VisualAge Generator EGL Plug-in for VSE

Reference Manual

Version 1.0

SC18-9531-00

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Note!
Before using this information and the product it supports, be sure to read the general information under “Notices” on page 31.

First Edition (June 2005)

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Chapter 1. Overview

The Rational® Development Products with the Enterprise Generation Language (EGL) component are the successor products for VisualAge® Generator. For the VSE platform, the VisualAge Generator EGL plug-in for VSE (which from now on will be called the "plug-in") is the successor product for VisualAge Generator.

The purpose of the plug-in is to generate COBOL applications that can be executed with VisualAge Generator Server for VSE (the "Server"). Currently the plug-in executes with Rational Application Developer (RAD) and Rational Web Developer (RWD). At a later stage, the plug-in may be shipped as a feature of other Rational or WebSphere® products.

Because the plug-in is based on the z/OS® EGL COBOL Generator, the two products share many similarities, and references to z/OS in EGL manuals will often apply for the VSE platform. This Reference Manual provides VSE-specific information to supplement or replace the information provided about z/OS in EGL manuals. More information is available from:

- The Rational Developer products online help system
- The *EGL Reference Guide* SC31-6837
- The *VisualAge Generator to EGL Migration Guide* SH23-0263
- The *VisualAge Generator Generation Guide* SH23-0263
- The *VisualAge Generator Server Guide for MVS, VSE and VM* SH23-0256
- The *TCPIP for VSE Installation Guide* from Connectivity Systems
- The web site and news group for VisualAge Generator. The web site is at `http://www.ibm.com/software/awdtools/visgen/`
- The web site for the VisualAge Generator Plug-in for VSE. The web site is at `http://www.ibm.com/software/awdtools/visgen/vse/`
- The web site and news group for the Rational Developer product that you are using.
- The web site and news group for Enterprise Generation Languages. The web site is at `http://www.ibm.com/developerworks/rational/products/egl/`

Supported and unsupported functions within EGL

EGL represents a major change and enhancement from the VisualAge Generator generation language. Due to restrictions on the VSE platform, or restrictions within the Server, not all of the functionality within EGL is currently supported by the plug-in.

The new EGL functions that are not supported by the plug-in are:

- Library functions
- Enhanced date and time functionality (VisualAge Generator date and time functions such as EZEDTE and EZETIM are still supported.)
- Formatting of numbers provided by the strLib.formatNumber EGL function
- Numeric items greater than 18 digits or numeric items with decimal places greater than 18 digits.

The new EGL functions that are supported by the plug-in are:

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- Dynamic arrays
- Comparisons using the EGL `like` and `matches` statements

Some VisualAge Generator functionality is not currently supported by EGL-generated COBOL, although there are plans to provide support in later versions of EGL:

- Web transactions
- DL/I support

For more information about supported and unsupported functions, refer to Chapter 4, "Enhancements to the VSE Server Runtime to support EGL," on page 11.

Chapter 2. Prerequisites and installation

Prerequisites

Plug-in prerequisites

Here are the minimum software requirements for the plug-in:
- RAD v 6.0.0.1 with iFix001, iFix002, and iFix003

or
- RWD v 6.0.0.1 with iFix001, iFix002, and iFix003

The following restrictions and recommendations apply:
- Both RAD and RWD have hardware and software prerequisites. Refer to the web sites for more information.
  - RAD: `http://www.ibm.com/software/awdtools/developer/application/index.html`
  - RWD: `http://www.ibm.com/software/awdtools/developer/web/index.html`
- The VSE plug-in replaces an existing EGL COBOL generator plug-in if one has been installed.
- The VSE plug-in is not supported when installed with any other EGL COBOL generator plug-in.
- If you need to run both the VSE plug-in and another EGL COBOL generator plug-in (such as the z/OS COBOL generator), then set up two separate development environments running on separate hardware, one for VSE the other for the other platform.

Server prerequisites

To execute programs generated from EGL, a version of the Server software must be installed on the VSE host platform. The following version of the Server software is supported:
- VisualAge Generator Server for VSE Version 1.2 (Program Number 5648-B02)

The Server software is dependent on other software products that are installed on the VSE host system. All of these products should be at a currently supported level.

The products that are mandatory are:

VSE System
A currently supported version of the VSE operating system up to and including z/VSE Version 3.1.

CICS A currently supported version of CICS® up to and including CICS Transaction Server 1.1.1 (Program Number 5648-054).

TCP/IP
A currently supported version of Connectivity Systems TCP/IP for VSE up to and including TCP/IP for VSE 1.5 (Program Number 5686-A04).

COBOL compiler
A currently supported version of COBOL for VSE/ESA™ up to and including COBOL for VSE/ESA Version 1.1 (Program Number 5686-068).

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LE A currently supported version of Language Environment® up to and including LE/VSE Version 144 (Program Number 5686-CF7-32). If LE/VSE version 144 is used, then apply PTF UK02403.

Optional products are:

MQSeries
A currently supported version of MQSeries® for VSE up to and including MQSeries for VSE Version 2.1.2 (Program Number 5686-A06).

DB2 A currently supported version of DB2® Server for VSE and VM up to and including DB2 Server for VSE and VM Version 7.4 (Program Number 5697-F42).

To find out if your version is currently supported, check the relevant web site, or contact IBM support.

Installation

Before you can generate and execute applications for VSE from EGL, there are two or three distinct installations:

- Installation of RAD or RWD and the plug-in on the developer platform.
- Installation of PTFs for the Server on the VSE host platform.
- Installation of the migration function for VisualAge Generator Developer (if you will be migrating VisualAge Generator applications to EGL).

Installation of RAD or RWD and the plug-in on the developer platform

For information about installing RAD or RWD please refer to the documentation for these products.

