using the existing ESFADMIN command line tool and also using the new ESF LDAP Security Administration Web Interface.
  - An ESF LDAP Security Administrator Web Interface - a new modern, scalable web interface enables you to administer the Micro Focus Enterprise Developer user, user group and security resource data stored on third-party LDAP-based Security Managers. Faster and more functional than the existing MFDS-based interface, it also provides a dedicated interface for the security administrator role which does not interfere with Enterprise Server's runtime or region configuration operation.
  - New ESFADMIN commands - the new commands ADDMEMBER, DELMEMBER, ADDACE, DELACE and ALTACE help simplify the manipulation of the multi-valued attributes for group membership and ACLs.
  - "username substitution" MLDAP ESM resource access rule feature - the MLDAP ESM module has been updated with a new algorithm for identifying the best-matching resource-access rule and ACE for resource-access security checks. The new algorithm also provides an optional "username substitution" feature.

See *Related Information* at the end of this topic.

Building JVM COBOL projects incrementally

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To minimize the number of modules to compile when building JVM COBOL projects, Enterprise Developer now enables you to configure your projects so that they are built incrementally - the IDE only rebuilds the files that have changed.

To enable incremental builds for JVM COBOL applications that contain namespaces, check the **Use incremental build (Technical preview feature)** option on the project build configuration tab in the project's properties.

For JVM COBOL applications that do not contain namespaces, you can use the **Use dynamic calls** option available on the build configuration tab in the project's properties. When the project is built with this setting, calls to modules are resolved at run time rather than during compilation. This has the effect of not requiring every module to be compiled when rebuilding the application.

COBOL editor

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Content Assist support for COBOL includes various enhancements and is now also available in JVM COBOL:

- Context sensitive proposal - Content Assist only shows proposal that are relevant for the position of the cursor in the code or for the type of project
- Enhanced proposal lists - lists include any relevant COBOL verbs, clauses and words, copybooks, code templates, data items and section and paragraph names
- Intelligent assistance with completing statements - when you have entered a COBOL verb, Content Assist shows proposals for the relevant clauses and identifiers that you can use to complete the statement.
- Automatic completion for items - Content Assist automatically inserts single suggestions in the code.
- Qualifying non-unique names - Content Assist qualifies data items whose names are not unique.
- Configuration preferences for Content Assist - enable you to configure what suggestions appear in the completion lists, whether suggestions are added in insert or overwrite mode, and the case of the inserted words.
- Code templates - code templates are now included in the Content Assist proposals.

CICS Web services (Technology Preview)

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Enterprise Server has been extended to provide a CICS Web Services capability compatible with the mainframe.

A new CICS Web Service wizard enables you to generate CICS Web service providers and requesters using either a CICS COBOL application or a WSDL file as input. This enables you to develop and test, including end-to-end testing, CICS Web Services for deployment to the mainframe.

Code analysis

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Enterprise Developer now offers more advanced code analysis features and enables you to run various analysis queries (rules and groups of rules called rule sets) against your code to ensure adherence to standards such as standards for coding or performance.

You can run analysis rules against programs in a project in the IDE at user request or you can run analysis rules at the end of a project's build.

Code coverage

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Enterprise Developer now provides support for code coverage of native COBOL applications directly from within the IDE where code coverage uses the Test Coverage functionality. You can produce code coverage reports for applications running in the COBOL run-time and for applications that run in Enterprise Server.

To produce reports, you need to enable code coverage in a project's, a build configuration's, or a file's properties, compile your application and then run your application with code coverage to produce the relevant reports. For applications that require an Enterprise Server instance, you start the enterprise server with code coverage.

Command line compilation and linkage

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When using the `cbllink` command to compile and link, there is a new `-y` option. Use this option to create an executable that includes support to be able to run on Windows XP and Windows Server 2003.

Compiler directives

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The following Compiler directives are new in this release:

EOF-1A	Treats a 0x1a character in the source file as the end of file.
JVMDECIMAL	Determines the type in which certain items are exposed. This directive affects COBOL data items of type 'decimal' and non-integral numeric items exposed as a result of either ILSMARTLINKAGE usage or the PROPERTY keyword.
NLS-CURRENCY-LENGTH	Specifies the number of bytes to allocate for the currency symbol in a PIC field.
NULL-ESCAPE	Treats a 0x00 character in the source file as an escape character for other non-printable characters in the source code.

The following Compiler directives contain new parameters in this release:

DBSPACE	The new parameter 'MIXED' extends the DBSPACE directive to be able to evaluate data items in programs that contain a mix of single-byte and double-byte strings.

Data File Structure command line utility

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The Data File Structure Command Line (DFSTRCL) utility is a DOS-based command line utility that enables you to create record layout (`.str`) files from COBOL debug information (`.idy`) files. You can use the utility to process a single `.idy` file or batch process up to 100 `.idy` files.

Data File Tools (Technology Preview)

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

The Data File Tools (Technology Preview) is a new standalone text editor in which you can create and edit data files. By nature of it being a 'technology preview' product, it does not currently include all the functionality that was available in the previous version of Data File Tools - now referred to as Classic Data

File Tools. If you require any of the functionality not provided in this version, you can still use the classic version by accessing it in the usual way.

To run Data File Tools (Technology Preview), type `mfdatatools2` from Enterprise Developer's command prompt (Windows) or a terminal (UNIX).

To use the new editor directly from the Eclipse IDE, use the **Open with** option on the shortcut menu when selecting a data file or structure file, and select **Data File Tools**. Eclipse remembers the last tool used for a particular file type, and so will use Data File Tools (Technology Preview) until you select a different editor.

Database access

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This release provides the following enhancements to database access:

COBSQL

This release provides:

- Selection and configuration of the Oracle Pro*COBOL preprocessor for compiling COBSQL applications in project properties on the **SQL Preprocessor** tab and in the build configuration settings.
- Support for COBOL directives SOURCEFORMAT=TERMINAL and SOURCEFORMAT=VARIABLE for Pro*COBOL applications.

HCO for DB2 LUW

This release provides:

- GUI versions of data migration tooling (Windows platforms)
- A new tool that enables you to bind or rebind all packages. See *BindAll Packages Tool* for details.
- Support for MFHCO mode across all platforms by default via the new HCO (NOHCO) DB2 compiler directive option. See the *HCO* DB2 compiler directive option topic for details.
- A new DB2 compiler directive option, OPTPER (NOOPTPER), that enhances performance for CHARSET EBCDIC processing. See the *OPTPER* DB2 compiler directive option topic for details.
- A new DB2 directive option, BINDDIR, which specifies an alternative directory in which to write the DBRM file created during compilation. You can set BINDDIR from the command line or specify it in your project properties. See the *BINDDIR* DB2 compiler directive option topic, and the *Binding* topic for details.
- 64-bit support for PL/I on appropriate platforms. See *Additional Software Requirements on Windows* and *Additional Software Requirements on UNIX* for details.

HCO for SQL Server

This release provides:

- Support for the DATA-CHANGE-TABLE-REFERENCE clause.
- Context Help is now provided for:
  - Options for HCO for SQL Server tools
  - Each tool in the HCO for SQL Server user interface

OpenESQL

Date/Time Processing	This release provides streamlined datetime processing for ODBC and JDBC.
OpenESQL Assistant	OpenESQL Assistant Options are now set via the Eclipse IDE from **Window > Preferences > Micro Focus > Database > OpenESQL Assistant** (applies to Windows environments only).
Performance	This release includes a new SQL compiler directive option, OPTPER (NOOPTPER), that enhances performance for CHARSET EBCDIC

processing. See the *OPTPER* SQL compiler directive option topic for details.

PL/I

This version provides 64-bit support for PL/I on appropriate platforms. See *Additional Software Requirements on Windows* or *Additional Software Requirements on UNIX* for details.

PostgreSQL

In this release, PostgreSQL 9.4 has been tested with OpenESQL and OpenESQL Assistant using the following PostgreSQL software:

Server software	PostgreSQL EnterpriseDB version 9.4.4
Client software	• psqlODBC driver version 09.03.04.00 • JDBC41 PostgreSQL driver version 9.4-1201

PostgreSQL 9.4 has been tested with OpenESQL and OpenESQL Assistant on the following Windows platforms:

- Windows 32-bit
- Windows 64-bit

PostgreSQL 9.4 has been tested with OpenESQL on the following UNIX platforms:

- X86-64 running Red Hat Linux, 32- and 64-bit
- X86-64 running SuSE Linux, 32- and 64-bit

Note: Micro Focus provides compatibility for PostgreSQL but does not directly contribute to or support the PostgreSQL open source project. Any issues relating to PostgreSQL functionality should be addressed through an open source support vendor.

SQL Server

This release provides support for the SQL Server OUTPUT clause.

Mainframe Batch Database Tools (MBDT)

Windows only. This release includes mainframe batch utilities that provide the following functionality for Oracle, DB2 LUW, and SQL Server agnostically, as well as specifically for HCO for SQL Server:

- DSNTEP2
- DSNUTILB LOAD
- DSNUTILB UNLOAD
- 32-bit and 64-bit support
- New batch configuration utility

SQL Option for DB2

This release provides the following enhancements:

- Initial support for XML data type in XDB Server, in addition to XDB Link
- Better performance on table expressions and joins using literal strings
- JDBC driver supports result set processing
- SQL Wizard provides better LOB data type support
- z/OS DB2 version 10:
  - Extended support for implicit casting
  - Greater timestamp precision for applications
  - Support for TIMESTAMP WITH TIME ZONE (applies to Windows environments only)

XA Switch Modules

In this release, the XA interface has been redesigned to provide:

- Consistent look and feel for SQL Server, DB2, and Oracle user personalization
- Consistent look and feel for both RM dynamic and static registration (SQL Server, DB2, Oracle, generic one-phase commit for ODBC)
- Additional support for two instances of the same switch module using Web Services applications via the new XAID compiler directive
- Using a specified XA resource only with batch applications executing under Enterprise Server

Environment variables

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The following new environment variables are available:

MFJ_REPRO_EMPTY	Enables or disables the ability for the IDCAMS REPRO action to copy from a pristine VSAM file. Permissible values: Y or N.
ES_JESYSMSG_RESTRICTED	When system message spool files are being routed directly to the Output queue, by using ES_JESYSMSG_OUTPUT, you can hold back spool files based on their class, by using ES_JESYSMSG_RESTRICTED. Permissible values: class names or numbers entered as a continuous string; for example, ES_JESYSMSG_RESTRICTED=ABC123.

File handling

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This release contains the following new configuration options:

ACUFH	Enables or disables the use of the ACU file handler (ACUFH), which is required to handle Vision and RM/COBOL indexed files.
ESACUFH	Enables or disables the use of the ACU file handler (ACUFH) for file handling operations running under Enterprise Server. ACUFH must also be enabled for this option to take effect.

File locking

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In versions prior to Enterprise Developer 2.3, the semantics of the sharing phrase specified in an OPEN statement or used within a call to CBL_OPEN_FILE were not correctly applied in some cases on UNIX and Linux platforms. From version 2.3 onwards, the sharing phrase is correctly honored when the tunable `strict_file_locking=true` is set, which is the default setting.

Example of potential changes in behavior:

- *Process-A* opens a file with read-only access and a sharing mode that denies other processes write access (SHARING WITH READ ONLY).
- *Process-B* then attempts to open the file with read-only access and a sharing mode that denies other processes read access (SHARING WITH NO OTHER).

With `strict_file_locking=true`, *Process-B* is unable to open the file, because *Process-A* has successfully opened the file allowing only read access.

With `strict_file_locking=false`, *Process-B* successfully opens the file.

If your application encounters unexpected OPEN conditions or fails to open files, it might be as a result of the new file locking behavior. In such circumstances, we recommend that you review the file locking and

sharing requirements of your application and refactor your source code to work with the default setting. The original file locking and sharing behavior can be restored by setting `strict_file_locking=false`.

iFileshare - Fileshare support under Enterprise Server (Technology Preview)

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

Should you wish to test and provide feedback for this feature please contact Micro Focus Support Line for instructions on how to enable the new functionality.

You can configure iFileshare to offer enhanced availability for mission critical files by configuring a high availability group, consisting of a primary iFileshare server and a number of stand-by servers. (Currently, this type of configuration only supports having one stand-by server)

Files that are critical to your application can be replicated from a primary server onto the stand-by servers. Should the primary server fail, you have up-to-date data (minus any in-flight transactions) available.

To reduce the complexity and to increase the stability of an iFileshare high availability group, it is recommended that each region is configured as a dedicated iFileshare server. If other Enterprise Server work is hosted within the group, the setup must be consistent on each server so that in the event of a fail-over, the non-Fileshare work can be continued on the new primary server.

JCL parsing editor

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A new parsing JCL editor provides assistance with writing JCL code to users who are not experienced mainframe programmers. This is especially useful when using the Enterprise Developer Connect to edit source files on a remote mainframe machine. Features include:

- Block selection - use the button from the toolbar to toggle the mode.
- Content assist for JCL constructs.
- Configurable background syntax parsing
- Configuration settings for the editor - you can hide or show the horizontal ruler, turn on or off visible lines for the margins, and configure the syntax coloring and the smart edit mode.
- Folding support - enables you to collapse and expand blocks of code.
- Horizontal ruler
- Locate definitions
- Margins
- Outline view - shows a structure of the procedure and structure declarations within a program. Clicking on an item in the Outline view positions the cursor on that item in the code and vice versa.
- Renumber and Unnumber - support for renumbering and unnumbering lines of code.
- Submit JCL command directly from the editor.
- Smart edit mode - defines the word wrapping behavior when breaking lines or around margins, moving the cursor using the Home and End keys.
- Syntax colorization
- Syntax error reporting - uses red squiggles to denote errors in the code.
- Task creation - inserting a TODO or a FIXME in a comment in the code automatically creates a task that appears in the Task view.
- Templates for the most common JCL constructs.

Note: The following limitations apply:

- There is no support for VSE dialect statements in the editor. JES2 and JES3 are supported.
- PROCS is not supported in the editor so that it is not possible to read in libraries of JCL routines from a PDS.

