



Data Express 4.0

Readme

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Readme

General information on Data Express is available here. This information includes hardware and software requirements, backward compatibility, known errors and restrictions and so on.

If you install a WrapPack containing updates and fixes to your installation, information on the WrapPack is included here. However, last-minute information is only in the WrapPack Readme, which is downloadable with the WrapPack from the SupportLine Web site.

To find out how to get the latest information, see the chapter *Updates and Product Support*.

System Requirements

This section provides system requirements.

Windows

This section describes the Windows system requirements for using Data Express with Data Express for z/OS and Data Express for Distributed Systems solutions.

Hardware Requirements

The following minimum configuration for Windows is required:

Component	Description
Processor	Must be at least the minimum specified for the operating system you are using.
Memory	<ul style="list-style-type: none">• Data Express for z/OS: at least 512 MB is needed; 1 GB is recommended.• Data Express for Distributed Systems: at least 1 GB is needed; 1.5 GB is recommended.
Disk space	<ul style="list-style-type: none">• Data Express for z/OS: at least 30 MB.• Data Express for Distributed Systems: 300 MB of disk space available to install all the modules of the Data Express suite (500 MB recommended).
Video	Display with 800 x 600 SVGA in 256 colors. Preferred screen resolution 1024 x 768 or higher.

Software Requirements

The following software is supported:

Component	Details	Description
Operating Systems	32-bit Windows	<ul style="list-style-type: none">• Windows XP Professional SP2 or later• Windows Vista• Windows 7, 8, 10• Windows Server 2003 and 2003 R2• Windows Server 2008 and 2008 R2
	64-bit Windows	<ul style="list-style-type: none">• Windows XP Professional SP2 or later

Component	Details	Description
		<ul style="list-style-type: none"> Windows Vista Windows 7, 8, 10 Windows Server 2003 and 2003 R2 Windows Server 2008 and 2008 R2 <p>When running on a 64-bit Windows platform, Data Express runs as a 32-bit application.</p>
Third-party software	Data Express for Distributed Systems	Borland Database Engine. This software needs to be installed after the Data Express product installation process on Windows.
	Data Express on z/OS	<p>IBM DB2 Connect Personal Edition (or Data Server Client) needed to access Gateway DB2 Connect Enterprise Edition.</p> <p>Borland Database Engine. This software needs to be installed after the Data Express product installation process on Windows.</p> <p>Although not required, if you are using the z/OS solution we recommend that your Windows machine have a direct connection to the DB2 database through DB2 Connect.</p>

User Authorization Requirements

For Data Express for z/OS, when a project is opened for the first time, the user ID and password for the connection to the database server where the work environment resides must be provided. The user ID provided must have read privileges on the following:

`SYSIBM.SYSTABLES`

All tables are created by Data Express during product installation.

z/OS

This section describes requirements for the System z servers running z/OS. If you are using Data Express for Distributed Systems, which means that your Knowledge Base will reside on a Windows machine, you can skip this section.

Hardware Requirements

Any mainframe system that supports the minimum software requirements listed in the Software Requirements section can be used. Data Express requires the following amount of disk space:

- 183 MB disk space available for product installation
- 3 MB of disk space per analyzed archive (50 fields)

Software Requirements

The following software is supported for z/OS:

- MVS, OS/390 2.5 or later, or z/OS 1.1 or later
- Language Environment 6.1 or later
- IBM DB2 (z/OS version, or OS/390 version 8 or later)

DB2 Database Requirements

Data Express for z/OS uses a DB2 database that contains about 150 tables and views. The database must be at least DB2 V7R1 with proper DDF configuration.