Before you install the VisualAge Generator EGL Plug-in for VSE, make sure that your machine has one of these products currently installed:

Either
IBM Rational Application Developer 6.0.0.1 with iFix001, iFix002, and iFix003
or
IBM Rational Web Developer 6.0.0.1 with iFix001, iFix002, and iFix003

The Enterprise Generation Language (EGL) feature should be installed on RAD or RWD. This feature is offered during the install of RAD or RWD under the **Additional Features** list. If you do not install the EGL feature, you will not be able to use the plug-in. If EGL is not installed, you should be able to execute the RAD/RWD installation procedure again to install it. Only select the installation of the EGL feature.

If RAD or RWD is installed at the v6.0 level, please use the Rational Product Updater to bring the product up to the 6.0.0.1 iFix003 level before you start to install VisualAge Generator EGL Plug-in for VSE. As iFixes are not necessarily cummulative, you should also install iFix001 and iFix002. See the appropriate RAD or RWD documentation for information on using the Rational Product Updater.

Once RAD or RWD is at the required level, here is the installation process:

- Ensure that RAD or RWD is closed down.

- Ensure there is enough disk space. For a successful installation, there must be at least 100 MB of disk space available on the installation disk drive.
- Review the `readme` file on the CD.
- Run the `setup.exe` file that is in the root directory of the CD that contains the VisualAge Generator EGL Plug-in for VSE. This initiates the installation of the plug-in.
- Follow the prompts to perform the install. No user input is required since the VisualAge Generator EGL Plug-in for VSE installs into the same location as either RAD or RWD. Note that the installation of the plug-in can take up to twenty minutes, depending on the workstation configuration.

To uninstall the plug-in, go to **Add/Remove Programs** in the Windows Control Panel. Select **IBM VisualAge Generator EGL Plug-in for VSE V1.0** and then click on the **Change/Remove** button. Follow the prompts in the Uninstaller to complete the removal of the plug-in from your system.

Installation of the Server and associated PTFs

To execute EGL-generated applications, you must install the Server on the VSE host platform, and then customize to site-specific requirements. In addition, there are updates to the Server product to support applications generated using the plug-in. These updates are delivered as PTFs. Install them using normal VSE maintenance procedures.

If you are performing a new installation of the Server, review the *Program Directory for VisualAge Generator Server for VSE* and the *VisualAge Generator Server Guide for MVS, VSE and VM* carefully before you install.

The following PTFs should be installed:

- UQ28232
- UQ36262
- UQ36930
- UQ37330
- UQ37988
- UQ40396
- UQ40851
- UQ40861
- UQ41992
- UQ52350
- UQ58427
- UQ61004
- UQ67369
- UQ76719
- UQ84692
- UQ85016
- UQ85060

The plug-in website (`http://www.ibm.com/software/awdtools/visgen/`) contains information about the latest PTFs that are available for VisualAge Generator Server for VSE. Check the web site regularly to ensure that you are aware of recent changes or new information about the product.

If your site has already installed the latest version of the Server, it should be sufficient to install all PTFs required by Server.

Installation of the migration function for VisualAge Generator Developer

If your site is migrating from VisualAge Generator Developer, refer to the *VisualAge Generator to EGL Migration Guide* to determine what additional software you need for migration purposes. The *VisualAge Generator to EGL Migration Guide* contains instructions about the installation of the Stage 1 tool that runs on VisualAge Generator Developer.

Chapter 3. Migration to EGL

Migration from VisualAge Generator Developer to EGL is described fully in the *VisualAge Generator to EGL Migration Guide*. It is beyond the scope of this Reference Manual to deal with all issues concerning migration.

The information in this chapter highlights VSE-specific migration issues.

In general, migration for VSE is the same as that for z/OS migration. The main points of departure exist where there are VSE-specific functions that have no equivalent function or requirement in z/OS.

Generation options and symbolic parameters

Table 1 contains a list of VisualAge Generator parameters that are specific to VSE, and the equivalent parameter in EGL. The VisualAge Generator parameter is migrated to the EGL parameter during the migration process and stored in a build descriptor. For a description of the parameters and how they are used, refer to the *VisualAge Generator Generation Guide*.

Table 1. Parameter migration to EGL

VisualAge Generator generation option or symbolic parameter	**Usage in VisualAge Generator**	**Migrated to EGL As**	**Usage in EGL**
/BLKSIZE	Defined in the Resource Association File	blockSize	Defined in the Resource Association File
/LABEL /NOLABEL	Defined in the Resource Association file	standardLabel	Defined in the Resource Association file
/SYSNUM	Defined in the Resource Association File	systemNumber	Defined in the Resource Association File
/JOBCARD	Defined in the Generation Options	JOBCARD	Defined as a symbolic parameter in the generation option file
/JOBNAME	Defined in the Generation Options	JOBNAME	Defined as a symbolic parameter in the generation option file
/VSELIB	Defined in the Generation Options	vseLibrary	Defined in the build descriptor options file
PROCLIB	Defined as a symbolic parameter	PROCLIB	Defined as a symbolic parameter in the symbolic parameter file
PWRCLASS	Defined as a symbolic parameter	PWRCLASS	Defined as a symbolic parameter in the symbolic parameter file
SQLDBNAM	Defined as a symbolic parameter	SQLDBNAM	Defined as a symbolic parameter in the symbolic parameter file

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Table 1. Parameter migration to EGL (continued)

VisualAge Generator generation option or symbolic parameter	Usage in VisualAge Generator	Migrated to EGL As	Usage in EGL
SQLPKGNM	Defined as a symbolic parameter	SQLPKGNM	Defined as a symbolic parameter in the symbolic parameter file
SQLPROPT	Defined as a symbolic parameter	SQLPROPT	Defined as a symbolic parameter in the symbolic parameter file
SQLSTMDE	Defined as a symbolic parameter	SQLSTMDE	Defined as a symbolic parameter in the symbolic parameter file
SQLSTOPT	Defined as a symbolic parameter	SQLSTOPT	Defined as a symbolic parameter in the symbolic parameter file
SQLUSRPW	Defined as a symbolic parameter	SQLUSRPW	Defined as a symbolic parameter in the symbolic parameter file
VUSERLIB	Defined as a symbolic parameter	VUSERLIB	Defined as a symbolic parameter in the symbolic parameter file

Note that the /JOBCARD and /JOBNAME generation options have been converted to symbolic parameters in EGL. The JOBCARD and JOBNAME symbolic parameters are used as follows:

JOBNAME
Specifies the value used for the job name in the job statement built for the runtime JCL. This name must be a valid VSE job name. This job name is used to replace the EZEJOB parameter in the job template.