Library routines

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The following library routines are new in this release:

CBL_MANAGED_SESSION_GET_USERDATA	Retrieves user data saved in the current RunUnit.
CBL_MANAGED_SESSION_SET_USERDATA	Sets user data in the current RunUnit.

The following library routines contain new parameters in this release:

CBL_LOCATE_FILE	You can now specify a file name that is a null-terminating string, which has resulted in three new values available for the `user-mode` parameter.

Mainframe compatibility

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- IMS DBCS - Enterprise Server IMS support has been expanded to include applications that use double-byte character sets (DBCS). MFS EATTR=ECGS (full DBCS string without SOSI) is now supported.
- Implement /DIS USER DEQUEUE - the /DEQUEUE USER command is now available to remove messages from the message queue to provide you with greater flexibility when managing IMS systems.
- IMS message queue (available with the 2.3 HotFix1 update) - provides a new dynamic IMS message queue that enables you to expand the queue on the fly, and also to fine-tune its performance dynamically.

Managed COBOL syntax

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The following enhancements have been made to the managed COBOL syntax:

- The `TYPE OF type-name[ANY...]` syntax enables you to obtain the `System.Type` (.NET) or `java.lang.Class` (JVM) object for a generic class, interface, or delegate.
- The `self::` or `super::` syntax is no longer required to access inherited data within a subclass.
- The `ATTRIBUTE-ID` syntax enables you to define new attribute types, which can be used in various contexts.

Micro Focus FTP utility

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A new utility, Micro Focus FTP (MFFTP), provides FTP support for JCL-enabled enterprise servers within Micro Focus Enterprise Server. The MFFTP utility provides a support mechanism for batch processes that takes advantage of FTP from JCL on the mainframe.

Support is available for:

- Fixed Block (FB) files
- Variable Block (VB) files
- Generation Data Group (GDG) files
- Configuring third party FTP clients
- Input and output temporary file handling
- Configuring the end-of-line markers
- Configuring the error codes

- Configuring the text messages

Micro Focus Infocenter

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The Micro Focus Infocenter Web site (*http://documentation.microfocus.com*) has been upgraded and now includes the following improvements:

- Scope being persisted when you select a product documentation in the Product Documentation section on the Micro Focus SupportLine Web site and choose to view the documentation in the Micro Focus Infocenter.
- Updated **Scope** settings - provides the ability to nest four levels deep when setting a scope.
- Scope being persisted between browser sessions once it has been set.
- Creating automatic scopes using the **Search Topics** icon,  .
- A link to change the scope from the search results when there are too many results.
- Improved Boolean search expressions.
- Details included with the search results.
- Help on how to use the Infocenter and how to construct search expressions - available using the Infocenter Help button,  .

Micro Focus Rumba

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Micro Focus Rumba version 9.4 is now supplied with the Enterprise Developer 2.3 setup file. The license for Enterprise Developer will license all components of Rumba.

Micro Focus Unit Testing Framework

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Note: This is a technology preview feature only. It is being made available to allow you to test and provide feedback on this new capability, but it is not intended for production use and is not supported as such. Furthermore, Micro Focus does not guarantee that this feature will be delivered at a GA level and if it is, then the functionality provided might differ considerably from this technology preview. During the preview, you are encouraged to share your feedback and experiences via the Micro Focus community forum - *http://community.microfocus.com/microfocus/*).

The Micro Focus Unit Testing Framework is an xUnit style testing framework, available from the command line, for procedural COBOL applications.

It includes much of the architecture you would expect in an xUnit framework. The test runner is a 32- or 64-bit executable that you run from an Enterprise Developer command or shell prompt. A test fixture or suite is a COBOL program compiled to `.dll` (Windows) or `.so` (UNIX) that can include the setup, the test case code, and the teardown associated with the test case.

Test results are available in a number of formats. By default, results are displayed to screen and to a `.txt` file, but you can use additional parameters on the command line to produce reports in JUnit format.

PL/I support

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This release provides the following enhancements to PL/I support in Enterprise Developer:

- 64-bit support - Enterprise Developer provides a full 64-bit environment for developing PL/I applications on Windows, Solaris(SPARC), Red Hat Linux, and SUSE Linux to enable you to take advantage of any 64-bit features such as 64-bit address space or interact with 64-bit relational databases when modernizing your applications.

- Data types - support has been added for GRAPHIC data type, including GRAPHIC, GRAPHIC VARYING, GRAPHIC VARYING BIGENDIAN, Gx and G constants. This enables you use GRAPHIC data within your applications to migrate to Open PL/I running under Enterprise Server.
- PL/I debugger:
  - The cwgui debugger is no longer available. You can now use the cw_java debugger which provides a richer graphical debugging experience.
  - The debugger has been enhanced to support the evaluation of the following built-in functions: CENTER, CENTERLEFT, CENTERRIGHT, HEX, LEFT, LOWERCASE, MAXLENGTH, PACKAGENAME, RIGHT, REVERSE, ROUND, SEARCH, SEARCHR, TALLY, and UPPERCASE.
- New -systemmvs, -systemims, and -systemcics link options - the mfplx and linker logic has been enhanced to decouple the -cics, -ims, and -mvs flags from the link options. If you have PL/I CICS EXCI applications, this enables you to compile and link your applications more easily to run under the control of JCL or IMS.

  In addition, the macro preprocessor SYSTEM() built-in function will now correctly return the value of the "SYSTEM" in effect (for example: IMS, CICS or MVS).
- The Open PL/I macro preprocessor now supports the following:
  - The Open PL/I macro statement ANSWER. This enables the migration of PL/I code which uses ANSWER in its PL/I macros.
  - The use of arrays of FIXED and CHAR macro variables. This simplifies the migration and maintenance of PL/I Macro preprocessor code that uses variable arrays.
- IBM Structure Alignment (-zalign) - the Open PL/I compiler has been enhanced to provide an option which causes ALIGNED structures to map data elements at the same offsets as IBM's compiler. This facilitates the migration of applications and data to Open PL/I running under the control of Enterprise Server.

Preprocessors

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Support has been added in the IDE for enabling and using multiple preprocessors with your projects.

A new page, **Additional Preprocessors**, has been added to the project's and the files' properties of native COBOL applications to enable you to choose one or more preprocessors to use when building your application and to specify their order of execution.

New reporting capability is now available for user preprocessors: resp-main code 18 indicates that a buffer contains a data name to be marked as modified by the immediately preceding preprocessed line. The data name may be qualified and resp-more contains the column information for the reference.

Profiler

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Enterprise Developer now provides support for Profiler for native COBOL applications directly from within the IDE. To produce reports, you need to:

1. Enable Profiler in the COBOL property page for a project, a build configuration, or a file.
2. Compile your application to apply the changes.
3. Create a run configuration that has Profiler enabled.
4. Run your application with Profiler to produce the relevant reports.

Remote connections

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This release provides the following enhancements:

- An improved diagnostic tooling to help determine connection problems - enhancements are available for both the client and the server installations.
- It is now possible to specify the Remote System Explorer (RSE) type of connections to create remote mainframe COBOL and PL/I projects. This is to cater for scenarios when it is not possible to use SAMBA or NFS connections within your environment.

  

  Note: The following features and utilities are not supported when remote projects use the RSE connection type:

  - The file layout editor and the file editor in the Classic Data File Tools and Data File Tools (Technology Preview) utilities.
  - The BMS compiler and painter.
  - The IMS layout editor and the IMS database editor.
  - Mainframe Assembler.
- Changing the type of a remote connection - it is now possible to change the type of the remote connection from RSE to NFS and vice versa using the **Remote Settings** for remote projects.

Remote PL/I applications

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Support is provided in Eclipse for editing, compiling and debugging of 32-bit and 64-bit PL/I applications running on remote UNIX and Linux machines.

All PL/I editor features available for local projects are present in the editor for remote PL/I applications. Improvements have been made to the syntax recognition of the PL/I editor parser.

REST service interfaces

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RESTful service interfaces utilizing JSON as the media type in request and response messages are now supported using the Interface Mapping Toolkit. This enables you to extend COBOL applications using modern transport payloads and protocols.

RPM UNIX installer

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In addition to its proprietary installer for installing Enterprise Developer on UNIX and Linux, Micro Focus provides a standard RPM installer for installing Enterprise Developer on Linux. RPM Package Manager (RPM) is a technology available on all Linux operating systems for managing the installation of products.

The RPM installer for Enterprise Developer supports all the RPM functionality.

For instructions on how to install using the RPM installer, refer to the *Installation* section in your product help.

Single file support

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The recommended way to work with files within Enterprise Developer is to include them in a project. For situations where you might want to quickly open edit a single file, Enterprise Developer now provides support for native COBOL files in the IDE when the file is not opened as part of a project. There is limited support for the IDE editing, compiling and debugging features as full support requires a project file.

Spooler housekeeping

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A new spooler housekeeping utility has been introduced (MVSSPLHK). It offers additional archiving functionality compared to the previous spooler housekeeping utility (MVSP0027), and can also be configured to run directly from a JCL job.

Transaction class (TRANCLASS) support

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Transaction class (TRANCLASS) support is no longer a technology preview feature, and is now a full release feature.

Tunables

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This release of Enterprise Developer contains the following new tunables:

putenv_interface	Provides backward compatibility for UNIX systems in which the operating system's putenv() function is required when setting environment variables.
strict_file_locking	Enables a new, more reliable method of file locking for UNIX systems. See *File Locking* for more information.

This release of Enterprise Developer contains the following updates to tunables:

default_cancel_mode	A new parameter, and default, has been introduced for this tunable; see *default_cancel_mode* for more information.
subsystem_cancel_mode	A new parameter has been introduced for this tunable; see *subsystem_cancel_mode* for more information.

Updated run-time system

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Enterprise Server has been updated to provide an execution environment capable of running applications that were each built using different development products. A consequence of this is that If your application has a main COBOL executable (`.exe`) that was built with a previous version of Enterprise Developer, you should ensure that the executable is rebuilt and packaged with the new run-time system. This does not affect mainframe subsystem projects deployed to Enterprise Developer. You can rebuild from the IDE or the command line.

Other COBOL subprograms built with previous versions of Enterprise Developer are not required to be rebuilt.

z/Server installation and configuration

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- XML configuration files - a single XML configuration file replaces the five separate configuration files that were used in previous releases. This helps reduce the complexity of the z/Server installation and configuration. An XML schema is supplied and enforced. The input parameter values for type and range are checked at execution time and can also be externally verified using standard or custom tooling before they are applied.
- z/Server Configuration Utility (Technical Preview only) - this release provides a technical preview of a new web-based z/Server Configuration Utility.

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

- The Application Workflow Manager now requires that you have both z/Server and Mainframe Access Server (MFA) installed.

Known Issues

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

In addition, note the following:

Application Workflow Manager

- In an Application Workflow Manager modelled action, you retrieve a file from the remote zOS system directly into a COBOL project, you must set the text file encoding of the COBOL project to UTF-8 in the project properties in order for the Compiler to correctly process the source code. To set the encoding, in the project properties of the COBOL project and on the **Micro Focus > Project Settings > COBOL**, specify the `source-encoding(utf8)` Compiler directive in the **Additional directives** field.
- Sequential MVS files are not locked when opened from zExplorer or from an AWM model using the **Edit MVS File** tool from the MVS function package. This means sequential MVS files can be opened in parallel in write mode and could be mutually overwritten.

Debugging

Remote debugging does not work for programs running on AIX or HP machines, if you are trying to debug using Enterprise Developer installed on a Linux machine.

Database Access

If you have a remote COBOL project under Eclipse that uses DB2 ECM in Visual COBOL or HCO for DB2 LUW in Enterprise Developer and the DB2 software is not installed on the client machine where you are using the Eclipse IDE, you receive background parsing errors in your application. To resolve the issue, you can do either one of the following:

- Disable background parsing **Window > Preferences > Micro Focus > COBOL > Editor** and disabling the checkbox for **Background parsing**.
- Install the IBM DB2 client-side software on the machine on which you are running Eclipse. Go to the IBM Support Home and locate the page entitled "IBM Download Fix Packs for IBM Data Server Client Packages" .

Enterprise Server

- The Historical Statistics Facility may generate incorrect records for SSTM-enabled enterprise servers.
- On Windows 10, if you are using Microsoft's EDGE browser to access the Enterprise Server Administration GUI, issues with EDGE can cause the automatic refresh feature to display a dialog asking whether you want to resubmit a form. To work around this issue, cancel the resubmit request and then refresh the server list page or the Home page of Enterprise Server Administration. You can also turn off the automatic refresh by setting the **Auto-refresh interval** setting on the Home page of Enterprise Server Administration to 0.
- Enterprise Server instances will fail to start if they have been configured with the MLDAP ESM module to use external security and are started using Enterprise Server credentials that are not configured with "user administration" privileges (that is they do not have an allow update ACE in the "User Administration" security resource in the Enterprise Server Administration). A fix for this is available if you install HotFix 1 of version 2.3. of this product.

IDE

- If you are upgrading your license from Enterprise Developer for Eclipse Personal Edition (v2.2 or earlier) to Enterprise Developer, or from Enterprise Developer Connect (v2.2.1 or later) to Enterprise Developer, any existing projects compiled to either .exe or .dll files using the old license must be updated in order to recreate the `.cobolBuild` file. You can do this done by adding or removing files from the project or by deleting the `.cobolBuild` file. Updating the project in this way ensures Eclipse will fully build the executable files.

ICETOOL Emulation

ICETOOL emulation for managed code is not available in this release.

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.

PL/I Support

- The Micro Focus PL/I Macro Preprocessor supports the majority of the IBM PP(MACRO) functions. The only support for PP(PLX) is for the deprecated KEYS option. There are no plans to further extend the existing support for PLX.
- On SUSE, the PL/I CodeWatch debugger does not display output with MicroFocus ViewNowX. To resolve this issue, you need to install a HotFix of ViewNowX - contact Micro Focus SupportLine for more details.
- Trying to debug remote PL/I projects that compile to 32-bit using the CodeWatch debugger fails. To work around this issue, you must set the environment variable $COBMODE to COBMODE=32 on the remote machine before you start the RDO daemon.