The tablespace definition for one table and the DDL statements used to create the database and are shown below.

```
CREATE TABLESPACE          ANURDCLA
    IN                      &URDBASE
    USING STOGROUP          &URSGROUP
    PRIQTY                  $PQTY
    SECQTY                  $SQTY
    FREEPAGE                $FPAGE
    PCTFREE                 $PFREE
    BUFFERPOOL              &URBPTS
    SEGSIZE 64
    COMPRESS                $COMPRESS ;
CREATE TABLE &UOWNER..ANURDCLA
(MCRECID                   SMALLINT           NOT NULL WITH DEFAULT,
 FLDRECID                  INTEGER           NOT NULL WITH DEFAULT,
 FLDRECID                  INTEGER           NOT NULL WITH DEFAULT,
 CLATYPE                   SMALLINT           NOT NULL WITH DEFAULT,
 PRG                       SMALLINT           NOT NULL WITH DEFAULT,
 CDRULECLA                 INTEGER           NOT NULL WITH DEFAULT,
 CONFID                    INTEGER           NOT NULL WITH DEFAULT,
 FLAGDEL                   CHAR              (001) NOT NULL WITH DEFAULT,
 BESTCLA                   CHAR              (001) NOT NULL WITH DEFAULT)
IN &URDBASE..ANURDCLA ;
```

Data Set Requirements

Data Express for z/OS uses 45 partitioned data sets (PDS) and 4 sequential data sets (SEQ). PDS and SEQ data sets are identified by the combination of a prefix and a suffix. However, the user can only choose the prefix.

The current prefixes are MFDATA.VxRx for the VR release library, MFDATA.VxRxPTF for the PTF library, and MFDATA.VxRxPER for the Personalized library. These prefixes can be modified. Suffixes (for example, BIND, CLIST, and DDL) cannot be modified.

Data Express for z/OS uses the following 45 partitioned data sets:

```
MFDATA.V2R0.BIND
MFDATA.V2R0.CBL
MFDATA.V2R0.CLIST
MFDATA.V2R0.COPY
MFDATA.V2R0.DBRMLIB
MFDATA.V2R0.DDL
MFDATA.V2R0.DDLALTER
MFDATA.V2R0.FTOUTPUT
MFDATA.V2R0.JCL
MFDATA.V2R0.LOAD
MFDATA.V2R0.OBJ
MFDATA.V2R0.PACKAGE
MFDATA.V2R0.PANEL
MFDATA.V2R0.SKEL
MFDATA.V2R0.SYSPUNCH
MFDATA.V2R0PTF.BIND
MFDATA.V2R0PTF.CBL
MFDATA.V2R0PTF.CLIST
MFDATA.V2R0PTF.COPY
MFDATA.V2R0PTF.DBRMLIB
MFDATA.V2R0PTF.DDL
MFDATA.V2R0PTF.DDLALTER
MFDATA.V2R0PTF.FTOUTPUT
```

```
MFDATA.V2R0PTF.JCL
MFDATA.V2R0PTF.LOAD
MFDATA.V2R0PTF.OBJ
MFDATA.V2R0PTF.PACKAGE
MFDATA.V2R0PTF.PANEL
MFDATA.V2R0PTF.SKEL
MFDATA.V2R0PTF.SYSPUNCH
MFDATA.V2R0PER.BIND
MFDATA.V2R0PER.CBL
MFDATA.V2R0PER.CLIST
MFDATA.V2R0PER.COPY
MFDATA.V2R0PER.DBRMLIB
MFDATA.V2R0PER.DDL
MFDATA.V2R0PER.DDLALTER
MFDATA.V2R0PER.FTOUTPUT
MFDATA.V2R0PER.JCL
MFDATA.V2R0PER.LOAD
MFDATA.V2R0PER.OBJ
MFDATA.V2R0PER.PACKAGE
MFDATA.V2R0PER.PANEL
MFDATA.V2R0PER.SKEL
MFDATA.V2R0PER.SYSPUNCH
```

Data Express uses the following four sequential data sets:

```
MFDATA.V2R0.IMPSRC
MFDATA.KBPARAM
MFDATA.V2R0.ALLDDL
MFDATA.V2R0.ALLBNDPK
```

The installer can modify the names of the first and second qualifier of a data set (for example: MFDATA.V2R0, MFDATA.V2R0PTF, and MFDATA.V2R0PER) according to your requirements.