JOBCARD
Specifies the name of the file containing the job statement you want to use for generated preparation or runtime JCL. The value for the JOBCARD symbolic parameter should be the name of a file located in the directory specified by the `templateDir` build descriptor option, or in the default VSE Templates directory. The default filename is `fda2vjob.tpl`.

Templates for preparation and execution of generated applications

Templates are used in the generation process as skeletons for JCL generation. The generated JCL is transferred to the host VSE system where it is used to prepare parts for run time, and to run the prepared parts.

The templates for EGL have been copied from the VisualAge Generator templates, and updates have been made. The updates keep the JCL in line with newer versions of the VSE operating system and COBOL compiler. Refer to Chapter 6, “Preparation of generated parts,” on page 17 for details about these changes.

The templates are provided with the plug-in at installation. They are stored within the plug-in directory structure in a default directory called `VSETemplates`. It is

possible to customize the templates in this default directory, however, our recommendation is to copy them to another directory structure and then customize them. Set the `templateDir` build descriptor option to point the generation process at the customized templates in the new directory. By customizing the templates in a new directory, any maintenance that is shipped will not overwrite your customized templates.

Table 2 lists the VisualAge Generator template and the EGL equivalent.

Table 2. VisualAge Generator template and EGL equivalent

VisualAge Generator Template	**EGL Template**	**Template Description and Use**
efk2vcal.tpl	fda2vcal.tpl	Comment generation in the runtime JCL
efk2veba.tpl	fda2veba.tpl	Generation of DLBL statements in runtime JCL
efk2vebd.tpl	fda2vebd.tpl	Generation of runtime JCL with DB2 access
efk2vebe.tpl	fda2vebe.tpl	Generation of runtime JCL
efk2veza.tpl	fda2veza.tpl	Comment generation in the runtime JCL
efk2vezd.tpl	fda2vezd.tpl	Comment and DLBL generation
efk2vjob.tpl	fda2vjob.tpl	Generation of the job statement for the preparation JCL
efk2vlba.tpl	fda2vlba.tpl	Batch DB2 link edit template used for preparation
efk2vlbc.tpl	fda2vlbc.tpl	Batch link edit template used for preparation
efk2vlca.tpl	fda2vlca.tpl	CICS link edit template used for preparation
efk2vlcc.tpl	fda2vlcc.tpl	CICS and DB2 link edit template used for preparation
efk2vmfm.tpl	fda2vmfm.tpl	Mapgroup link edit template used for preparation
efk2vpba.tpl	fda2vpba.tpl	Batch preparation template
efk2vpbd.tpl	fda2vpbd.tpl	Batch preparation template including DB2 access
efk2vpca.tpl	fda2vpca.tpl	CICS preparation template
efk2vpcb.tpl	fda2vpcb.tpl	CICS preparation template including DB2 access
efk2vpej.tpl	fda2vpej.tpl	End of job template
efk2vsei.tpl	fda2vsei.tpl	Runtime sequential input file allocation template
efk2vseo.tpl	fda2vseo.tpl	Runtime sequential output file allocation template
efk2vtcl.tpl	fda2vtcl.tpl	Preparation template for print services programs
efk2vvsi.tpl	fda2vvsi.tpl	Runtime VSAM input file allocation template
efk2vvso.tpl	fda2vvso.tpl	Runtime VSAM output file allocation template

There is more information about templates and how they are used at generation time in Chapter 11 of the *VisualAge Generator Generation Guide*.

Chapter 4. Enhancements to the VSE Server Runtime to support EGL

The *VisualAge Generator to EGL Migration Guide* has a detailed description of the language functionality that has been migrated from VisualAge Generator to EGL. This functionality continues to be supported by the Server runtime. In addition, the Server runtime has been enhanced to support dynamic arrays, the `like` operator, and the `matches` operator which are new functions available with EGL. Any enhancements to the Server are delivered as PTFs, which you should install according to the standard installation procedures. Refer to Chapter 2, "Prerequisites and installation," on page 3 for more details about installation of PTFs.

EGL features supported by the server

Dynamic arrays

With EGL, an array of records or data items can be declared without specifying the number of elements. The number of elements in the array varies at runtime as elements are inserted or deleted from the array. This ability to use dynamic arrays is supported by the Server runtime code if the relevant PTFs are installed.

For more information on the use of dynamic arrays, refer to the *EGL Reference Guide* and the EGL on-line help.

`like` and `matches` operators

With EGL, the `like` and `matches` operators can be used in logical expressions for comparison of strings. These operators are supported by the Server runtime code, providing that the relevant PTFs are installed.

For more information on the use of the `like` and `matches` operators, refer to the *EGL Reference Guide* and the EGL online help.

EGL features that are not supported by the Server or Plug-in

Not all features that are available in EGL are supported by COBOL generation; for more information about these unsupported features, refer to the *EGL Reference Guide*. In addition to these unsupported features, the features described below are not supported by the Server or Plug-in. At some stage in the future, support for these features may be included.

Date and time support

Enhanced date and time features that are available in EGL are not supported by the Server runtime. Date and time functions that have been migrated from VisualAge Generator to EGL will continue to be supported.

Table 3 shows the EZE words and the equivalent EGL statement that are supported by VisualAge Generator, and are supported in the new EGL form.