Resource Adapters

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

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

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

Setup

- On UNIX, check *UNIX Installer Issues* before you start the installation.

z/Server

IBM's PTF UA75804 causes ISPF dialogs in a user server to stop working. If you have this PTF installed, contact Micro Focus SupportLine to obtain a fix for this issue.

-2814867 (1098663)

Significant Changes in Behavior or Usage

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

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

AMB

Back to the list

- Loading PSBs sometimes caused an error that prevented the building of DDI symbols required for generation.

  2813119 (1098471)

Assembler Support

Back to the list

- Previously, the Assembler run-time error SOC4 (Invalid 370 address abend) was mapped to the COBOL run-time error 200 (Internal logic error) which was misleading. It is now mapped to the COBOL run-time error 205 (COBRT205 Invalid mainframe pointer value (Fatal)). Note that, in most cases, you receive an Assembler SOC4 abend if the calling COBOL program was compiled without the AMODE(24) or the AMODE(31) Compiler directives.

  2806239 (1097738)

CAS Security

Back to the list

- The Enterprise Server External Security Facility now includes MLDAP ESM Module 2.0, with a new algorithm for identifying the best-matching resource-access rule and ACE for resource-access security checks. This algorithm is faster and matches most customers' expectations. The new algorithm also provides an optional "username substitution" feature. It can be enabled by setting "rule substitutions" to "yes" in the [Operation] section in the Security Manager configuration text area. When this is enabled,

the string "${user}" in a resource-rule name will be replaced with the name of the user that makes the request. For example, a DATASET rule named "USERS.${user}.**" would apply to datasets with the requesting user's name as the second qualifier. In rare cases, customers with complex, ambiguous resource-access security rules might see experience changes in behavior as a result of the new algorithm. The old algorithm is still supported and can be enabled by setting "version 1 authentication" to "yes" in the [Operation] section of the Security Manager configuration.

2807531 (1097783)

CAS XA Switch modules

Back to the list

- The XA switch modules now support dynamic registration.

  2682101 (1092325)
- The XA switch modules now support batch-only operations when multiple XA Resource Managers have been defined.

  2664675 (1091082)
- In Enterprise Developer 2.2 update 2, Micro Focus identified undefined run-time behavior when the following combination of directives was specified: SIGN"EBCDIC", CHARSET"ASCII", and one of the following: HOST-NUMMOVE, HOST-NUMCOMPARE or SIGN-FIXUP. Previously (Enterprise Developer 2.2 update 1 and earlier), if this combination was specified, the SIGN”EBCDIC” directive should have been ignored, to avoid a mixture of ASCII and EBCDIC characters; however, SIGN”EBCDIC” was still being honored, resulting in undefined run-time behavior. Therefore, this combination of directives is now invalid for Enterprise Developer 2.2 update 2 or later, and if specified, will be rejected at compile time.

  2786397 (1095265)

Compiler

Back to the list

- For native COBOL, the size limit of the Data Division now stands at 2GB -1.

  2796076 (1096384)
- COBDATA has no effect on compilation. The output of the Compiler is the same location regardless of whether COBDATA is set.

  Previously, it was not possible to specify sign(EBCDIC) with sign-fixup, host-num-move or with host-num-compare. This combination is now supported in native COBOL but remains invalid for managed COBOL code. This is applicable to version 2.2 U2 HotFix 10 onwards.

  2824577 (1100823)

Data Tools

Back to the list

- DFCONV now returns the correct return-code; previously, it would always return 0.

Discontinued support for cwgui

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The cwgui debugger is no longer available. You can now use the cw_java debugger which provides a richer graphical debugging experience.

File Handling - External File Handler

Back to the list

- Custom file handlers (using DYNREDIR) are now called for each part of a concatenated file.

  2795077 (1096322)

File Locking

Back to the list

- In versions prior to Enterprise Developer 2.3, the semantics of the sharing phrase specified in an OPEN statement or used within a call to CBL_OPEN_FILE were not correctly applied in some cases on UNIX and Linux platforms. From version 2.3 onwards, the sharing phrase is correctly honored when the tunable `strict_file_locking=true` is set, which is the default setting.

  Example of potential changes in behavior:

  - *Process-A* opens a file with read-only access and a sharing mode that denies other processes write access (SHARING WITH READ ONLY).
  - *Process-B* then attempts to open the file with read-only access and a sharing mode that denies other processes read access (SHARING WITH NO OTHER).

  With `strict_file_locking=true`, *Process-B* is unable to open the file, because *Process-A* has successfully opened the file allowing only read access.

  With `strict_file_locking=false`, *Process-B* successfully opens the file.

  If your application encounters unexpected OPEN conditions or fails to open files, it might be as a result of the new file locking behavior. In such circumstances, we recommend that you review the file locking and sharing requirements of your application and refactor your source code to work with the default setting. The original file locking and sharing behavior can be restored by setting `strict_file_locking=false`.

IDE

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- Enterprise Developer for Eclipse now ships with Eclipse 4.4.2 (Luna). If your applications contain JVM COBOL code that was built with a previous version of the product, those parts of your application must be rebuilt; otherwise you will experience errors at either compilation or run time.

  (609469)
- A project can have one of two connection modes: NFS/Samba, where the target location is mounted as a local drive, and RSE, which is a purely remote connection to the target location. For project types such as Mainframe COBOL, NFS/Samba is required to use some tools which do not support RSE. For most other projects, it is possible to switch between connection modes using the **Remote Settings** context menu option. In the dialog box, there are radio buttons allowing for selection of connection modes. On changing mode, you must select an existing connection of the appropriate type, or create a new one. If switching to NFS/Samba mode, you must specify the local path to the project.

  2792882 (1096196)
- By setting "-Denable.projectrepair=true" in the eclipse.ini file, .cobolProj and .pliProj files will be repaired to reflect the workspace on project refresh.

  2696707 (1095994)

J2EE Connector

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- This release provides a new command-line argument to Java, mf.ssl.algorithm, which can be set to an appropriate algorithm.

  2799213 (1096684)

JCL Support

Back to the list

- When allocating a dataset to a step using MVSCTLBP, the values returned for the dataset attributes are those defined in the catalog. If these are unset in the catalog, then the values defined in the MVSCTLBP call are returned.

  2816179 (1098882)
- The program attributes for the SSTM job have been changed to default to a mainframe dialect, AMODE 31 program. These attributes will be used when constructing the MVS Control Blocks for the job, which means that the pointers to the sub-block areas will be in mainframe format rather than native format.

  2815695 (1098825)
- Any OUTPUT statement information passed to the printer exit now includes the correct class of that statement.

  2814249 (1098636)
- In ESMAC, when deleting the Spool, the physical spool files and the entries in casspool.dat are deleted.

  2812899 (1098412)
- New functionality has been added to the printer exit interface that enables you to delete the printer spool file after a file has been printed. Set (ws)-prn-file-disp, which is defined in cascbprn.cpy, to 1 to delete the spool file after printing. Additionally, the environment variable ES_JESYSMSG_OUTPUT=Y now correctly routes spool files to the Output queue. Previously, ESMAC still showed the job on the HELD display, even when there were no spool files HELD.

  2812899 (1099966)
- A new environment variable has been introduced - ES_JESYSMSG_RESTRICTED. JESYSMSG spool files are normally routed to HELD. This can be overridden by setting the environment variable ES_JESYSMSG_OUTPUT=Y, which causes all JESYSMSG spool files to be routed to OUTPUT. If ES_JESYSMSG_OUTPUT=Y is set but you require specific classes to be held, set the environment variable ES_JESYSMSG_RESTRICTED to a string containing the classes to be HELD.

  2812878 (1098417)
- The IEBDG PICTURE value length must match the length specified. The value can now contain any characters including quotes as on the mainframe.

  2794881 (1096221)
- Changes to the IDCAMS ALTER processing prohibit applying MGMTCLASS changes to GDGs and to a VSAM element other than a Cluster. Shareoption settings in a SMS DATACLASS are now applied to the VSAM elements correctly.

  2789939 (1095803)

Mainframe Access

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Mainframe Access is now built using the IBM XL/C compiler rather than the SAS/C compiler that was used previously. This change requires you to update your production JCL procedures with reference to the supplied samples MFA, MFAS, and MFAAS. In each JCL procedure, change the STEPLIB DD statement and add a new one, CEEOPTS.

The web administration feature is no longer available in Enterprise Developer.

To use the Mainframe Access support for Endevor you must be using Endevor R14 or later. CA stabilized the Endevor API at R14, so if you upgrade from R14 to a later version you will not need to update the support module that Mainframe Access uses.

MF Server Administrator (GUI)

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- Passwords that entered through either the MFDS or the ESMAC interface now use the same encoding.

  2792382 (1096011)

PL/I Support

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- For BASED variables declared using the form BASED (ADDR(x)), storage checking is now performed on the base reference “x”. This behavior requires the compiler option –nolaxbased. See the Open-PLI User guide for more information on the options –[no]laxbased and –[no]laxdefined.

  2819663 (1099293)
- The behavior of the –zp1 option has been reverted to that of before Enterprise Developer 2.2 Update 1, with an additional correction relating to Char Varying data items. For a full description of the –zp1 option, refer to the Open-PLI User’s Guide in your product help. If you are installing ED 2.2 U1 HF5 as an upgrade to ED 2.2 U1, you must rebuild any applications that are compiled using the –zp1 option after the upgrade.

  2789213 (1095636)
- Previously, when using any of the complier options -mvs, -dli, -ims, or -cics, the BINARY attribute was incorrectly applied if the FIXED attribute is specified without BINARY or DECIMAL. The default attribute DECIMAL is now applied.
- The BIGENDIAN attribute, when explicitly applied to a structure, is now propagated to its CHAR VARYING and WIDECHAR VARYING members.
- Declarations using DEFINED storage are now checked for compatible types between the DEFINED variable and its base variable. This behavior requires the compiler option –nolaxdefined. See the Open-PLI User guide for more information on the options –[no]laxbased and –[no]laxdefined.
- The PL/I Macro preprocessor has been enhanced to support the use of the ANSWER statement from within a PL/I Macro.

  2698537 (1094243)
- The macro preprocessor has been enhanced to support arrays of CHAR and FIXED variables. New macro builtin functions have been implemented (HBOUND, LBOUND, DIMENSION).

  2696129 (1094011)

SQL: HCO for SQL Server

Back to the list

- The return type for the HCOSS DB2 CHAR() function has changed from CHAR(255) to VARCHAR(255).

  2804069 (1097253)

Updated Run-Time System

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- Enterprise Server now provides an execution environment capable of running applications that were each built using different development products. A consequence of this is that if your application has a main COBOL executable (.exe) that was built with a version of Enterprise Developer prior to version 2.3, you should ensure that the executable is rebuilt and packaged with the new run-time system. This does not affect mainframe subsystem projects deployed to Enterprise Server. You can rebuild from the IDE or the command line.

  Other COBOL subprograms built with previous versions of Enterprise Developer are not required to be rebuilt.

Resolved Issues

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

Adis

Back to the list

- Paste now works as expected when pasting into numeric items under MS(2) with ACCEPT statements.

  2800091 (1096820)
- When the MS Compiler directive is set, ACCEPT with EMPTY-CHECK now supports manually entering of a zero for numeric items and a space for alphanumeric items.

  2795831 (1096324)
- When using ACCEPT WITH UPDATE with the MS Compiler directive, the pre- and post- display behavior is now the same as that of the MS compiler.

  2795709 (1096311)

Application Workflow Manager

Back to the list

- The PL/I editor now parses the TRANSLATE function correctly without generating a NullPointerException.

  2824821 (1100151)

AppMaster Builder

Back to the list

- The generation process now packages the application items, generates them and, when the generation is completed, adds the generated screens or programs to a COBOL project.

  2826890 (1100284)
- Each generated item added or updated in a COBOL project will be refreshed. After all generated items are added or updated, the appropriated folders will be refreshed to ensure that all project items are up-to-date.

  2823920 (1099991)
- The environment preference page now correctly stores and retrieves the environment data for a project.

  2822888 (1099772)
- Syntax checking in the SQL DDL Importer has been modified to allow TIMESTAMP data types using a format of TIMESTAMP().

  2815127 (1099154)
- CRTL+ALT+DEL key combination produced a "Delete Object" message.

  2827005 (1100243)
- Some threading issues in JobQueue View have been corrected, to avoid using excessive CPU resources in Windows 8.

  2821106 (1099857)
- The Restore Defaults button failed to restore default values.

  2818582 (1099235)
- AppMaster Builder Program Properties dialog box did not display properly for some screen resolutions.

  2816283 (1098864)
- AppMaster Builder Preferences did not save or display properly.

  2816274 (1098843)
- AppMaster Builder Application Properties did not save properly.

  2816273 (1098842)
- Opening a data view using Data View Manager sometimes caused an IDE error when the data view contained a large number of treeview elements. With this release, the Data View Manager loads each

treeview element as needed rather than loading all elements when the data view is opened. This corrects the IDE error and saves resources.

2809748 (1098065)

- In AppMaster Builder, if an APSPROG member and an APSDATA member have the same name, it is not possible to edit them both at the same time.

  2807111 (1097627)

CASRDO

Back to the list

- When trying to access the Catalog page from casrdo45, the JESSPOOL class was checked instead of DATASET.

  2819633 (1099350)
- The ESMAC Spool view is now sorted correctly when using a filter criteria.

  2798643 (1096681)

CICS Support

Back to the list

- Compiling a BMS file that includes COPY statements and macros that contain comments no longer shows an error in scenarios where the /PREPASM compiler directive is used to pre-process the BMS file and no pre-processing errors were reported.

  2791709 (1095975)

- Previously, if an EXEC CICS RECEIVE MAP was executed in a transaction that was started from an EXEC CICS START TERMID, the RECEIVE would hang.