Note: The total space occupied by all data sets does not exceed 50 MB.

User Credential Requirements

Data Express for z/OS users must be suitably configured both at the TSO and DB2 level. For a proper configuration, the following authorizations are required:

- RACF authorizations (create, update, and delete) to the product PDS and sequential files (for example, JCL, CLIST, and SKEL).
- Authorizations to the creation of the product DB2 database (storage group and database).
- Authorizations to the creation of the DB2 tablespaces, views, and indexes.
- Authorizations to the execution of package and plan binds.

Site-specific Requirements

Most activities in Data Express for z/OS consist of batch jobs executed through JCLs, which are normally created by specific submission functions by updating predefined skeletons (parameters, environment, and database specifications).



Note: If necessary, you can create permanent copies of the updated JCLs and adjust them to your organizational requirements.

The following actions may be performed in order to customize the product to meet organizational standards:

- Modify job names (function supported during product installation).
- Customize the skeletons.
- Start work with proprietary or third-party products for scheduling or controlling jobs.

- Make adjustments as required to provide interfaces with scheduling products

```
CREATE STOGROUP &URSGROUP VOLUMES (xxxxxxxx) VCAT xxx;
CREATE DATABASE &URDBASE STOGROUP &URSGROUP;
```

- Modify names such as the DB2 storage group group (STOGROUP), database, and owner (function supported during product installation)
- Modify names of tablespaces, tables, views, and indexes (function not supported during product installation) *Define ALIAS or SYNONYM*
- During the installation phase at your site, the installer will need to know your standards for:
 - Jobs names, accounting, etc.
 - Names of each DB2 subsystem, name of the DB2 load library, name and plan of DSNTIAD, name and plan of DSNTIAUL.
 - Name of the volume on which to allocate your partitioned data sets.

Extension Technology

This section describes requirements needed for the Extension Technology: ODBC Extension or Oracle Extension.

Hardware Requirements

Component	Description
Processor	Must be at least the minimum specified for the operating system you are using.
Disk space	<ul style="list-style-type: none"> • Optional ODBC Extension: less than 5 MB per platform, precise details provided during install. • Optional Oracle Extension: less than 5 MB per platform, precise details provided during install.

Software Requirements

Component	Description
32-bit Windows	<ul style="list-style-type: none"> • Windows XP Professional SP2 or later • Windows Vista • Windows 7, 8, 10 • Windows Server 2003 and 2003 R2 • Windows Server 2008 and 2008 R2
64-bit Windows	<ul style="list-style-type: none"> • Windows XP Professional SP2 or later • Windows Vista • Windows 7, 8, 10 • Windows Server 2003 and 2003 R2 • Windows Server 2008 and 2008 R2
UNIX	<ul style="list-style-type: none"> • IBM System p running AIX 5.3 or 6.1 • IBM System z running SuSE Linux Enterprise Server 10 SP1 • Itanium running HP/UX 11iv2 or 11iv3 • x86 running Red Hat Linux 4.0 Update 1, 5.1, 5.3, 6.1, or 7.2 • x86 running SuSE Linux Enterprise Server 10 SP1 or 11 • SPARC running Solaris 9 or 10

Component	Description
	 Note: When running on 64-bit UNIX platforms, Data Express Extension works as a 32-bit application.

Run-time Knowledge Base Requirements

This section describes requirements that apply to both Windows and UNIX platforms.

Before using either the ODBC or Oracle Extension, a Run-time Knowledge Base needs to be created within your source data store(s). The Run-time Knowledge Base drives the operation and performance of the Data Express masking and subsetting processes.