Table 3. EZE words and equivalent EGL statements

EZE word in VisualAge Generator 4.5	EGL definition
EZEDAY	VGVar.currentShortJulianDate

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Table 3. EZE words and equivalent EGL statements (continued)

EZE word in VisualAge Generator 4.5	EGL definition
EZEDAYL	VGVar.currentJulianDate
EZEDAYLC	VGVar.currentFormattedJulianDate
EZEDTE	VGVar.currentShortGregorianDate
EZEDTEL	VGVar.currentGregorianDate
EZEDTELC	VGVar.currentFormattedGregorianDate
EZETIM	VGVar.currentFormattedTime

Library functions

A library part contains a set of functions, variables and constants that can be used by programs or other libraries. Library functions are not supported by the Server runtime.

Formatting of numbers

The strLib.formatNumber EGL statement is not supported by the Server runtime.

Numeric items and numeric items with decimal places

EGL allows the definition of numeric items with more than 18 digits, or numeric items with decimal places of more than 18 digits. The COBOL compiler on VSE does not support this, therefore the 18-digit limit set by VisualAge Generator Developer applies to the plug-in.

VisualAge Generator features that are not supported by EGL

The following features of VisualAge Generator are not yet supported by EGL:

- Web transactions
- DL/I data access

They may be supported at some stage in the future.

Chapter 5. Generation of applications

Various parameters and options govern the generation of COBOL applications and the generation of JCL for preparation and execution. These parameters are described in the *EGL Reference Guide* and the on-line help.

This chapter describes VSE-specific options as a supplement to other documentation.

The build descriptor options, symbolic parameters and other parameters are entered in a "dialog based" editor. The editor may retain white space characters such as spaces. At generation time, white space may be removed for certain parameters. It is recommended that white space characters be used only where they are appropriate.

Build descriptor options

The **build descriptor options** that are VSE specific, or have special meaning for VSE are listed below. Refer to the *VisualAge Generator Generation Guide* for full descriptions of these parameters.

system
The two valid values for VSE generation are `VSEBATCH` and `VSECICS`.

vseLibrary
This is equivalent to the /VSELIB generation option in VisualAge Generator and is used to specify the library where objects are created during generation.

VSE-specific **symbolic parameters** that can be defined as part of the build descriptor are:

JOBCARD
The file that is to be used as a jobcard template. This file should exist in the template directory specified by the templateDir build parameter, or in the default VSETemplates directory

JOBNAME
The job name used for compiles and linkedits. The first seven characters of this symbolic parameter are used to generate the jobname of the preparation JCL.

PROCLIB
Used to change the VSE PROCLIB (16 bytes)

PWRCLASS
User-defined POWER class

SQLDBNAM
Used to change the default database name

SQLPKGNM
Used to change the default package name

SQLPROPT
Precompiler options part name

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SQLSTMDE
DB2 startup mode

SQLSTOPT
Startup options file

SQLUSRPW
Userid and password for database connection

TRANSLATETABLE
Used to change the FTP Translate Table on the VSE host system. Refer to Chapter 6, "Preparation of generated parts," on page 17 for a detailed description.

VUSERLIB
Additional library used for link-editing

The JOBCARD and JOBNAME symbolic parameters were part of the generation options parameters in VisualAge Generator, and have been migrated to symbolic parameters in EGL. The other symbolic parameters, with the exception of TRANSLATETABLE, are available in both VisualAge Generator and EGL, and their usage is the same across both products. Refer to the *VisualAge Generator Generation Guide* for a full description of these symbolic parameters.

In the chapters that follow, the use of these symbolic parameters is described in more detail. Sample build descriptors are provided in "Samples," on page 25.

There are other build descriptor options that are common to z/OS and VSE. In particular, we recommend that you read about the CICS-related options in the *VisualAge Generator Generation Guide*.

Resource Association options

These parameters in the Resource Association Editor should be used for VSE generation:

system
The two valid values for VSE generation are `VSEBATCH` and `VSECICS`.

For VSE generation, three properties have been added to the Resource Association Editor:

blockSize
Equivalent to the /BLKSIZE property in VisualAge Generator.

standardLabel
Equivalent to the /LABEL property in VisualAge Generator; this only applies to VSEBATCH. If `standardLabel=YES` is set, then for `PRINTER` files, the generator generates a `LABEL RECORDS ARE STANDARD` clause. For serial files, a `LABEL RECORDS` statement is not generated. The default is `standardLabel=Yes`.

If `standardLabel=NO` is set, for `PRINTER` files, the generator will generate a `LABEL RECORDS ARE OMITTED` clause. For SERIAL files, `LABEL RECORDS ARE OMITTED` will also be generated.

Printer data is written to a logical file called `PRINTER`. The `PRINTER` file in EGL-generated programs is equivalent to the `EZEPRINT` file generated with the VisualAge Generator Developer. Refer to "Allocating Printer Files" on page 23 for further information.

systemNumber
Equivalent to the /SYSNUM property in VisualAge Generator.

Refer to the *VisualAge Generator Generation Guide* and APAR PQ25672 for more information about the use of these properties.

Outputs from generation

For VSEBATCH, depending on the build descriptor options set, a successful generation may produce the following generated parts:

- COBOL programs with a suffix of .cbl
- Preparation JCL with a suffix of .jcp
- Execution JCL with a suffix of .jcx

For VSECICS, depending on the build descriptor options and the application, a successful generation may produce the following generated parts:

- COBOL programs with a suffix of .cbl
- Map format modules with a suffix of .fmt
- Preparation JCL with a suffix of .jcp
- Execution JCL with a suffix of .jcx
- CICS PCT entries with a suffix of .pct
- CICS PPT entries with a suffix of .ppt

These generated parts are placed in the directory specified by the `genDirectory` build descriptor option.

Chapter 6. Preparation of generated parts

The preparation process has two steps:

1. Transferring parts to the VSE host, including code conversion if needed.
2. Running precompilers, compilers, and linkers.

Transferring parts to the VSE host system

If the `prep` option is not set, then no file transfer occurs.

If the `prep` option is set in the build descriptor file, the plug-in will transfer the generated files to a VSE host using the file transfer protocol (FTP). A prerequisite product, therefore, is TCPIP for VSE from Connectivity Systems. The FTP server available with this product should be configured and active on the host VSE system. The FTP server should be configured to allow:

- Submission of jobs to the internal reader.
- Write access to all libraries that are used for generation output.