  2811686 (1098238)
- TWA registrations no longer cause memory leaks.

  2808391 (1097845)
- It is now possible to use an environment variable to configure the maximum number of pool threads of threaded processes. This should only be used if requested by a Micro Focus SupportLine representative.

  2808391 (1097846)

- The CICS Web interface now supports http requests that are greater than 32k. Previously, a LINK to the application would fail with errors EIBRESP 22 (LENGERR) or EIBRESP2 11 (The COMMAREA length is less than 0 or greater than the permitted length). Note that a request in the commarea will be truncated as is the behavior on the mainframe.

  2833996 (1101078)
- Previously, an EXEC CICS INQUIRE TASK LIST statement with more than one option (RUNNING/ SUSPENDED/DISPATCHABLE) would return the information about the current task only, even if there were other running or suspended tasks in the system.

  2819519 (1099396)
- Executing the first EXEC CICS READ statement on a file defined as a remote one on the TOR and both as a cataloged one and "open on first reference" on the FOR no longer fails.

  2809423 (1097915)
- This release provides a new user exit, casmguex. You can use casmguex to control whether a particular message is displayed on the console or not.

  2808523 (1098090)

- The EXEC CICS FORMATTIME option MILLISECONDS is now supported. MILLISECONDS(data-area) returns the number of milliseconds in the current second specified by ABSTIME as a binary integer in the range 0 - 999.

  2807604 (1097661)
- When a SIT commarea override is set, an XCTL with a commarea now passes the data correctly.

  2804601 (1097349)
- The Micro Focus implementation of ECI was matching a shorter system-name than the one specified. Is is now verifying the name on length of the server name passed to the ECI interface.

  2800359 (1096885)
- When using COMMAREA override, the exit of an XCTL command was not restoring the ptr for the next COMMAREA to the original COMMAREA.

  2793862 (1096334)
- When changing a class in ESMAC for a sysout, the MVSSPOOL class was not changed to reflect the new class, and the old class was being passed to the exit. This has now been fixed.

  2680710 (1092574)
- To ensure that the F1 Help function behaves correctly, the resource definition file must be upgraded using the command: caspcupg /dp=<resource-definition-path>

  2789687 (1096765)

Code Analysis

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- An issue that was causing a slow down in opening source files in the editor has been resolved.

  2804209 (1097351)
- Sequential line calculation has been fixed to provide correct position of POI (Point Of Interest) within file.
- The analysis component no longer hangs when running on programs containing DBCS (double-byte character sets).
- 'error starting the query' and other similar non-descriptive error messages have been expanded to include additional information as to what caused the error.
- The generic "Violations detected" string, preceding the actual description for the rule, has been removed from the rule description. Users of Enterprise Developer for Visual Studio will no longer see this string as part of the description.

Character Animator

Back to the list

- Monitoring large fields no longer causes the Animator to abort.

  2828703 (1100628)

Compiler

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- A program compiled with the INIT-BY-TYPE directive that contains 'PROGRAM-ID IS INITIAL' syntax and declarations of index names or data items now produces correct intermediate code.

  2831469 (1100741)
- A redefinition of a CICS-inserted DFHCOMMAREA block that is preceded by a level 77 definition now compiles correctly.

  2831205 (1100706)

- Programs compiled with DIALECT"RM" and containing 'PROGRAM-ID .. AS' syntax now execute as expected.

  2830956 (1100700)
- The CP preprocessor used in conjunction with the COBSQL preprocessor now correctly replaces any text affected by the COPY... REPLACING statement.

  2826558 (1100370)
- When using the WINDOW1 preprocessor, specification of the AUTOCLOSE option no longer prevents subsequent preprocessor options from being actioned.

  2822206 (1099687)
- The output from the SETTINGS compiler directive now also appears for programs specified via the ILSOURCE option.

  2822102 (1099604)
- The XML GENERATE statement now functions as expected in programs containing the DECIMAL POINT IS COMMA clause.

  2821786 (1099599)
- The XML GENERATE statement now executes correctly when the specified FROM operand is a group containing nested ODO tables (which is only possible with the ODOSLIDE directive).

  2821779 (1099600)
- The INITBYTYPE compiler directive no longer causes spurious flag messages with DIALECT(OSVS).

  2820920 (1099488)
- Typing "DEADDATA" in the Quick Browse window no longer causes Eclipse to crash.

  2818822 (1099230)
- The LINE-COUNT Compiler directive now operates as expected.

  2817442 (1098979)
- The maximum size of data items in a program compiled with the DIALECT(ENTCOBOL) directive now correctly reflects the respective mainframe values in the latest version of Enterprise COBOL.

  2816030 (1098926)
- The Compiler now rejects the use of special register names as arguments for reserved word altering directives. You can only specify standard reserved words with these directives.

  2813931 (1098542)
- Data names that start with a numeric digit and contain DBCS characters are now accepted by the Compiler, as expected.

  2813223 (1098456)
- A MOVE operation of an alphanumeric literal to an unsigned numeric DISPLAY field under RM/COBOL emulation now executes as expected.

  2812561 (1098446)
- Data names longer than 30 characters are now flagged when specifying the FLAG option with a mainframe argument and not just when using the equivalent full DIALECT.

  2810924 (1098133)
- Compiling a program with the COBSQL preprocessor, which contains a COPY REPLACING statement with trailing spaces in the replacement pseudo text, now works as expected.

  2807470 (1097737)
- Compilation of a program containing a GO TO statement that references an undeclared procedure name, and has the RESTRICT-GOTO directive set no longer results in a run-time exception.

  2807280 (1097616)
- A user function that specifies a PIC 1 item as a RETURNING field now receives an appropriate compile-time error.

2806037 (1097470)

- The addressability of a linkage data item is now checked correctly.

2805523 (1097453)

- Compilation with a mainframe dialect, of a program containing a CALL statement with a mixture of non-01 level group items and literals, now proceeds as expected with no internal error produced.

2803613 (1097190)

- A debugger query of a condition name with a negative literal VALUE now returns the expected result.

2801993 (1097607)

- The combination of a mainframe dialect and SOURCEFORMAT(FREE) no longer produces unexpected compiler errors referring to tokens being in the wrong area of source.

2800332 (1096911)

- The specification of an alphanumeric literal in the VALUE clause of a DBCS data item (i.e. the G\N prefix is missing) is now accepted as an MF extension. This still generates an error under mainframe dialects, but can be hidden/suppressed like any other flag message.

2798426 (1096574)

- Under DIALECT"MF", the Report Group description entry now permits the NEXT GROUP NEXT PAGE clause without a LINE clause.

2798367 (1097201)

- It is now possible to specify fixed-point numeric literals without a trailing separator space before the next token or operator. This provides a better mainframe emulation.

2797274 (1096469)

- A new CP option, ANYCOPYCASE, now provides more flexibility in matching the case of copybook names.

2797035 (1096494)

- Previously, numeric items that used a decimal point and the OR sign were truncated when using the MS display syntax under MS(2).

2795709 (1096308)

- DBSPACE(MIXED) directive has been implemented to allow comparison of mixed single and double-byte spaces to the SPACE figurative constant.

2679222 (1092427)

- When importing an Enterprise Developer source file, the generation of a CBLast (COBOL Abstract Symbol Table) file no longer hangs when instructed to process a COBOL.DIR file.
- Mixing alphanumeric and national items in intrinsic functions which only allow one type now produces a syntax error.
- A source line longer than the maximum supported by the compiler no longer receives an error about truncation if the line is simply a comment.
- An error during compilation, when creating .int files when the COBDATA directive is set, has been fixed.
- An error reading the default directive file $COBDIR/etc/cobol.dir when COBDATA is set during compilation has been fixed.
- A bug in accepting a field containing double-byte and single-byte characters has been fixed.

2829369 (1100513)

- A bug during compilation has been fixed, which caused a Run-Time System error 114 when generating 32-bit programs using the OPT directive, containing decimal operations.

2819838 (1099305)

- An error has been fixed in COMPUTE statements of the following form: COMPUTE a = b / constant where a and b are COMP-3 or DISPLAY; a has greater than 19 digits and b has less than or equal to 19 digits, and constant is a literal which is a power of 10 (such as 10, 100, 1000, etc.)

2808008 (1097715)

- An error in managed COBOL that resulted in EXIT PROGRAM or GOBACK statements not being executed has been fixed. The error could occur when perform ranges overlapped.

  2825425 (1100162)
- When compiling for JVM COBOL with the ILSMARTLINKAGE directive, pic 9v9 items used as VALUE parameters are now generated correctly.

  2815477 (1098847)
- An illegal instruction 'invokespecial' is no longer generated. Previously, in some circumstances, this could be generated, leading to a verification error on class load.

  2811246 (1098205)
- When compiling a large program for JVM COBOL, the use of performtype(osvs) or performtype(rm) with declaratives no longer leads to bad code generation and invalid jump errors when loading the resulting class.

  2695030 (1093952)

Data Tools

Back to the list

- It is now possible to associate data files with specific .STR files. This information is stored in the .pro file for the respective data file.

  2792214 (1095979)
- Creating a record or a segment layout file no longer fails when the COBOL names contain double-byte characters.

  (606488)

Debugging

Back to the list

- Pointer values no longer get incorrectly byte-swapped when their value is accepted.

  2824427 (1100287)
- Trying to view the values of data-items that contain UTF-8 data no longer corrupts the values.

  2810079 (1097992)
- Stepping through programs with large data items could occasionally cause Eclipse to crashes.

  2823848 (1099954)
- When using the Expressions view in Eclipse, you no longer receive an error related to variables declared in nested programs.

  2809946 (1098036)
- Sources are now located successfully when debugging COBOL JVM JUnit tests when the COBOL JVM project is added to the debug configuration source lookup path.

  2808860 (1097879)

Designer

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- When importing using the Designer, you now receive an "Source Code Import Wizard Detected Errors Page" if there are parsing errors. See your product help for more details. Previously, the import process proceeded even when there were parsing errors. If errors or warnings were reported but the FD and 01 extraction process ran to completion, the errors will be reported but the "Next" button is enabled to allow the partially extracted data items to be imported. The "Back" button is also enabled allowing the process

to be repeated once the errors are fixed. If a severe parsing error occurred, the errors are reported and, since they must be fixed, the "Next" button is not enabled.

Documentation

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- The product help now includes the optional attributes for the ‘container’ objectclass definition used by Enterprise Server external security.

  2801420 (1096977)
- The product help now includes information about how to retrieve the Run-Time System error code from a file status code returned as a decimal value. For example, if you receive 14657 as a value for the file status, this is a decimal value. This converts to 3941 HEX. The second byte of this value, 41, must be converted to Decimal before looking at the RTS error code - thus this HEX value then represents an extended file status code of 9/065 which means the error code is COBRT065, a locked file status.

  2822853 (1099769)
- The MFJSTATS topic has been updated to clarify that this refers to a COBOL SORT operation.

  2828881 (1100446)
- The product documentation about the START statement and Relation Conditions now states that THEN may be used instead of THAN.

  2799291 (1096903)
- The topic "Using the CP Preprocessor to Expand Copybooks" in the product documentation has been updated to include the following text: If the MODE=ANSI option is specified to the Oracle precompiler, Pro*COBOL, then you should additionally use CP's SY directive to ensure that the SQLCA gets populated correctly.

  2792368 (1096084)
- The documentation for debugging in the IDE now includes instructions about how to create and configure a COBOL Wait for Attachment configuration in order to debug a Windows Service, when you do not have the original Eclipse project that builds the Service.

  2781118 (1095738)
- The default setting for the ES_ESM_PLTPISEC variable is NONE.

  2821810 (1099672)
- Additional information has been added to the description of the CASSI1400 error message.

  2821806 (1099711)
- The AdminAPI resource class has been documented for ESF features.

  2815870 (1098815)
- The Enterprise Server documentation for Retain Periods has been updated to include additional information specific to spool output.

  2790146 (1095777)
- The LISTCAT topic in the documentation has been updated to reflect accurate column headings and descriptions for output format.

  2789939 (1095765)
- The explanation of error message CASCF0052S has been updated with UNIX-specific information.

  2821745 (1099737)
- Topic amended to refer to entry_point_mapper rather than entry_name_mapper.

  2807744 (1097673)
- Details on MF_MVSJOB environment variable added.

  2797526 (1096488)

- The Micro Focus Communications Server now supports rotational log files. To enable this feature, you need to edit the mf-server.dat file, which resides in the product's bin directory (Windows), or the $COBDIR/etc directory (UNIX). The mf-server.dat file contains details of this feature under the [logging] paragraph, and full documentation is provided in the online help under "Server Instance Diagnostics: CS Console".

  2675327 (1092083)
- NONCONNECTED has been added to the list of attributes of DECLARE.

ecijava

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- Stateless Java ECI requests no longer cause memory leaks in MFCS as a result of abandoned sessions.

  2822108 (1099645)
- The Enterprise Developer product help now includes information about the CICS Resource Adapters and ECI.

  2799936 (1096775)

Enterprise Server

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- When using an EXCI link and a PPT defined with commarea 32767, the modified commarea was not reflected back to the caller.

  2830739 (1100654)
- It is possible to configure a Visual Studio or an Eclipse project to perform emergency debugging of an application running in an enterprise server even when the server is operating in production mode (with dynamic debugging disabled). To prevent this, starting with this HotFix, you can use the environment variable ES_PRODUCTION in the server's [ES-Environment]. When set to Y, this variable prevents the IDE from initiating a debug session.

  2825848 (1100160)
- When running with HSF switched on, it was possible to have a concurrent shared memory access which would lead to shared memory corruption. This would most likely occur when running JCL jobs although it could occur with any tasks. Shared memory access in this scenario is now performed under a shared memory lock.

  2824909 (1099975)
- When using a secure region and when the environment variable ES_ESM_DISABLE_DFLTUSER_ESMAC is set to Y, clicking on the Home button in the signon page now correctly opens the MFDS page.