The Run-time Knowledge Base consists of tables and indexes, and needs to be created using the schema name **DEKB**.

 **Note:** As different data stores have different requirements for creating schemas and associated objects, Micro Focus strongly suggests that the database administrator (DBA) for each source data store create the associated Data Express Run-time Knowledge Base.

A script, `createkb.sql` is provided within the `config` directory. This script contains canonical DDL (Data Definition Language) statements, describing the Run-time Knowledge Base tables and indexes.

Please note that `createkb.sql` is not guaranteed to execute correctly for all source data stores as-is. Each data store can have slightly different syntax when it comes to `CREATE TABLE` and `CREATE INDEX` statements. The DBA for your source data store can assess what changes are necessary to allow the successful creation of the `DEKB` schema, and will have the appropriate permissions to create and populate that schema.

If you are the DBA for a source data store, please review the Customer Care Knowledge Base article #10277 for additional details on how to create the Run-time Knowledge Base for your source data store.

User Credential Requirements

This section describes requirements that apply to both Windows and UNIX platforms.

ODBC or Oracle Extension users are required to have the appropriate access to source and target data stores, as well as to the Run-time Knowledge Base, which is located in the source data store(s).

The table below lists the pertinent objects and specific privileges required to mask and subset data:

Object	Privilege Required
Source data store(s)	<code>SELECT</code> on tables to be processed within the specified schema(s).
Run-time Knowledge Base	<code>INSERT</code> , <code>SELECT</code> , and <code>DELETE</code> on the tables within the <code>DEKB</code> schema.
Target data store(s)	<code>CREATE TABLE</code> , <code>INSERT</code> , <code>UPDATE</code> , and <code>DELETE</code> on tables to be processed within the specified schema(s).

 **Note:** As different data stores have different user credential requirements, Micro Focus strongly suggests that the DBA for the data stores listed above establish appropriate user credentials.

For security reasons, it may not be permissible to allow Data Express privileges to operate in the manner described in the table above. In this case, you can use Extension Technology in *unload* mode.

For more information regarding unload mode, see the chapter *Extension Technology Utilities* in the *Getting Started with Distributed Data Stores* guide.

ODBC Extension Requirements

To use the ODBC Extension with an ODBC-enabled data store, you will need:

- ODBC driver relevant to your data store
- The UNIX machine should be configured with the environment variable settings needed to provide connectivity to the ODBC data store. At minimum, this should include:
 - ODBCINI - this should be set to the ODBC configuration file LD_LIBRARY_PATH (Linux, Solaris), SHLIB_PATH (HP/UX), or LIBPATH (AIX) , for the ODBC Driver Manager.
 - Any additional environment variables as specified within the documentation of your ODBC Driver Manager and ODBC Driver software.

Data Express for Distributed Systems is regularly tested against the following data sources and ODBC drivers:

Data Source Version	ODBC Driver Name	ODBC Driver Version
COBOL Files	Micro Focus Relativity	2.2.2
DB2 v8	IBM DB2 ODBC Driver	01.300.257
DB2 v9	IBM DB2 ODBC Driver	01.300.257
DB2 v10	IBM DB2 ODBC Driver	01.300.257
DB2 v11	IBM DB2 ODBC Driver	01.300.257
DB2 v12	IBM DB2 ODBC Driver	01.300.257
Informix 11.70	IBM Informix ODBC Driver	3.70 TC5
Micro Focus XDB Server 6.0	Micro Focus XDB for DX4.0	8.00.06.1001
Microsoft SQL Server	SQL Server	85.1132.00
Microsoft SQL Server	SQL Server Native Client 10.0	100.2500.00
MySQL 8.0	MySQL ODBC Driver	
Oracle 11g R1	Oracle in OraDb11g_home1	01.00.06
Oracle 12 R1	Oracle 12R1	
PostgreSQL 9.6	Devart ODBC Driver for PostgreSQL	2.1.5
Sybase 6.0.0.4765	Sybase Adaptive Server Enterprise	05.00.1016
Teradata 15	Teradata 15 ODBC Driver	15.00.00.02

Oracle Extension Requirements

To use the Oracle Extension, the machine housing the Data Express installation requires, at minimum, an Oracle client installation, including the Oracle Call Interface (OCI) support, configured to connect to the Oracle data store.