Note that SNA file transfer that is supported in VisualAge Generator is not supported by the plug-in.

File transfer options

These build descriptor options control the file transfer:

debugTrace
Controls the amount of tracing produced by the FTP process. For each element transferred to the host, a file is created with trace information, and placed in the directory specified by the `genDirectory` build descriptor option. The filename for the trace has this format:

```
element.suffix.FTPresults
```

For example, if a program is called `PROG1`, then the trace information is written to a file named `PROG1.cbl.FTPResults`.

If you experience problems with FTP during the preparation phase, then IBM Support may ask you to set the `debugTrace` option and provide a copy of the resultant trace file.

destHost
The TCP/IP host address or hostname of the VSE host server.

destPort
The port on which the FTP server is listening for FTP requests. The default is 21.

destPassword
The password associated with the destUserID used to connect to the FTP server.

destUserId
The userid that is used to connect to the FTP server.

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serverCodeSet
Character code conversion control for maps. For more information, see "Character code conversion."

vseLibrary
The VSE library and sublibrary on the host server that is used to store the output of the FTP process and the preparation process.

In addition, the following symbolic parameter is used for character code conversion:

TRANSLATETABLE
Changes the FTP Translation Table on the VSE host system.

Outputs of the file transfer

For VSEBATCH, a successful FTP process transfers parts to the library and sublibrary specified in the vseLibrary option. These parts have a VSE "type" as listed:

- COBOL programs: type of "C"
- Preparation JCL: type of "Z"
- Execution JCL: type of "X"

For VSECICS, a successful FTP process transfers the following parts to the library and sublibrary specified in the vseLibrary option:

- COBOL programs: type of "C"
- Map format modules: type of "OBJ"
- Preparation JCL: type of "Z"
- Execution JCL: type of "X"
- CICS PCT entries: type of "PCT"
- CICS PPT entries: type of "PPT"

The preparation JCL is also FTPed to the VSE/POWER™ reader queue on the host system.

A log of the FTP process is created in the `genDirectory`. For details about the control of the log, refer to the `debugTrace` build descriptor option described above. Three types of FTP log message are produced:

- Information messages with a suffix of "i".
- Error messages with a suffix of "e".
- Trace messages with a suffix of "t".

Character code conversion

Character code conversion is performed at two different times:

1. At generation time, for text fields defined in a form group part.
2. At preparation time, for text fields in generated COBOL source.

Character code conversion at generation

The `serverCodeSet` build descriptor option is used for converting the text in maps from the code page on the development platform, to a code page on the host VSE system. The value specified by the `serverCodeSet` build descriptor option should be the name of a valid code page translation table as defined on the workstation. Once the map format module is generated, it is transferred to the VSE host using a binary FTP transfer.

Character code conversion at preparation

The TRANSLATETABLE symbolic parameter is used for converting characters in generated parts such as COBOL programs, tables and JCL, from the code page on the development platform to a code page on the host VSE system.

The value specified by the TRANSLATETABLE symbolic parameter should be the name of a valid code page translation table as defined to the FTP server on the host.

If no value is entered for the TRANSLATETABLE symbolic parameter, then the default code page translation table as defined to the FTP server is used.

If a value is entered for the TRANSLATETABLE build descriptor option, then for text parts, this value is sent to the FTP server as part of a SITE TRANSLATE command.

For information on code page translation, and the FTP server, refer to Chapter 11, "ASCII to EBCDIC translation" in the *TCPIP for VSE Installation Guide*.

FTP commands issued during preparation

These FTP commands are issued during the preparation process, and should be enabled on the FTP server:

```
CWD
PASV
PORT
PWD
QUIT
SITE clrf off/on
SITE crlf on
SITE lrecl 80
SITE reclf on
SITE TRANSLATE
STOR
TYPE I
USER
```

In addition, JCL is transferred to the VSE/POWER reader queue using FTP. Transfer to the VSE/POWER reader queue should also be enabled on the FTP server.

Running precompilers, compilers and linkers

The templates used by VisualAge Generator for JCL generation have been used as a basis for the plug-in. For EGL, the templates have been renamed and placed in the VSETemplates directory. Minor changes to the templates bring the JCL up to date with new versions of the compiler and operating system.

Chapter 2, "Prerequisites and installation," on page 3 contains a table with the name of the VisualAge Generator template and the name of the equivalent template in the plug-in.

Changes to the templates

For the plug-in, the following changes have been made to the templates:

- In template fda2vjob, a "J" has been added to the jobname to differentiate it from other jobs that are part of the preparation stream.
- Construction of the jobname for all jobs has been changed. To create the jobname, up to seven characters of the JOBNAME symbolic parameter are used

with a character appended according to the stage of preparation. If no JOBNAME symbolic parameter is specified, then the first seven characters of the program name are used.

- EZETPROC is set to eight characters in length where:

  position 1-4
  First four characters of the `destUserID` build descriptor option

  If destUserID is not set, then the first four characters of the program name are used.

  If less than four characters are available, then "Z" is used as the padding character

  position 5-8
  MMSS (min,min,sec,sec) obtained from the system-generated time.

  For example, if `destUserID` is set to `USERID` and the program is generated at `8:45:29`, `SYMPARM EZETPROC` is set to `USER4529`.

- The `RES` COBOL compiler option has been removed from these templates:

  ```
  fda2vpba.tpl
  fda2vpbd.tpl
  fda2vpca.tpl
  fda2vpcb.tpl
  fda2vtcl.tpl
  ```

- In fda2vpca.tpl and fda2vpcb.tpl, for the CICS translator step, the `SP` parameter has been added as an option to XOPTs.

Outputs from the execution of the preparation JCL

As there has been no significant change to the preparation JCL, the outputs from the execution of the preparation JCL are similar to that of VisualAge Generator. Refer to the *VisualAge Generator Server Guide for MVS, VSE and VM* for more information.