  2824772 (1099949)
- When the casspool.dat file is shared across multiple servers (excluding cluster scenarios), ESMAC displays all jobs, including those that are not running in the current server. However, it is only possible to cancel jobs that are running in the current server. For other jobs the CANCEL button is disabled.

  2824230 (1099917)
- It is now possible to start a BATCH printer in ESMAC if its name consists of space characters only but an exit name is provided.

  2819122 (1099216)
- When using ESMAC, Enterprise Server now correctly loads the MFESMAC resource class, when necessary. Previously, it was loading the ESMAC class.

  2814789 (1098652)

- You can now use the environment variable ES_ESM_DISABLE_DFLTUSER_ESMAC in order to disable the ESMAC default user. When this variable is set, the "DEFAULT" button on the logon screen is disabled and a valid userid and password must always be entered.

  2813092 (1098438)
- DBCS fields are now processed correctly when the PS attribute is set in the DSECT rather that defined in the MAP in single field, groups and OCCURs.

  2811683 (1098233)
- Web service timeout values are no longer truncated to two digits.

  2792860 (1096024)
- An issue with dynamic debugging has been fixed where, previously, the ports that were freed were not being reallocated.

  2785911 (1095510)
- An artificial restriction on the size of cookies passed when invoking ESMAC requests has been removed. Previously, this was causing Run-Time exceptions.

  2692460 (1094557)
- The characteristics of an FCT that references a cataloged file are now refreshed on each file open.
- If a file was already present, the date for an open request was not sent to the file handler.
- Open and close operations are no longer recorded in the transaction logs and replicated by extension when they are associated with open input requests.
- A secondary node in a group no longer attempts to take over the role of a primary node. The entire group now initializes correctly and all roles are assigned as expected.
- Microsoft's Internet Explorer versions 10 and 11, by default, does not use the current form name. As a result, when invoking the javascript functions, the form name was not correct and the product behavior was wrong. This has now been fixed.
- This release provides a number of enhancements to the CAS administration console:
  - Improvements have been made to the log-in mechanism for situations where you are using an External Security Manager to secure the MFDS and Enterprise Server, and you are logged on to MFDS and ESMAC using different user accounts – for example, "user1" and "user2", respectively. If you navigate from ESMAC to MFDS and you log off "user1" from the MFDS, this will now automatically log off "user2" from ESMAC as well.
  - When using an external security manager, if you sign off from ESMAC, the sign on screen no longer preserves and displays the userID of the last user that was logged on.
  - An issue with the "Home" link in the ESMAC sign on page when the environment variable ES_ESM_DISABLE_DFLTUSER_ESMAC is set has been resolved.

  2814494 (1098607)
- A memory leak occurred in the External Security Facility's MLDAP ESM Module in some HotFix releases of Enterprise Server 2.2 Update 2.

  2833758 (1101024)
- When using the Enterprise Server External Security Facility with the audit feature, some audit events generated by ESF Admin requests (such as ADDGROUP or ALTGROUP commands specifying many group members) may include too much information to fit in a single audit event. These parameters are now split across multiple audit events of category 5, type 3. Each split parameter has a unique number (per process), and each piece of a split parameter has a sequence number. The original event will contain a string with the split parameter identifier.

  2827010 (1100238)
- The new resource access authorization processing in Enterprise Server's MLDAP ESM Module (LDAP-based security), introduced in HotFix releases of Enterprise Server 2.2 Update 2, now correctly handles cases where multiple access control entries have the same rank. For example, this may apply when all group mode is enabled and an Access Control List (ACL) contains Access Control Entries (ACE) for different groups the user belongs to.

2826650 (1100313)

- In Enterprise Server 2.2 Update 2 HotFix 06 only, when Enterprise Server External Security is used with the "Version 2 Authentication" mode enabled, some ACEs might not be processed or applied. This has been fixed.

2826650 (1100195)

- When using the Enterprise Server External Security Facility (ESF) with auditing enabled, and using the ESF Admin API (programmatically or with the Enterprise Server Administration web interface or the esfadmin command-line tool) to make certain changes to security data, very large audit events could be generated. In some circumstances these could cause the Audit Manager process to crash or hang the program making the request. This has been corrected by truncating parameter information for very large security administration requests.

2825505 (1100158)

- When using Enterprise Server External Security Facility (ESF) with the optional Referential Integrity User Exit, integrity constraints are now ignored for Access Control List (ACL) actors containing wildcard characters. This enables ESF Admin actions that include resource access control ACLs containing wildcard actors.

2824117 (1099908)

- The optional ESF Referential Integrity user exit module no longer fails with an LDAP "filter error" message when processing certain resource-rule commands, such as ALTRESOURCE, for resource rules with names that include an asterisk, "*".

2824049 (1099884)

- The "referential integrity" sample user exit module for Enterprise Server External Security no longer causes the MFDS process (Enterprise Server Administration) to terminate when external security with the exit is configured for MFDS, and MFDS is used to add a user or to perform some other security administration tasks.

2823947 (1099880)

- A new MFDS command line startup option (-b) is now available. Specifying -b disables the establishment of anonymous MLDAP API sessions.

2818587 (1099264)

- This release enables you to prevent an Enterprise Server Monitor and Control (ESMAC) user from displaying an enterprise server's environment variable settings using the "Env. Vars." button or the direct URL. To enable this feature, you need to create a new element (ENV*) in the LDAP schema in the CN=MFESMAC group below CN=Enterprise Server Resources.

  This release includes an updated copy of the supplied LDIF import files that contain this change. Once this element is installed in the security manager, you can control the visibility of the environment variables page by configuring the group/user access rights using the microfocus-MFDS-Resource-ACE attribute.

2811696 (1098264)

- The number of security manager user group members displayed by the Enterprise Server Administration and the esfadmin tool is no longer limited to a maximum of 1024.

2807579 (1097703)

- Trying to use the SNMP audit emitter with Enterprise Server no longer fails with a run-time system error 114.

2800729 (1096951)

- The MLDAP ESM Module, part of the Enterprise Server External Security Facility, now supports "nested" user groups where one user group can contain another user group. Members of the contained group belong to both groups. This enables administrators to define very large user groups as well as hierarchies of user groups.

2510993 (1078988)

- A new option, "LITERAL=YES" has been provided in the Enterprise Server External Security Facility's Administration API, and in the esfadmin command-line utility. When this is set, "*" is not interpreted as a wildcard when using any of the administrator's LIST commands. This is particularly useful for listing resource access rules that include "*" in their name. Search the product documentation for esfadmin for more information.
- Oracle and OCI XA switch modules leaked memory when using user personalization.

  2830922 (1100676)
- When issuing an ENQ change request in a cluster environment, the request to change the lock type was being sent to the GLM but not processed locally. It is now also being processed locally.

  2826218 (1100148)
- During a cluster RECONNECT request, each cluster client sends a list of active locks and the GLM re-populates the Global ENQ. Since the introduction of the VSAM shared options, the lock may also contain a tca ptr which is used to store the client's casmgr information. This is required for lock with persistence server. A pointer set to low-value was sent as part of a GIVELOCK request, but on the GLM that value was not used. This causes a run-time system error 114 in casgreqt on the RECONNECT/GIVELOCKS function. This fix allocates the required tca for client casmgr for a RECONNECT request, sets up the pointer depending on the lock persistence type as well as the clients casmgr PID.

File Handling

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- The IMS recovery process is now working as expected; previously, a scan of the transaction log was incorrectly resetting the integrity flag of the files logged.

  2821280 (1099615)
- You now receive an RC16 error message, if a PDSM file is missing from a list of concatenated DD's.

  2821187 (1099770)
- Indexed files are no longer corrupted when their file size limit is reached.

  2817599 (1099359)
- When lock mode is set to 'automatic', with single record locking, the lock from the previous operation is released at the start of the next file operation; this is to avoid an ABBA deadlock situation occurring.

  2816981 (1099052)
- A new file handler configuration file option (STRICTLSEQ) has been added. Only use this option if instructed to by Support.

  2814458 (1099019)
- RM and ACU files accessed from Enterprise Developer no longer crash with a 114 error for I/O operations on a non-existent optional file opened for input. An appropriate error code is now returned.

  2809718 (1098141)
- MFSORT now takes the record length from a previous output file, if its record length is specified, rather than defaulting to the value in the SORTIN statement.

  2808188 (1098243)
- The rollback recovery process is now working as expected.

  2802180 (1097066)
- This release provides a new format of the dataset allocation override rules file that supports multiple conditions.

  2783138 (1095007)
- The ACUFH interface between the MF File Handler and the RM File Manager will no longer report an 05 status (optional file created) to more than one COBOL run unit for creation of the same file. The 05 status will be reported to the COBOL run unit that actually created the file. The RM File Manager that runs under ACUFH and the Micro Focus File Handler for Enterprise Developer now includes

optimizations that enable it to use pread and pwrite system calls and to report status 99 (record locked) quicker. These optimizations match the optimizations added to the RM File Manager within RM/COBOL.

- The file handler configuration file (extfh.cfg) now supports the following options:
  - ACUFH=ON/OFF - enables or disables any calls to ACUFH. ON by default.
  - ESACUFH=ON/OFF - enables or disables calls to ACUFH while running under Enterprise Server. OFF by default.

  Note: As a result of this change, calls to ACUFH are now disabled by default when running under Enterprise Server.
- Copying an ESDS file no longer causes an RTS114 error.

  2811583 (1098244)
- When a file is closed under Enterprise Server, the file's details are correctly removed from Fileshare. Previously, some details were not removed.

  2810549 (1098111)
- When handling indexed files, the correct .IDX file is now being processed.

  2803247 (1097279)
- A return-code (from the call to callrb) and the file-status is now returned when using JCL to add an alternate index to a file.

  2800520 (1096852)
- During a SORT operation, the DYNALLOC parameter is now parsed, but ignored.

  2818757 (1099320)
- A Run-Time System error 114 could occur when passing the sort control card continued onto the next line.

  2818291 (1099152)
- The formatting of COUNT to BINARY (BI) is now supported in MFSORT.

  2811581 (1098245)
- A SOC4 error no longer occurs when running a SORT operation containing a large number of conditions.

  2803518 (1099559)
- ICETOOL no longer abends when SORTIN is directed to DUMMY and a physical file is missing.

  2790053 (1095812)

HCO for Microsoft SQL Server

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- The DISCARDDN option is now enabled.

  (608200)

IBM Language Environment for OS/390 and VM Support

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- The Language Environment utilities are now available as Java managed code.

  2826067 (1100134)
- Mainframe Language Environment support (LE Services) is now available in Micro Focus Visual COBOL and COBOL Server.

  2799388 (1097806)
- The Language Environment functions CEEGMT, CEEUTC and CEELOCT now return the number of seconds to millisecond precision.

2796098 (1098276)

- The I-S-Info field of the Language Environment (LE) Feed-Back group has been changed from a pointer to a PIC S9(9) BINARY item.

IDE

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- The system set COBPATH value is respected when running or debugging a COBOL program.

2826740 (1100255)

- Content Assist in the PL/I editor now takes fully qualified names into account when generating proposals

2824838 (1099956)

- PL/I include files were not found during background parsing of mainframe programs opened via AWM.

2824729 (1099957)

- SUPPRESS and OPTIONS attributes are now supported by the background parser in the PL/I editor.

2824724 (1099946)

- An issue has been resolved where using valid control characters in column 1 of PL/I programs would cause incorrect syntax errors to be displayed in the editor.

2824695 (1099942)

- Semicolon characters inside comments within a PL/I preprocessor statement could cause parser errors to be displayed in the editor.

2824679 (1099944)

- Debugging a program located in a remote linked folder of an NFS remote project, previously could result in errors being displayed and the program not being debugged.

2819526 (1099290)

- New functionality added, for COBOL only, that enables building of dependent programs from any copybook i.e. it builds the programs that use the selected copybook.

2817675 (1099004)

- Linking of programs that are configured to compile as "Single Executable File" or "Single Native Library File" no longer fails when there were build warnings but the build succeeded.

2816593 (1098972)

- When debugging a program in a project which had dependent projects calls to other programs in the same project would give RTS 173 errors but calls to programs in the dependent projects would succeed.

2814906 (1098671)

- Source lookup now works correctly during JIT debugging when there are duplicate source file names in the workspace.

2814382 (1098669)

- If you associated a new file extension with COBOL programs from Window > Preferences > General > Content Types, the IDE would not recognize files with that extension as COBOL programs if the case of the extension did not exactly match. On case insensitive file systems, the case of the file extension is now ignored.

2814262 (610304)

- Duplicate COBOL Programs in the project whose names only differed in case or file extension were all compiled during a project build. Only the first program in the build precedence order is now compiled.

2813787 (1098602)

- Creating a COBOL project from a project held in AccuRev could result in errors preventing the project from being built.

2812951 (1098678)

- Previously, if you opened a COBOL program on the mainframe from the Team Developer Tree View, hovering data items in the editor did not display their definitions and the Open Copybook context menu command was not available.

2812435 (1098341)

- If the IBM Remote Debug Tool is installed, you could sometimes receive an "Unexpected Exception" message when toggling a breakpoint.

2811173 (1098165)

- New debug option on the Enterprise Server debug configuration that controls whether the debugger suspends on entry to the transaction or continues until a breakpoint is hit.

2810123 (1098582)

- Importing an existing NFS style remote project containing a linked folder could cause a NullPointerException error.

2809790 (1098249)

- A new Debug Source Lookup container type called "Paths from debugger information files" causes the debugger to search for source files using the paths specified when programs were compiled.

2802214 (1097212)

- Programs that use copybooks using a COPY... REPLACING statement that in effect replaces a line with nothing will now open correctly in the Copy view.

2799982 (1096796)

- The error "Unable to read workbench state" could sometimes occur when opening Eclipse if a remote file had been opened in the editor the last time Eclipse was closed.

2799151 (1096711)

- A remote build was sometimes not recognized as being complete even when the Console view showed that it was, leaving a running progress monitor which could not be cancelled.