Data Express supports the following Oracle versions:

- 9i
- 10g
- 10g r2
- 11g
- 11g R2

The UNIX machine should be configured with the environment variable settings needed to connect to the Oracle database, for example:

```
ORACLE_HOME
ORACLE_SID
PATH
LD_LIBRARY_PATH (Linux, Solaris) SHLIB_PATH (HP/UX) or LIBPATH (AIX)
```

Installation Notes

After installing, you need to install the latest updates, from the Micro Focus product support Web site <http://supportline.microfocus.com>.

For installation instructions, refer to the following chapters of the *Installation Guide*, as appropriate:

- z/OS - z/OS System Procedures.
- Windows - Section Windows Installation of chapter Distributed Systems Procedures.
- UNIX - Section UNIX/Linux Installation of chapter Distributed Systems Procedures.

Windows Installation Program

To install the product, you need to be logged in with a user-ID that has Administrator privileges on the local machine, so the installation software can set the environment appropriately.

The installation program should start automatically when you insert the CD. If after a few seconds the installation window hasn't appeared, run the installation program as follows: `x:\setup.exe`

where x is your CD drive.

If you do not install an option or a sub-option, you can add it later by using **Control Panel > Add or Remove Programs** and selecting Micro Focus Data Express 4.0 and clicking **Change**.

Offline Web Browser

To use your Web browser off line, you need the dial-up networking feature Windows XP installed. Otherwise you may have TCP/IP errors such as being unable find "localhost" or the numeric equivalent (127.0.0.1).

Uninstalling

To uninstall the product, you need to be logged in with the same user-ID as you used when you installed it.

To uninstall the product, you cannot simply delete its files from your hard disk. Instead, you uninstall by using **Control Panel > Add or Remove Programs**, on most Windows systems. You might need to ensure that **Show Updates** (at the top of the **Add or Remove Programs** dialog) is checked, so that any hot fixes or WrapPacks are listed.

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

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 do this, use **Control Panel > Add or Remove Programs** and follow the instructions on the screen.

New Features

Data Express version 4.0 Update 24 includes the following new features:

- Incremental update of target data sources enhanced with additional options
- Data store information copied more easily between different machines/companies and between different Data Express instances
- Automatic creation of indexes and foreign keys in target data sources

- Minor synthetic data generation improvements
- Better management of RI constraints, providing deletion and recreation
- Manage interfaces as tables in addition to standard MVS flat files
- Enhanced management of NULL filters processing
- Improved and enhanced logging provided for diverse scenarios
- Minor batch life cycle improvements

Updates and Product Support

After you have installed Data Express, you need to apply the latest updates if there are any. These are located on the Micro Focus web site in the Support section.

Before you can access the updates, you need to register with Product Support, as follows:

1. Go to the main product support page by entering `http://supportline.microfocus.com` in your browser.
2. Click **Register** on the product support page.
3. Enter your details. You will need your product serial numbers, which you can find on the colored card in the CD case or on a sticker on the box.

To access the updates:

1. Either enter `http://supportline.microfocus.com` in your browser, or start your Micro Focus product and click **Help > Micro Focus SupportLine**.
2. Log in.
3. Click **Product Updates** in the left-hand menu column, and select the appropriate link.
4. Apply the latest updates for your product and version number.

SupportLine is a Web-based support and information service from Micro Focus. It provides all the latest information and software updates for your development system:

- Technical support information
- Latest product information
- Documentation updates
- New and updated demonstrations and templates
- Hints and tips
- Lots more - try it and see!