Chapter 7. Execution of generated applications

As there has been no significant change to the generation of the execution JCL, or COBOL programs, the process for running generated applications has not changed. Refer to the *VisualAge Generator Server Guide for MVS, VSE and VM* for more information.

Additional runtime messages

New runtime messages have been added for the support of dynamic arrays. An explanation of the new messages follows:

ELA00269E Array index value $01D07 out of range for Array $02C18 with size of $03D07

Explanation: An attempt has been made to access an element in an array, at a position in the array which is outside the array's range.

The run unit ends.

User Response: Change the program to only use indexes within the size of the array.

ELA00270E An attempt was made to exceed the maximum size of array $01C18

Explanation: An attempt has been made to add an element to an array, but the array is too small to hold the additional element.

The run unit ends.

User Response: Increase the size of the array.

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Execution of generated applications

Chapter 8. Recommendations

Connections to DB2 on VSE

With EGL, it is possible to connect to DB2 to debug programs and to retrieve SQL record definitions. To connect to a DB2 system running on a VSE host, a type 2 JDBC connection should be used.

It is beyond the scope of this document to provide detailed descriptions of the configuration required to support JDBC calls to DB2 VSE. However, in broad terms, the following software will need to be configured:

- **DB2 Connect™** should be installed on the developer platform. We recommend use of the JDBC driver available with DB2 Connect. Within DB2 Connect a database definition should be made for the databases that reside on the VSE host.
- In **RAD/RWD** the *Preferences > EGL > SQL Database Connections* should be configured to use a type 2 JDBC driver. See "Sample 5: SQL database connections" on page 29 for an example configuration.
- **DB2 VSE Server** should be configured to allow TCP/IP and JDBC communication. Refer to the DB2 manuals for further information.

Allocating Printer Files

For printer files, the plug-in generates a default filename of `PRINTER`. This is in contrast to VisualAge Generator Developer which generates a filename of `EZEPRINT`. To control the characteristics of the printer file, we recommend that a resource association element be created for filename `PRINTER`.

For CICS applications, you can associate the `PRINTER` file with either a transient data queue (type TRANSIENT) or a VSE/POWER file (type SPOOL) using a `PRINTER` resource association. We recommend that:

- Either a default transient data queue named `PRIN` be defined to the CICS system, or
- A resource association entry for `PRINTER` be defined with a systemname of `EZEP` (as a transient data queue called `EZEP` is defined when the Server is installed)

Resource Association files migrated from VisualAge Generator Developer to EGL should have any `EZEPRINT` resource association definitions migrated to `PRINTER` resource association definitions.

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Appendix. Samples

These samples are provided as a reference only, and should be customized according to site requirements.

Sample 1: Basic build descriptor options

Figure 1 shows the basic build descriptor options.

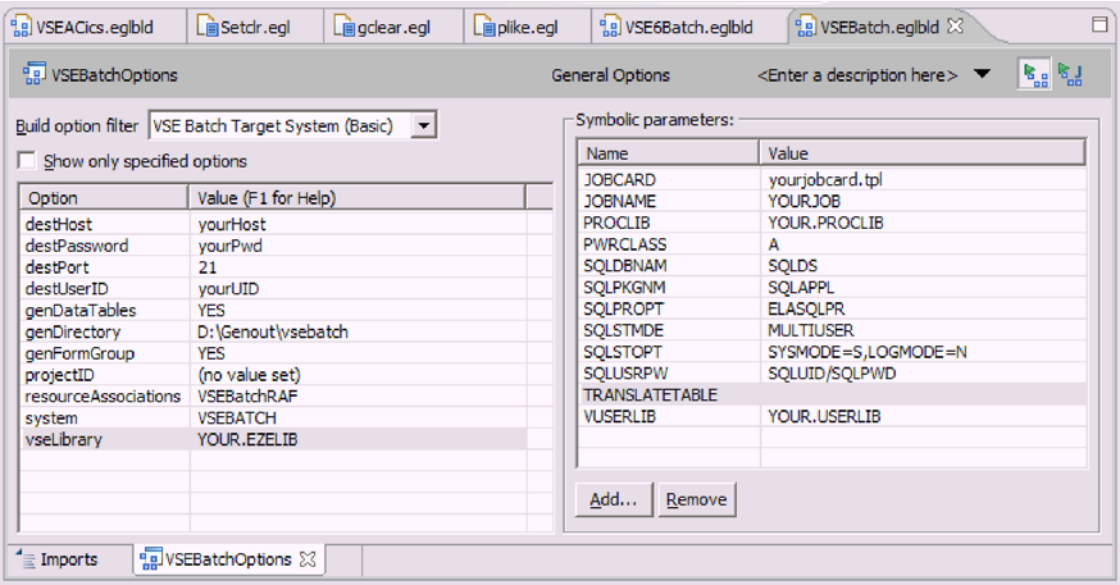

Figure 1. The basic build descriptor options

Sample 2: The associated Resource Association File

Figure 2 on page 26 shows the Resource Association File associated with the build descriptor options in Sample 1.