2798493 (1097187)

- Remote connections are now resolved correctly and do not depend on their order in the Remote Systems view.

2797878 (1097183)

- You no longer receive a syntax checking error message (COBCH1641) in AWM programs if a file name is a full qualified member name that contains a period, ".".

2796384 (1096475)

- You can now use a shortcut key combination in COBOL Explorer to submit a JCL file - click the JCL file in your project, press Ctrl+Shift+S then release the keys and press J.

2795540 (1096289)

- You could sometimes receive an internal error when restarting Eclipse, if a remote project that was using an NFS connection type contained a linked folder.

2791099 (1095976)

- DBD, PSB and MFS files are now only built as part of an incremental build, if required. Previously, they were always rebuilt.

2640512 (1088711)

- A known issue has been documented that describes how Kerberos security settings can lead to a failure to validate and create remote projects from the Eclipse IDE. It provides steps to diagnose and implement a workaround by disabling the gssapi-with-mic authentication method.

IMS Support

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- The DLI Interface Block (DIB) was invalid after a path retrieval call from an EBCDIC EXEC DLI application.

  2818159 (1099146)
- Following an IMS Database Control warm restart, IMS failed to return a 'DX' status code on delete of a logical parent.

  2812447 (1098364)
- An IMS database that uses a system generated /SX field to make its secondary index unique was limited to 4GB in size. This was due to a 4-byte RBA used to construct an /SX field. A new DBD generation directive, SXRBAFORMAT, allows for control of system generated /SX fields. For details, see the SXRBAFORMAT topic in your online help. In addition, DBD generation now supports KEYCOMPRESSION and DATACOMPRESSION directives.

  2807747 (1097733)
- A new feature, the IMSLOCK DD statement, has been added as an alternative to the LOCALDLI feature set by the ES_IMS_LOCALDLI environment variable. To use this new feature, omit the ES_IMS_LOCALDLI environment variable, and add the IMSLOCK DD statement to job steps that require LOCALDLI behavior as follows: //IMSLOCK DD * (locking-parm) /* Where (locking-parm) is one of: EXCLUSIVE – Batch only. Equivalent to LOCALDLI. Requires exclusive. Access to DB – Does not allow GO sharing. Highest performance batch. SHAREDGO – Batch only. Shared Get Only (dirty read). Default.

  2803155 (1097200)
- Documentation for the MFDBUJCL utility has been updated to include syntax and an example for executing the Rebuild utility from JCL.

  2579603 (1084678)
- When using IMSLOCK EXCLUSIVE (LOCALDLI) feature, an incorrect DB position could result when a GET-NEXT call follows a PCB switch where a second PCB accessed the same IMS database.

  (613461)
- When using the IMS database editor, a database open error sometimes resulted in process termination.

  (607437)
- When a PFKEY executes an IMS /FOR command, the screen will be cleared prior to being formatted.

  2825736 (1100207)
- Leading null input segments no longer cause incorrect behavior of a transaction.

  2817693 (1099329)
- An EXEC DLI program that specified a symbolic checkpoint (SYMCHKP) call but did not include any AREAs failed to compile.

  (612244)
- The presence of superfluous parentheses in the EXEC DLI PCB keyword caused errors. These parentheses are now ignored.

  (612721)
- Connections by the same user from more than one terminal caused incorrect behavior.

  2824846 (1100164)
- The /DISPLAY USER command sometimes failed to recognize valid usernames.

  2817244 (1098959)
- IMS applications using 3270 datastream optimization erroneously changed values in the screen buffer.

  2814267 (1098667)
- An IMS ACB error no longer causes a Run-Time System error RTS200.

  2809817 (1098004)

- MQ-IMS Bridge messages with little-endian encoding are now supported.

  2803805 (1097573)
- The /DIS USER command did not remove messages from the message queue. The /DEQUEUE USER command is now available to remove messages from the message queue.

  2781608 (1095370)

Interface Mapping Toolkit

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- The Interface Mapping Toolkit was not properly recognizing 64-bit applications, and would not generate 64-bit DLL files.

  2792065 (1096292)

JCL Support

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- This release provides a number of enhancements to the ESMAC spool view:
  - Specifying a large page number and clicking "<" (previous page) displays the current page. Similarly, typing a large page number and pressing ">" (next page) opens the last page if the page number you specified does not exist. Previously, the product abended with an RTS 114 in both scenarios.
  - The total number of pages has been removed from the ESMAC spool view in order to improve the display performance of this page. - A new button, "go", enables you to navigate to a specified page. If you specify a page number that does not exist, this opens the last page.
  - If you are viewing the last page, clicking ">" (next page) opens the first page. Clicking "<" (previous page) when the spool view shows the first page, will redisplay the first page.

  2829135 (1100722)
- Security check for user access to CANCEL.* resource is now made only if the queried job is in the ACTIVE queue. Previously it was being made for jobs in all queues. This was not necessary as jobs on queues other than the ACTIVE queue CANNOT be cancelled.

  2828492 (1100393)
- Previously, on the JES spool screen in ESMAC, if an automatic refresh was set up, the screen would revert to displaying the contents of the Output queue after a refresh even if the radio button for another queue was selected and showing as enabled on the screen.

  2785064 (1095144)
- Within ESMAC, jobs in INPUT queues are now deleted correctly.

  2828372 (1100382)
- Under mainframe emulation, opening a virgin file I-O now correctly returns a 3/5 status.

  2827755 (1100327)
- JCL validation has changed to allow parentheses when assigning a symbolic parm on a PROC statement without enclosing the string in quotes; for example, the following is now allowed: //PROCBAD PROC DISP=(,CATLG)

  2824260 (1099915)
- Submitting an empty file to the JCL internal reader no longer causes an error.

  2813939 (1098593)
- JCL PARM statements containing symbolics that are split over multiple lines are now passed correctly.

  2811692 (1098262)

- The environment variable MF_SPOOL_ARCHIVE_LOC, which sets the location for the contents of the MVS SPOOL spool file to be copied prior to deletion, can now be set to a value with or without a trailing slash.

  2811289 (1098730)
- A syntax error in the SET statement no longer causes ESMAC to hang.

  2809821 (1098106)
- A problem with the CTF tracing of mvscatio during region shutdown, which caused exceptional termination of processes, has been corrected.

  2809071 (1098043)
- Data sets with a normal disposition of PASS and an abnormal disposition of CATLG are no longer removed incorrectly.

  2790099 (1095773)
- An error in the allocated data set information returned by MFJCTLBP has been corrected.

  2788775 (1095585)
- Spool datasets with the same DD name, which are created in the same job but from different steps with the same step name, will now be archived as expected, and will create unique entries in the archive index file.

  2786077 (1095243)
- When DSNALI is called with the function parameter DISCONNECT, it will also close the connection.

  2780333 (604544)
- The file status is now correctly displayed as "9/009" when the JES "Default Allocated Dataset Location" setting is set to a directory that does not exist.

  2693298 (1093619)
- A problem with the MVSP0027 spool archive process, which was causing spool records to be removed without archiving them, has been corrected.

  2677631 (1092956)
- Previously, the allocation override processing produced an uppercase path for the first rule in the file.

  2836531 (1101338)
- SSTM jobs are now displayed correctly in ESMAC in the JES > SPOOL > ACTIVE list.

  2813588 (1098501)
- You no longer receive a memory error in the catalog program produced when using Fileshare to access VSAM files with large record sizes.

  2807110 (1097830)
- To decrease the amount of memory used when processing CICS spool datasets in an SSTM region, you can now use a new environment variable, ES_JES_FREE_SSTM_SYSOUT, and set it to "Y".

  2660637 (1091980)
- The MFELXA file is now removed when the spool housekeeping is executed and the spool files are in a non-default location.

  2659555 (1097267)
- The rules file used for overriding the location for creating datasets has a new format that enables you to use specific names, define conditions on them and to define multiple conditions. See your product help and the sample "JCL - Allocation Override" in the Mainframe Samples for more details. The older file format is still supported so there is no need to change any existing configuration files.

  (601709)
- Trying to open an input of an empty ESDS file now correctly results a 3/5 error.

  2824959 (1100323)

- Using the LISTCAT LVL command under IKJEFT01 now returns a condition code of 4 for empty GDG base entries. When using PROF NOPREFIX, LISTCAT LVL lists the GDG base and the step ends with COND CODE of 0.

  2796751 (1096433)

- The use of a PATH entry in VSAM Shareoptions, which previously resulted in an error, has now been corrected.

  2827366 (1100286)

- When asking for file information for an input file to a JCL SORT step, an 'access denied' error is no longer produced.

  2824933 (1100014)

- An error when running an ICETOOL statement, where multiple steps were causing a file locked error to be returned due to the files not being closed at end of step, has been fixed.

  2822169 (1099656)

- The incorrect removal at the end of a job, of a cataloged PASS'd data set, has been corrected.

  2822144 (1099644)

- IEBGENER now pads LSEQ files with spaces rather than with low values.

  2813760 (1098521)

- When concatenating SYSUT1 data sets, the validation of logical record lengths is now working as expected.

  2810787 (1098246)

- Mainframe SORT emulation now adheres to the rules of the environment variable MFJ_INPUTDS_ERROR.

  2803524 (1097176)

- A MVSCATPB call to functions DLET, REN, or REPL, with a DSNAME of nulls no longer causes the catalog to become corrupt.

  2793169 (1096127)

- If a concatenated data set has an LRECL of zero, then the LRECL value of the previous file in the concatenation is used.

  2660492 (1090627)

- IEBDG has been corrected to process an empty input file with a return code of 0.

  2607628 (1088100)

- When MF_DEL_DYNPDS=Y, deleting the entire dynamic PDS now deletes all members and also the directory folder.

  2567645 (1088706)

- A problem that produced an RTS 114 error when tracing the IDAEFT01 module has been corrected.

  (607893)

- REPRO for ALTERNATE INDEXES and PATHS is treated as a "NO-OP", because it is not appropriate for the underlying physical structure of the Micro Focus files.

  2800292 (1096872)

- A new option when performing IDCAMS REPRO allows the bypass of the pristine file state (Error JCLAM0150S) and the REPRO to produce an empty output file: set the environment variable MFJ_REPRO_EMPTY=Y.

  2790606 (1095968)

- A problem causing the truncation of a catalog listing to 100 VSAM clusters has been corrected.

  2654125 (1090116)

- IDCAMS now processes the TSO ALLOCATE(xxx) COPY(yyy) command correctly, where the yyy data set is a VSAM data set.

  2581587 (1096352)

- The ON condition processing has been changed in order to avoid generating "IF <conditon> GOTO" label statements before every EXEC statement.

  2787049 (1095670)

Library

Back to the list

- Using a dd_ environment variable to specify the path used in CBL_LOCTE_FILE now works as expected.

  2822153 (1099632)

Mainframe Access

Back to the list

- A new parameter, /ENDLOG=<endlogPath>, has been added to the MFDAS Endevor commands. If an endlogpath is specified and the Endevor command fails, the transaction log is downloaded to the specified location.

  2814266 (1098581)

- The FS_CHECK_FILE_EXIST routine no longer deletes the data set being checked on a mainframe.

  (608326)

- MFMONMX.exe now returns a non-zero return code when it encounters an error.

  2814298 (1098677)

- If the "Delete workstation file if mainframe member is deleted" option in the advanced synchronization options of Mfmonmx2 is checked, mfmonmx2 now successfully executes the operation. Deleting an entire directory on the mainframe is also synchronized.

- An occasional abend U0996, which occurs when the MFA Endevor job starts, should no longer occur.

  2828402 (1100415)

- You no longer receive an error message "Unknown return code 9/64" when importing copybook members in Source Connect.

  2809371 (1097999)

- The MFDAS EXPORT PAN commands now work correctly.

  2805251 (1097867)

- MFA server now supports CA Endevor R17.

  2800686 (1096931)

Micro Focus Common Client

Back to the list

- The Micro Focus Common Client, used by COBOL Web Service proxies and other components, now allows HTTP URLs with certain characters such as ":". It also no longer rejects correct URLs with "%xx" escape sequences.

  2828629 (1100520)

Micro Focus Communications Server

Back to the list

- An issue with leaked sessions for IMS Connect conversations has been corrected.

  2797552 (611154)
- Certain Enterprise Server administration actions such as notifying a running enterprise server of a security update could cause MFCS to hang.

  2784219 (1095045)

Micro Focus Directory Server

Back to the list

- The generated HTML fragment displayed for an individual resource entity element when using the Enterprise Server Administration HTML GUI to administer an external Security Manager was overflowing a fixed size buffer. This is now allocated based on the actual length required.

  2828732 (1100545)
- Corrected the resource entity that the Enterprise Server Administration GUI checks to determine whether the external Security Manager administration pages are accessible to a logged on user. The correct resource entity is "User Administration" under the "Enterprise Server Administration" resource class.

  2828553 (1100539)
- Require read permission before returning repository data for authenticated users if MFDS is started with the -b option.

  2828228 (1100364)
- Access to password data is prevented on the security manager edit page in the Enterprise Server Administration HTML GUI.

  2827942 (1100333)
- When MFDS is secured using an external Security Manager, it does not display internal security configuration pages which no longer have an effect.

  2827786 (1100314)
- Correct display of user session data in the Enterprise Server Administration HTML GUI.

  2826210 (1100161)
- An issue with the persistency of the audit output option in the MF Directory Server security configuration has been resolved.

  2824201 (1099902)
- Honor the trace flags values set in an Enterprise Server XML configuration file when importing it into MFDS via the -g command line option.

  2823855 (1099846)
- An issue with storing certificate passphrase in the Enterprise Server Administration HTML GUI form data has been resolved.

  2820846 (1099448)
- The resistance of the Enterprise Server Administration HTML GUI log-on page to cross-site scripting attacks has been increased.

  2819223 (1099212)
- Improve browser caching control to increase security of the Enterprise Server Administration HTML GUI.

  2819218 (1099209)
- An issue with storing certificate passphrase in the Enterprise Server Administration GUI has been resolved.