Known Issues and Restrictions

The restrictions covered here are those that are not covered elsewhere in the documentation, or that are of a temporary nature and may be removed in a later product. Other restrictions are covered in the chapter *Supplementary Information for Data Express*:

- Data Express does not support the INTERVAL DATE data type because the 32-bit Oracle Driver does not support it.
- Data Express supports LOB field types for DB2 with some restrictions. For more information, see *Getting Started with z/OS Data Stores*, and the topic *DB2 for z/OS Environment Restrictions* in this book.
- Data Express supports XML field types for DB2 with some restrictions. For more information, see *Getting Started with z/OS Data Stores*, and the topic *DB2 for z/OS Environment Restrictions* in this book.
- Data Express supports VARBINARY fields types for DB2 with some restrictions. For more information, see the *DB2 for z/OS Environment Restrictions* topic and *Getting Started with z/OS Data Stores*.

- Data Express does not support LOB field types for ADABAS databases. Also, some Binary field types are not handled during ADABAS FDT analysis.
- For DB2 tables with non-direct access, Life Cycle requires SYSPUNCH and DCLGEN to be partitioned data set (PDS) members, even though the cataloging phase supports SYSPUNCH and DCLGEN as sequential files. If you want to use Life Cycle and you have cataloged SYSPUNCH in a sequential file, you will need to delete it from the knowledge base and re-catalog it as a PDS member.
- The Extension Technology does not support use of the parallel execution mode where multiple methods access the same tables within the target data store(s).
- Data Express does not support sampling on true binary data.
- Currently Data Express only shows the first 1000 distinct values and ranges, which are sorted either numerically or alphanumerically based on the data element type. When there are more than 1000 distinct data element values, the Data Element Value ends at the 1000th unique value instead of the greatest data element value.
- Data Express uses USERID and PASSWORD to connect to the databases containing lookup tables. The password is mandatory.
- On 64-bit platforms, Data Express runs as a 32-bit application; therefore, you must use 32-bit ODBC connections for Distributed Loader and Distributed Exporter even when running Data Express on a 64-bit platform.

Supplementary Information

The following sections contain supplementary information about this release.

Supported Character Encoding Systems

The following 1-byte character encoding systems are supported:

Character Encoding System	Windows CP	Mainframe CP	UNIX CS
ISO8859-1 Latin1 (Western Europe)	1252	*see table below	ISO8859-1(15)
ISO8859-2 Latin2 (Eastern Europe)	1250	IBM-870	ISO8859-2
ISO8859-5 Cyrillic	1251	IBM-1025	ISO8859-5* (iconv)
ISO8859-7 Greek	1253	IBM-875	ISO8859-7
ISO8859-9 Turkish	1254	IBM-1026	ISO8859-9
ISO8859-8 Hebrew	1255	IBM-424	ISO8859-8
ISO8859-6 Arabic	1256	IBM-420	ISO8859-6* (iconv)

The following mainframe character encoding systems are compatible with ISO8859-1:

Encoding System	Location
IBM-037(1140) -	USA, Canada, Australia, New Zealand, Netherlands, Brazil, Portugal
IBM-273(1141) -	Austria, Germany
IBM-274 -	Belgium
IBM-275 -	Brazil
IBM-277(1142) -	Denmark, Norway
IBM-278(1143) -	Finland, Sweden
IBM-280(1144) -	Italy

Encoding System	Location
IBM-281 -	Japanese English
IBM-284(1145) -	Spanish
IBM-285(1146) -	United Kingdom
IBM-297(1147) -	France
IBM-500(1047) -	Latin-1
IBM-871(1149) -	Iceland

Data Express does not support any additional character encoding systems at this time. This includes any multi or mixed byte character sets for CJK languages, Vietnamese, or any of the various forms of UNICODE, including UTF-8, UTF-16, and UCS-2.