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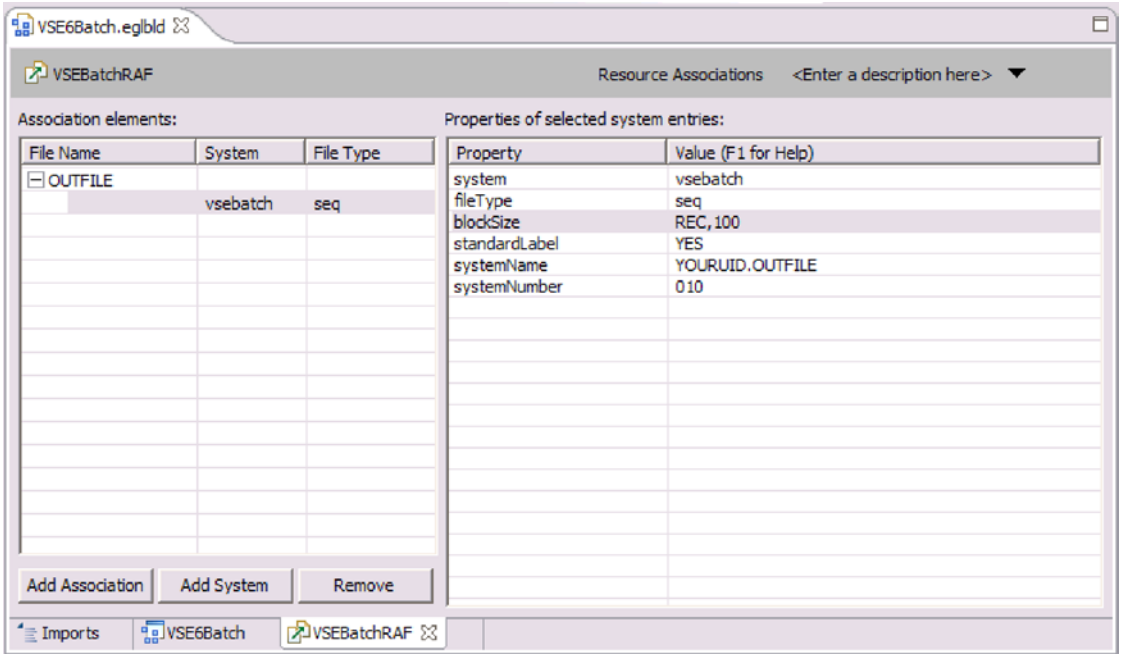

Figure 2. The Resource Association File

Sample 3: The resultant XML file

Figure 3 on page 27 shows the XML file that holds the build descriptor options of Sample 1 and resource association file of Sample 2.

```
<?xml version="1.0" encoding="UTF-8"?>

<!DOCTYPE EGL PUBLIC "-//IBM Corporation, Inc.//DTD EGL Build Parts 6.0//EN" "">

<EGL>
  <BuildDescriptor name="VSEBatchOptions" destHost="yourHost" destPassword="yourPwd" destPort="21"
destUserID="yourUID" genDataTables="YES" genDirectory="D:\Genout\vsebatch" genFormGroup="YES"
system="VSEBATCH" vseLibrary="YOUR.EZELIB" resourceAssociations="VSEBatchRAF">
    <symbolicParameter name="JOBCARD">
      <symbolicValue><![CDATA[yourjobcard.tpl]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="JOBNAME">
      <symbolicValue><![CDATA[YOURJOB]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="PROCLIB">
      <symbolicValue><![CDATA[YOUR.PROCLIB]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="PWRCLASS">
      <symbolicValue><![CDATA[A]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLDBNAM">
      <symbolicValue><![CDATA[SQLDS]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLPKGNM">
      <symbolicValue><![CDATA[SQLAPPL]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLPROPT">
      <symbolicValue><![CDATA[ELASQLPR]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLSTMDE">
      <symbolicValue><![CDATA[MULTIUSER]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLSTOPT">
      <symbolicValue><![CDATA[SYSMODE=S,LOGMODE=N]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="SQLUSRPW">
      <symbolicValue><![CDATA[SQLUID/SQLPWD]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="TRANSLATETABLE">
      <symbolicValue><![CDATA[]]></symbolicValue></symbolicParameter>
    <symbolicParameter name="VUSERLIB">
      <symbolicValue><![CDATA[YOUR.USERLIB]]></symbolicValue></symbolicParameter>
  </BuildDescriptor>
  <ResourceAssociations name="VSEBatchRAF">
    <association fileName="OUTFILE">
      <vsebatch>
        <seq systemNumber="010" systemName="YOURUID.OUTFILE" standardLabel="YES" blockSize="REC,100"/>
      </vsebatch>
    </association>
  </ResourceAssociations>
</EGL>
```

Figure 3. Sample XML file

Sample 4: An FTP trace

Figure 4 on page 28 shows an FTP trace produced when the `debugTrace` build descriptor option (see page 17) is specified.

Sample 4: An FTP trace

```
20050322 05:04:10  ELA.FTP.0000.i  (c) Copyright, IBM Corp. 2005
20050322 05:04:10  ELA.FTP.2001.t  Attempt connection to yourHost on port 21
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 220-TCP/IP for VSE FTP Daemon Version 01.05 C 10/12/03 22.50

20050322 05:04:10  ELA.FTP.2010.t  FTP server response:     Copyright (c) 1995,2003 Connectivity Systems Incorporated

20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 220 FTPD ready for new user.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 220 .
20050322 05:04:10  ELA.FTP.0001.i  Connection to yourHost opened on port 21
20050322 05:04:10  ELA.FTP.2003.t  Attempt login with userid youruid .
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'USER youruid' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 331 User name okay, need password.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 331 .
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'PASS ********' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 230 User logged in, proceed.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 230 .
20050322 05:04:10  ELA.FTP.0003.i  Login to Host for user youruid successful.
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'SITE lrecl 80' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 200 Command okay.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 200 .
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'SITE crlf on' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 200 Command okay.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 200 .
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'SITE reclf on' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 200 Command okay.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 200 .
20050322 05:04:10  ELA.FTP.2004.t  Attempt 'cd' to YOUR.EZELIB
20050322 05:04:10  ELA.FTP.0004.i  Change Directory command to library YOUR.EZELIB successful.
20050322 05:04:10  ELA.FTP.2005.t  Attempt 'put' command for file TESTDLBL.cbl
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'PORT nnn,nnn,nnn,nnn,n,nn' .
20050322 05:04:10  ELA.FTP.2010.t  FTP server response: 200 Command okay.

20050322 05:04:10  ELA.FTP.2007.t  FTP Reply code of 200 .
20050322 05:04:10  ELA.FTP.2006.t  Issue FTP command 'STOR TESTDLBL.c' .
20050322 05:04:11  ELA.FTP.2010.t  FTP server response: 150-About to open data connection

20050322 05:04:11  ELA.FTP.2010.t  FTP server response:     File: YOUR.EZELIB.TESTDLBL.C

20050322 05:04:11  ELA.FTP.2010.t  FTP server response:     Type: ASCII  Recfm: FB Lrecl:    80 Blksize:      80

20050322 05:04:11  ELA.FTP.2010.t  FTP server response:     CC=ON  UNIX=OFF RECLF=ON  TRCC=OFF CRLF=ON

20050322 05:04:11  ELA.FTP.2010.t  FTP server response:     Translate with US_ENG_03

20050322 05:04:11  ELA.FTP.2010.t  FTP server response:     MODE=Stream      STRU=File

20050322 05:04:12  ELA.FTP.2010.t  FTP server response: 150 File status okay; about to open data connection

20050322 05:04:12  ELA.FTP.2007.t  FTP Reply code of 150 .
20050322 05:04:13  ELA.FTP.2010.t  FTP server response: 226-Bytes received: 102,949

20050322 05:04:14  ELA.FTP.2010.t  FTP server response:     Records received:         1,356

20050322 05:04:14  ELA.FTP.2010.t  FTP server response:     Transfer Seconds:         1.68 (    100K/Sec)

20050322 05:04:14  ELA.FTP.2010.t  FTP server response:     File I/O Seconds:          .09 (      0K/Sec)

20050322 05:04:14  ELA.FTP.2010.t  FTP server response: 226 Closing data connection.

20050322 05:04:14  ELA.FTP.2007.t  FTP Reply code of 226 .
20050322 05:04:14  ELA.FTP.0005.i  Put command for file TESTDLBL.cbl successful.
20050322 05:04:14  ELA.FTP.2002.t  Attempt to close connection to Host.
20050322 05:04:14  ELA.FTP.2006.t  Issue FTP command 'QUIT' .
20050322 05:04:14  ELA.FTP.2010.t  FTP server response: 221 FTPD closing control connection.
20050322 05:04:14  ELA.FTP.2007.t  FTP Reply code of 221 .
20050322 05:04:14  ELA.FTP.0002.i  Connection to Host closed.
```