2819212 (1099207)

- The Enterprise Server Administration web page makes additional authorization checks before displaying screens.

2819069 (1099192)

- The Enterprise Server Administration web page no longer displays sensitive session data.

2818974 (1099178)

- Password length restriction has been fixed in the Enterprise Server Administration login page.

2818973 (1099179)

- Enterprise Server Historical Statistics Facility (HSF) configuration can now be exported and imported via the mfds -x and -g command-line options.

2815030 (1098695)

- Previously, the Enterprise Server Administration journal export to text truncated the exported file.

2802793 (1097108)

- It is now possible to expand and collapse items within the tree view of the external security manager security resources in Enterprise Server Administration.

2801421 (1096979)

- The MFDS GUI now correctly displays external Security Manager resource ACL strings that are greater than 3K byte length.

2800727 (1096978)

- The MFDS -x XML export option was not exporting Windows Monitoring and Management configuration values for enterprise server instances.

2794382 (1096428)

Micro Focus Server Administrator (GUI)

Back to the list

- If access to Enterprise Server Administration is restricted by use of an MLDAP ESM-based external Security Manager, you can now configure a user to have access to the "Security" menu item but not to the "Options" menu item.

2804728 (1097916)

- Previously, when expanding or collapsing items in the tree view for external Security Manager within Enterprise Server Administration, items associated with a user or a group no longer would always move to the top of the resource list.

2803399 (1097848)

- If MFDS is configured to use an external Security Manager with the Windows "user" class, it is not possible to edit the users from the MFDS GUI and you receive a warning.

MLDAP API Interface

Back to the list

- The MLDAP ESM module now recognizes a wider range of errors that indicate that the specified LDAP server is unavailable and, if configured, the server will retry to establish a connection.

2799921 (1098128)

- The MFDS GUI and the ESFADMIN utility now display the pages with LDAP query results.

2681539 (1092705)

Monitoring and Management

Back to the list

- The HSF records for JCL STEPs could contain incorrect values for IMS, SQL and API fields because they were not initialized for each STEP. This has been fixed.

  2830910 (1100672)

PL/I Support

Back to the list

- Specifying -optexec plitest for a program that uses more than one EXEC language (such as SQL, CICS and DLI) now works as expected and generates or activates only one instance of the CodeWatch debugger.

  2783575 (1094972)
- The CICSDEMO Open PL/I sample application has been updated to provide a demonstration of both 32-bit (X86) and 64-bit (X64) projects and execution environments.

  (609689)
- The ROUND built-in function now works with FIXED BINARY data.

  2830667 (1100641)
- A problem with initial repetition factors not working for the GRAPHIC and WIDECHAR data types has been fixed.

  2830665 (1100640)
- A problem with the RANDOM built-in function has been fixed.

  2830364 (1100611)
- A problem with ALLOCATE CTL EXTERNAL has been fixed.

  2828211 (1100361)
- A problem with the DECIMAL built-in function when the second and third arguments (precision and scale) are both omitted has been fixed.

  2827872 (1100326)
- A problem when the second and/or third arguments of the SUBSTR built-in are expressions of result type fixed bin (31) has been fixed.

  2825937 (1100124)
- A problem with automatic initializers containing function calls with star-extent parameters has been fixed.

  2825936 (1100123)
- Previously if linking a shared object on Linux utilizing the -dll, -so, -mvs, -ims or -cics flags you would not be notified if there were any unresolved external symbols (default behavior of the ld linker). You will now receive a warning from the linker for any missing unresolved external symbols.

  2822736 (1099722)
- A new compilation option, -rc, enables you to set the minimum error code level 0, 4, 8 which results in a zero return (successful compilation).

  2822734 (1099721)
- A problem with multiple allocate statements of a based variable with initializers resulting in the compiler warning MFPLI00121W ("fewer values than are required to initialize the variable") has been fixed.

  2821140 (1099524)
- A problem has been fixed with the ALLOCATE statement where CONTROLLED items with variable-sized extents are evaluated at the execution of the ALLOCATE statement.

  2818212 (1099406)
- Previously, if a user program was compiled with -range and using the VERIFY() builtin function on a zero length string with an omitted starting position argument, STRINGRANGE was incorrectly raised. This has now been fixed.

2815832 (1098780)

- A problem with the REPEAT and COPY built-in functions when the repeat string is of constant length > 1 has been fixed.

2813416 (1098487)

- A problem when appending diagnostic messages to listing file resulting in a compiler I/O abort has been corrected.

2806933 (1097641)

- The PL/I compiler no longer crashes for some cases where a function returning a CHAR VARYING value is used as an argument.

2802889 (1097127)

- The NONASSIGNABLE attribute is now diagnosed as not yet supported.

2800777 (1096900)

- String truncation is now diagnosed when the target string is shorter than the source string in an assignment statement or INITIAL clause.

2800745 (1096898)

- A function without a return statement is now diagnosed.

2799526 (1096718)

- DEFAULT RANGE storage and alignment attributes are no longer applied to named constants.

2795076 (1096300)

- A problem causing error 2000A when using the construct: TRIM(STRUCTURE), BY NAME ; has been fixed.

2788933 (1095606)

- A problem with ALLOCATE in an AREA variable based on a pointer returned by a function invocation has been fixed.

2787752 (1095450)

- The Open-PL/I compiler now supports the %INCLUDE statement syntax: %include LIBRARYNAME(FILENAME); If LIBRARYNAME is used, it is ignored. The above statement is equivalent to: %include FILENAME; and the rules used for the compiler options -ipath and -isuffix are applied.

2691090 (1093644)

- A problem causing Error MFPLI00109S when passing a controlled structure containing arrays as an argument has been fixed.

2680705 (1092894)

- The compiler option -zalign has been added for Z/OS structure mapping behavior. This feature is in Early Adopter Product (EAP) release status.

2675882 (1092102)

- Problems with the order of block prologue initialization of automatic variables have been fixed.

2675382 (1092043)

- -fdmaxp available in ED 2.2 U2 now provides the requested arithmetic precision functionality.

2614820 (1088014)

- The compiler now diagnoses BASED variable declarations which contain both REFER-extents and other extents with non-constant values.

(610382)

- The CONNECTED and NONCONNECTED attributes are now accepted on the DEFAULT statement.

(607463)

- If a hex literal was embedded in a non Macro IF/THEN, where the "THEN" invoked a macro procedure to generate its source, the "X" that terminated the hex literal was split across a %SDEBUG; which caused the source to no longer compile. This no longer happens.

  2802841 (1097112)
- Previously if utilizing a FIXED variable in a preprocessor macro in an expression without a comparison operator such as =, <, > in an IF statement with the bitwise OR ("|"), an incorrect result was returned. For example: %IF PLI_64BIT | SYSOS = "WIN" THEN The behavior was also exhibited if a similar expression was used as an assignment into a macro preprocessor variable. This has now been fixed.

  (610534)
- Previously, a warning message occurred about sprintf used in systemcics.o when linking a PL/I CICS application with the most strict unresolved external warnings enabled. This no longer occurs.

  2831590 (1100755)
- Previously, on Linux and UNIX, if two DD's were of type DUMMY and opened for output, a 9/065 error occurs and the job abends with a U4038 abend. This no longer happens.

  2829194 (1100515)
- Previously a SYSPRINT output via stream I/O in an EBCDIC ES Region with a program compiled with -EBCDIC resulted in an ASCII output to the EBCDIC file.

  2828418 (1100384)
- A fix for RPI 1092067 caused a regression in the processing of input datasets assigned to a DUMMY DD via JCL.

  2813471 (1098494)
- A previous enhancement made to provide support for DD DUMMY without any DCB specified in the user program or in the JCL broke the behavior when a fixed length file was created using JCL that contained no DCB information about the DD statement. This has now been fixed.

  2804948 (1097350)
- Previously, if you compiled your code with -range and used the INDEX built-in function without the optional third parameter and a string with zero length, it would incorrectly raise the STRINGRANGE condition. This no longer happens.

  2804815 (1097359)
- The user can use an environment variable of the form DCB_ddname, where ddname equates to the PL/I file variable name, to specify the record length and format of the file. See the PL/I User's guide for more information.

  2588122 (1085972)
- When using the DELAY() built-in function, and executing such that the output displayed via an XWindows Server, XWindows sometimes interrupted the process via a signal, preventing the delay period from fully elapsing.

  (611125)
- EXEC SQL (or EXEC DLI or EXEC CICS) statements may now span across multiple include members and may start anywhere (including primary source file) and end anywhere (including primary source file). Such statements can also be debugged using the debugger successfully and correctly.

  2824293 (1099907)
- GRAPHIC and WIDECHAR data types are now supported in PL/I SQL.

  2809520 (1097905)
- The DB2 pre-compiler no longer requires setting the DB2(UDB-VERSION) directive when compiling against DB2 z/OS server.

  2799215 (1096688)
- Previously, when two consecutive EXEC SQL INCLUDE statements were made with no intervening logic and when each one of these statements started and terminated with a larger comment, an error

occurred in the tokenizing phase. As a result, any EXEC SQL logic contained in the second INCLUDE was missed and not preprocessed.

2797042 (1096728)

- SQL embedded within PL/I macro code included via EXEC SQL INCLUDE is now supported.

  2605681 (1087117)

RM/COBOL

Back to the list

- The RM File Manager for Enterprise Developer now provides a mechanism for avoiding RM indexed file corruption while debugging in managed code.

  In Enterprise Developer for Eclipse, to avoid file corruption, you need to manually set the environment variable RMFM_PRETEND_FORCE_CLOSED to YES in the Debug Configuration.

  Enterprise Developer for Visual Studio is preconfigured to avoid file corruption. If necessary, you can also specify the RMFM_PRETEND_FORCE_CLOSED variable in a project's Application Configuration File (App.config).

  See your product help for more details.

  2796890 (1096699)

Run-Time System

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- The RM/COBOL version of the “SYSTEM” library routine nows supports the return of an exit-code, for native COBOL applications.

  2830238 (1100599)

- When using ADIS DISPLAY statements and the RELDECDELIM=0D0A file handler configuration option on UNIX, you could receive a Run-Time System error during process termination.

  2829860 (1100601)

- On UNIX platforms, if the Audit Manager process is recycled, dependent processes will continue to pass events to it after it's recycled; previously, these processes would hang.

  2810770 (1098085)

- On a 32-bit Enterprise Server running on Windows, tasks that are blocked in the operating system can now be canceled without terminating the SEP process.

  2807997 (1097918)

- An error in generated code when initializing comp-2 data items from fractional literal values has been fixed.

  2800938 (1096960)

- The tunables default_cancel_mode and subsystem_cancel_mode both have a new setting, which enables programs to remain in memory after they are canceled; this is opposed to the default behavior, which physically removes .dll files and shared objects from memory when they are canceled.

  2690881 (1096628)

Setup

Back to the list

- A problem with the product setup file handling install locations has been fixed.

  2802386 (1097065)

SQL: COBSQL

Back to the list

- The COBSQL preprocessor generated an error when it encountered a host variable declared as "01 HV PICTURE S9(9) VALUE ZERO COMP."

  2826093 (1100163)
- COBSQL now honors the position of the $SET statements in copybooks that are expanded inline in the editor by the CP preprocessor.

  2825364 (1100308)
- COBSQL examined hostvars in commented lines, causing compilation errors.

  2824211 (1099928)
- CCOBSQL now processes COPY... REPLACING COBOL data items' level correctly.

  2813839 (1098531)
- The COBSQL preprocessor inserted a NULL character in front of each non-printable character, causing errors when processing Pro*COBOL (i.e., when COBSQLTYPE=ORACLE8).

  2809551 (1097939)
- COBSQL did not always correctly handle COPY... REPLACING with text exceeding the 72 column.

  2809404 (1097890)
- COBSQL incorrectly handled COPY... REPLACING when the level numbers of data items in the copybook were being replaced.

  2807898 (1097765)
- COBSQL was not recognizing the DECLARATIVES statement in some scenarios.

  2804183 (1097346)
- COBSQL now processes COPY...REPLACING statements correctly.

  2779818 (1094538)

SQL: DB2 ECM

Back to the list

- The HCO DCLGEN tool sometimes generated inappropriate values for REAL and DOUBLE columns in PL/I copybooks.

  2831022 (1100684)
- The DB2 ECM incorrectly generated code to process SET CURRENT PACKAGE PATH, resulting in SQLCODE -4952 when executed.

  2817342 (1098963)
- HCO incorrectly handled .bnd files. The new DB2(BINDDIR) directive resolves this issue.

  2815734 (1098893)
- The DB2 ECM preprocessor incorrectly generated COBDB0103S errors when a fixed CHAR host variable was defined as greater than 254 characters.

  2803193 (1097169)
- When FILLER was used in group host variable structure, the DB2 ECM raised an SQL4914 error.

  2802547 (1097091)

SQL: HCO for SQL Server

Back to the list

- The OpenESQL pre-compiler no longer incorrectly swaps a colon and blank inside a literal if compiled with HCOSS directive SQL(DIALECT=MAINFRAME), which was resulting in a -305 SQL error when executed.

  2822809 (1099757)
- The OpenESQL preprocessor generated incorrect connection information when compiling with the SQL(INIT) AND CHARSET(EBCDIC) directives.

  2814325 (1098596)
- The OpenESQL preprocessor sometimes erroneously returned SQLCODE error code 1, NULL value returned but no indicator variable supplied, when it encountered a stored procedure call.
- DLL files for 64-bit aliases for DSNTEP2 and DSNUTILB were not available, and have been added in this release: 64-bit DSNTEP2 alias DLL: sqltp264.dll 64-bit DSNUTILB alias DLL: sqlutb64.dll. Use these in JES alias-program mappings.

SQL: OpenESQL

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- For managed-code projects, PF_RO_CURSOR and other BEHAVIOR primitive directives were not available from the User Interface.

  2833926 (1101049)
- Some problems related to using ASSOCIATE with the Host Compatibility Option for SQL Server where the stored procedure name was supplied in a host variable have been fixed.