Supported Data Types

ODBC Extension

The ODBC extension works with the following data types:

- SQL_SS_XML
- SQL_GUID
- SQL_BIT
- SQL_TINYINT
- SQL_BIGINT
- SQL_LONGVARBINARY
- SQL_VARBINARY
- SQL_BINARY
- SQL_LONGVARCHAR
- SQL_CHAR
- SQL_NUMERIC
- SQL_DECIMAL
- SQL_INTEGER
- SQL_SMALLINT
- SQL_FLOAT
- SQL_REAL
- SQL_DOUBLE
- SQL_DATE
- SQL_TIME
- SQL_TIMESTAMP
- SQL_VARCHAR
- SQL_TYPE_DATE
- SQL_TYPE_TIME
- SQL_TYPE_TIMESTAMP

Oracle Extension

The Oracle Extension works with the following Oracle Built-in data types:

- VARCHAR2
- NUMBER
- FLOAT

- LONG
- DATE
- TIMESTAMP
- INTERVAL YEAR TO MONTH
- INTERVAL DAY TO SECOND
- RAW
- LONG RAW
- CHAR
- CLOB
- BLOB
- BFILE

The Oracle Extension also works with the following Oracle-supplied type: XMLType.

DB2 for z/OS Environment Data Type

Data Express for z/OS works with the following DB2 data types:

- CHAR
- VARCHAR
- GRAPHIC (Processed as char)
- VARGRAPHIC (Processed as Varchar)
- TIME
- TIMESTAMP
- DATE
- SMALL INTEGER
- INTEGER
- BIGINT
- DECIMAL
- NUMERIC
- REAL FLOAT (Supported only for Loading process)
- DOUBLE FLOAT (Supported only for Loading process)
- DOUBLE PRECISION FLOAT (Supported only for Loading process)
- DECFLOAT (Supported only for Loading process)
- ROWID
- LONGVARCHAR
- LONGVARGRAPHIC
- BINARY
- VARBINARY

z/OS also works with the following Large Object data type:

- CLOB
- DBCLOB
- BLOB
- XML

COBOL & PL/I for z/OS Environment Data Type

Data Express for z/OS works with the following Cobol & PL/I data types:

- CHAR PIC X(n)
- BINARY PIC 9(n) COMP-4
- PACKED PIC S9(p-s)V9(s) COMP-3

- ZONED PIC S9(p-s)V9(s)
- EDITED Use of edit char, e.g. PIC ZZ99

ADABAS for z/OS Environment Data Type

Data Express for z/OS works with the following ADABAS data types:

- ALPHANUMERIC
- BINARY
- F LOATING POINT
- PACKED DECIMAL
- UNPACKED DECIMAL(ZONED)

Data Type Restrictions

This section lists size and format restrictions for data types.

Size Restrictions

The ODBC Extension has a size restriction of 1,048,576 bytes when processing the following data types:

- IMAGE
- TEXT
- VARBINARY
- VARBINARY(MAX)
- VARCHAR(MAX)
- XML

Format Restrictions

The ODBC Extension has a format restriction for field content that use the `DATETIME` or `SMALLDATETIME` data type for Data Subset Extraction: Data Subset Extraction rules must be specified using the format as documented by Microsoft.

ADABAS Restrictions

This section describes size restrictions for ADABAS data stores.

ADABAS Catalog Link

Data Express does not support a direct link to the ADABAS catalog . In order to mask or subset your data, you must first use the **ADABAS FDT** report to produce the output sequential file containing the structure definition of your ADABAS tables. Then, you must upload the decompressed files (that were created by the command `ADACMP DECOMPRESS`) that contain the content of your ADABAS tables.

For information about the ADABAS FDT report, see the chapter *Load Sequential File with ADABAS FDT report* in your *Toolkit (z/OS) guide*.

For information about the structure of the output sequential file, see the section *ADABAS - API Load Sequential File* in the chapter *Sequential Files* in the *Data Model Guide*.