Figure 4. Sample FTP trace

Sample 5: SQL database connections

Figure 5 shows an example of parameters used to connect to a DB2 database on a VSE host.

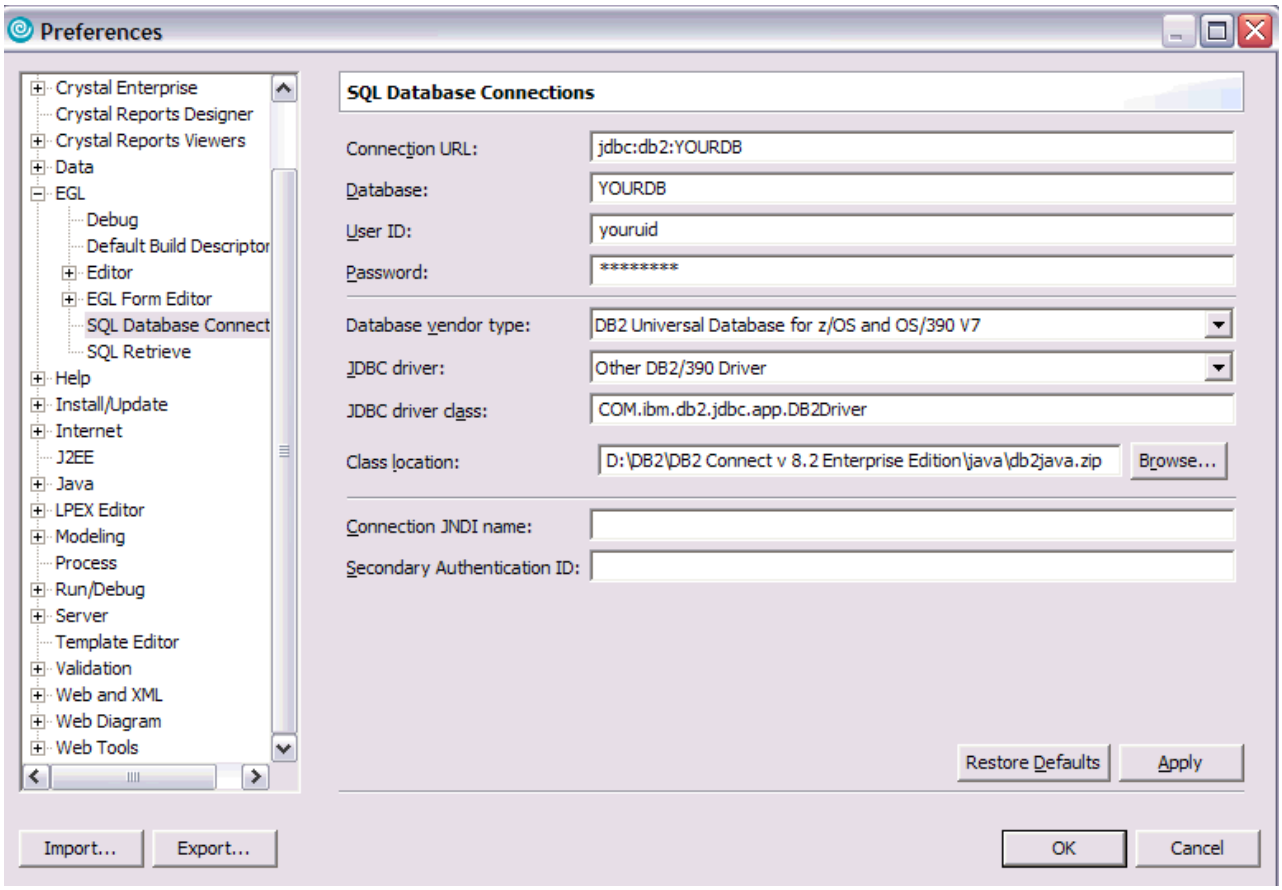

Figure 5. Parameters used to connect to a DB2 database on a VSE host

Sample 5: SQL database connections

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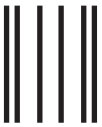

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