  2831480 (1100747)
- HCO with SQL Server (HCOSS) using the ADO.NET run-time system exhibited a problem retrieving result set locators on the second call and subsequent calls to a stored procedure.

  2830688 (1100659)
- The SQL CLR wrapper program generated by the Generate SPD File tool caused errors during deployment when it contained one or more data types exceeding 8000 bytes in size. To eliminate these errors, the Generate SPD File tool now generates the SQL CLR wrapper program with MAX SIZE = -1.

  2830545 (1100650)
- PIC X host variables passed to the server as variable-length data with trailing blank suppression sometimes caused OpenESQL to return different query results than some earlier versions of this COBOL development product.

  2829810 (1100685)
- When generating a COBOL wrapper program, the Generate SPD File tool did not support the passing of all parameters for a SQL CLR Stored Procedure definition routine as fixed length. To resolve this, a new option, GENFIXEDLENGTH, has been added.

  2829499 (1100629)
- A number of issues with PostgreSQL record logic and error handling have been fixed in OpenESQL's run-time systems for ODBC and ADO.NET.

  2828058 (1100338)
- When the SQL(PROCOB) directive is set, OpenESQL for ADO.NET now supports anonymous PL/SQL blocks and the following host variable types: SQL-CURSOR SQL-ROWID SQL-BFILE SQL-BLOB SQL-CLOB SQL-NCLOB

  2825199 (1100003)
- When compiling with the SQL(PROCOB) directive, the OpenESQL preprocessor sometimes generated incorrect SQL code when a host variable reference in COBOL was split over multiple lines.

  2825194 (1099997)
- When using the SQL(CHECK) directives with SQL TYPE CLOB host variables, compilation sometimes failed.

2819480 (1099342)

- Windows GUI projects compiled with the SQL compiler directive might throw a MicroFocus.COBOL.Program.COBOLStopRunException on GOBACK.

2816463 (1098907)

- The insertion of more that 8000 characters into a SQL Server VARCHAR(MAX) column from a PIC X(n) host variable caused a data truncation error.

2814679 (1098675)

- When SQL(TARGETDB=ORACLE) was set and the FOR UPDATE clause was used to enable row locking, this combination could sometimes trigger a runtime failure. SQL(TARGETDB=ORACLE) is no longer required to enable row locking via FOR UPDATE clauses on queries.

2814613 (1098624)

- A 114 error on DISCONNECT sometimes occured due to a long-standing bug in Oracle ODBC drivers. This release provides a workaround. The ODBC specification states that the ODBC row status array is an array of 2-byte integers, but some Oracle ODBC drivers from Oracle 11 onwards have been observed to use either 4-byte or 8-byte integers. The OpenESQL runtime for ODBC now automatically detects the element size used by the driver when an Oracle connection is opened, and adapts its behavior accordingly.

2813428 (1098480)

- OpenESQL now supports OUTPUT clauses in SQL Server INSERT, UPDATE, and DELETE statements. HCO for SQL Server now supports the DATA-CHANGE-TABLE-REFERENCE clause.

2812940 (1098424)

- An SQLCA error message occurred when inserting a record into a table using a SQL CLR stored procedure with a VARCHAR (max) column where the host variable was more than 8000 bytes.

2812261 (1098390)

- The OpenESQL preprocessor incorrectly generated a COBES0100 error when compiling code that contained GEN-GV-FROM-GROUP and the same host variable used multiple times in same SQL statement.

2811682 (1098231)

- The OpenESQL preprocessor reported an error for LOCK TABLE statements encountered when using an Oracle database with the SQL(CHECK) compiler directive option.

2808579 (1097797)

- When using the SQL compiler directive option to compile a program that contained no SQL statements, a 153 trap occurred when the OpenESQL preprocessor encountered SQLCODE defined as COMP.

2808076 (1097758)

- The OpenESQL preprocessor sometimes generated a "COBCH0302 IF....ELSE or scope-delimiter mismatch" error if a program defined SQLCODE separately as COMP.

2807937 (1097702)

- The OpenESQL preprocessor sometimes generated a STOP RUN rather than a GOBACK at the program end, which sometime caused improper termination for subroutines not coded with one or more GOBACK statements.

2807272 (1097624)

- The OpenESQL preprocessor produced a COBES0125 or COBES0112 error message when it encountered indicator variable arrays used with non-host array variables.

2805207 (1097457)

- COBOL SQL CLR stored procedures can now open connections to other databases using EXEC SQL CONNECT statements. For type 6 CONNECT statements, this requires using a post-deployment script to alter the connection string for the OpenESQL runtime such that it runs with EXTERNAL_ACCESS privilege. For other CONNECT statement formats, INSAFE privilege is required. Use SQL Server authentication rather than Windows authentication for external connections.

2804010 (1097230)

- In some situations, the OpenESQL pre-compiler incorrectly generated a COBES0125 error, "<variable> should be defined with an OCCURS clause".

2802029 (1097036)

- The ODBC ECM incorrectly generated swap logic for COMP fields on singleton SELECTs in managed applications which could result in field corruption if the variable was used in a WHERE clause.

2801806 (1097049)

- The OpenESQL Assistant generated copybooks using the same size for DATETIME2 columns regardless of their definitions. The OpenESQL Assistant now generates PIC X(26) for DATETIME2(6), and PIC X(29) for all other DATETIME2 definitions.

2799778 (1096776)

- A problem that affected the use of 'select *' in OpenESQL subqueries has been fixed.

2799720 (1096751)

- A problem with array fetches into PIC N NATIONAL host variables has been fixed in the ODBC run-time system for OpenESQL.

2799002 (1096790)

- The OCI run-time now handles the NULL indicator correctly when running in 64-bit mode.

2792566 (1096149)

- OpenESQL for JDBC now supports positioned updates with PosgreSQL.
- The THREAD SQL compiler directive option mishandled threads in certain scenarios.
- In certain scenarios, OpenESQL incorrectly handled host variables defined as SQL TYPE DBCLOB when inserting or fetching DBCS data.
- OpenESQL for JVM now supports spaces between the start of an ODBC, JDBC, date, time or timestamp escape marker and its associated date, time or timestamp literal string when the SQL(DETECTDATE) directive is set.
- Use of the tinyint (pic s99 comp-5) host variable sometimes resulted in bad code generation for some OpenESQL runtime systems. Tinyint is now fully supported on all OpenESQL runtime systems.
- The OpenESQL run-time now truncates DBCS character strings cleanly at a whole character boundary.
- Using CHARSET(EBCDIC) in a DBCS locale caused problems with the OpenESQL runtime systems for ADO and JDBC. This has been corrected by changing the behavior to be consistent with the ODBC runtime. In particular, SO/SI characters are now correctly inserted and removed for EBCDIC and ASCII data respectively.
- The one-phase ODBC switch module now handles commit and rollback API calls from applications and uses DSNRLI correctly, together with handling of global temporary tables by HCOSS applications.

SQL Option for DB2

Back to the list

- The XDB ECM precompiler option GRANT-EXECUTE"NONE" will now be picked up so that the static bind utility skips performing a GRANT after a successful bind operation.

2816862 (1099030)

- Sometimes, the XDB pre-compiler incorrectly generated an COBCH0002S error message, "Undefined ECM error, error code 309". This has been fixed.

2827471 (1100376)

- The XDB Link no longer returns SQLCODE -501, "THE CURSOR IDENTIFIED IN A FETCH OR CLOSE STATEMENT IS NOT OPEN", when running against mainframe DB2V8 locations with SQLAM level 7.

2810688 (1098123)

- Support for code point CCSIDXML has been limited to SQLAM level 8 and above so that you no longer receive an error L30073 for the client.

2810166 (1098034)

- Dependence on outdated XDB Link configuration files has been removed.

2803118 (1097147)

- The XDB ODBC Driver has been modified to use the newer-format XDB error message files.
- A complex set of conditions caused UNION clauses to omit rows.

2829690 (1100541)

- You no longer receive an X352 access violation error during compound index optimization of complex queries.

2824820 (1100759)

- VARCHAR FOR BIT DATA items could cause data conversion errors. To resolve this, the JDBC driver now receives errors on SYSTEM location access.

2815915 (1098918)

- Previously, the XDB Optimizer marked a LIKE predicate as ALWAYS TRUE during a compound index search which resulted in too many rows appearing in the results.

2815394 (1098853)

- XDB Server no longer reports a message "Command not implemented" when creating an index using the reserved word DOCUMENT.

2807906 (1097716)

- UPDATE statements containing a SET clause with a scalar-subselect parameter caused an X352 server violation error.

2804775 (1097348)

- XDB used the incorrect UNION of data types integer and decimal, and incorrectly correlated table expressions for data retrieval.

2798097 (1096617)

- An ORDER BY clause using a name with name(field) inside of an expression in a projection list has been fixed.

2793635 (1096110)

- When executing a DELETE CURSOR with ROWSET and using a decimal host variable to indicate the rowset row number, the row was not deleted from the table.

2660884 (1090705)

- Unexpected behavior occurred when processing a query with a T.* expression in a projection list if its CHAR/VARCHAR elements were always described as FOR BIT DATA.
- Unexpected behavior occurred when processing a query with an ORDER BY clause with a T.* expression in the projection list.
- When using the MFDB2UNL utility, the SELECT statement had to start at column 1. This restriction has now been removed.

2695319 (1095955)

- Unexpected behavior sometimes occurred when working with host variables that were explicitly declared to be in a CCSID.

2452020 (1074507)

- During an install or uninstall, SQL Option for DB2 sometimes issued an X028 Cannot find table sysibm.syslocations message.

(612443)

- Queries on tables with NOT NULL columns were generated incorrectly.
- The SQL wizard no longer crashes when selecting a data type while creating or altering a table.

2816786 (1098964)

- It is now possible to copy data from cells of a read-only table using a context menu option.

  2597630 (1086397)

XML Extensions

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- The XML model file must be accessible to the XML extensions run-time environment. To make the file accessible, either add it to the system path, or move it to the directory from which the program is run.

  2822399 (1099702)

XML Support

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- XMLPARSE no longer reports an error if a prefix is not properly declared and no validation is specified.

  2823420 (1099786)
- The Compiler no longer errors preprocessed lines containing non-ASCII characters in the indicator area. Previously, this could cause user programs using the htmlpp preprocessor to fail to compile.

  2805067 (1097977)
- The XML I/O run-time used to read the whole document into memory which caused an out-of-memory error.

  2801337 (1096999)
- The namespace prefix in the namespace declaration is now handled correctly when the element itself does not contain a prefix.

  2799691 (1098150)

z/Server

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- Previously, if you installed IBM's PTF UA75804, it caused ISPF dialogs in a user server to stop working.

  2814867 (1098663)
- The ISPF option available on an Eclipse client z/Server connection now works correctly when used with z/OS 2.1.

  2796179 (1096478)
- z/Server now works on z/OS with JES3.

  2786009 (1095541)
- A new configuration option enables you to specify that a user server has the job character suffixed as well as prefixed to the userid.

  2692711 (1093705)
- Browsing the contents of an entire job no longer causes an exception in the AWM JES Explorer.
- You no longer need to specify DSP_SIZE and RESTAB_SIZE in the configuration file.
- When issuing a LOGOFF command against multiple user servers, now only one command is issued.
- FINDMEM commands will now produce the former output if the old member syntax is used.
- If Application Workflow Modeller sends an illegal DSN to z/Server, an error message is now returned and the server does not abend.

  2814864 (1098660)
- z/Server no longer allows edits when the RESTAB is full. This is to protect the data integrity.
- If a scheduler has the parameter LIMITED=1 specified in its start options, it can only be stopped from the holder task, and not with a STOP (P) command.

- Browsing jobs and data sets that contain XML CDATA markup no longer causes exceptions in Application Workflow Manager.
- ISPTABL is now allocated correctly in IVPINIT1.

Updates and SupportLine

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

Further Information and Product Support

Additional technical information or advice is available from several sources.

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

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

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

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.

Also, visit:

- The Micro Focus Community Web site, where you can browse the Knowledge Base, read articles and blogs, find demonstration programs and examples, and discuss this product with other users and Micro Focus specialists. See *http://community.microfocus.com*.
- The Micro Focus YouTube channel for videos related to your product - see *https://www.youtube.com/user/MicroFocusIntl*.

Information We Need

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

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

On Windows, if you are reporting a protection violation you might be asked to provide a dump (`.dmp`) file. To produce a dump file you use the **Unexpected Error** dialog box that is displayed when a protection violation occurs. Unless requested by Micro Focus SupportLine, leave the dump setting as `Normal` (recommended), click **Dump**, then specify a location and name for the dump file. Once the dump file has been written you can email it to Micro Focus SupportLine.

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

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

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

To run mfsupportinfoII:

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

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

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

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

      This creates a `.zip` archive, `MFSupportInfo_Log_`*`MachineName_YYYY-MM-DD_HH-MM-SS`*`.zip`, in the `%temp%` directory.
4. Send the diagnostic information to your Micro Focus SupportLine representative:

   The following requires an Internet connection and an Email client:

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

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

On UNIX, you can use the Micro Focus UNIX Support Scan Utility, `mfsupport`, to create a log file that contains the details about your environment, product, and settings. The `mfsupport` script is stored in `$COBDIR/bin`.

To run `mfsupport`:

1. Start a UNIX shell.
2. Set COBDIR to the product with issues.
3. Execute `mfsupport` from a directory where you have write permissions.

   This creates a log file, `mfpoll.txt`, in that directory.
4. When the script finishes, send the `mfpoll.txt` file to your Micro Focus SupportLine representative.

Note:

If COBDIR is set to a location that does not contain `etc/cobver`, the script outputs the contents of `/opt/microfocus/logs/MicroFocusProductRegistry.dat` which keeps a list of the installed Micro Focus products.

If COBDIR is set to a location that does not contain `etc/cobver` or COBDIR is not set, `mfsupport` gives you the option to search your machine for possible product locations. Note that the search can take some time if you have a large amount of disc storage and files.

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.

Disclaimer