Descriptors, Subdescriptors, and Superdescriptors

Descriptors are handled as normal fields, but subdescriptors cannot be handled. In order to mask or subset a subdescriptor, an exit routine that is associated to the field referenced by the subdescriptor is needed.

The superdescriptor clause in the FTD is not directly supported by Data Express. However, a superdescriptor can be handled if a combined data element is created in Data Builder that is composed of each field within that superdescriptor.

Target Environment Creation and Population Limitation

Sequential data sets that contain the output of the masking or subsetting process for ADABAS data stores are created by Data Express in the same way sequential data sets are created for other data store types. But, to populate your target environment, ADABAS utilities must be used as Data Express does not provide functionality that enables creation or population of your target environment.

Process Identifier Limitation

Data Express needs a specific Process Identifier in order to work properly with ADABAS data store.

We recommend using a pre-loaded Process Id ADAUN.

For information about the structure of the ADAUN Process Identifier, see the section *Process Identifier and Databases Type Relationships* in the chapter *Getting Started with Data Builder* in the *Front End Guide*.

Oracle Restrictions

Support for Oracle nested tables is not provided in this release of Data Express. If you are interested in obtaining an EAP release that supports nested tables, please contact Micro Focus SupportLine.

DB2 for z/OS Environment Restrictions

This section lists size restrictions for DB2 for z/OS Large Object data types like CLOB, DBCLOB, BLOB, XML, and for DB2 z/OS VARBINARY data types.

DB2 Large Object Data Types restrictions

Data Express does not support a direct link to all the DB2 Large Object data types for these three operations:

- Masking
- Subsetting
- Sampling

In order to mask or subset or sample your data, you must first use file reference variables method to unload each LOB or XML to a separate file. With this method, the LOB or XML values are unloaded to a different file than the normal unload file. DB2 creates or uses a different output file for each LOB or XML value to be unloaded. The output file should be on the following type:

Member of a partitioned data set (PDS) or partitioned data set extended (PDSE). See the following example JCL :

```
//LOADJOB JOB KRM,MSGCLASS=A,CLASS=1,NOTIFY=&SYSUID
// * *****
// * TABLE &OWNNNAME.&TABNAME
// * (PDFBLO BLOB (27994))
// * (TXTCLO CLOB (16094))
// * (PDFBLO BLOB (16032))
// * UNIT(SYSDA) SPACE ((20,2) MB)
// * (PDFBLO VARCHAR(54) BLOBF TSYSLOB)
// * *****
//STEP1 EXEC DSNUPROC,UTPROC=,SYSTEM=&SYSTEM,LIB=DSN810.SDSNLOAD
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  TEMPLATE TSYSYPUN
    DSN('URADAR.&SS..&DB..PUNCH.&TABNAME')
    DISP(MOD,CATLG,CATLG)
  TEMPLATE TSYSREC
    DSN('URADAR.&SS..&DB..SYSREC.&TABNAME')
    DISP(MOD,CATLG,CATLG)
  TEMPLATE TSYSLOB
```

```

        DSN( 'URADAR.&SS..&DB..PDS.&TABNAME' )
        DISP(MOD,CATLG,CATLG)
        DSNTYPE(PDS)
UNLOAD DATA FROM TABLE &OWNNAME.&TABNAME
        (A, B,C VARCHAR(44) CLOBF TSYSLOB, D)
UNLDDN(TSYSREC) PUNCHDDN(TSYSPUN)
/*
//

```

Data Express supports a direct link to all the Large Object data types for this operation:

- Cataloguing
- Life Cycle
- Reload
- Unload

For the Data Express skeleton of Unload and/or Reload's Job, there are some modifications to apply:

- Add the "TEMPLATE" condition.
- If needed, add the field list with the specific keyword &FLDLST to be substituted.

The following example shows the Data Express Unload skeleton with the modifications applied:

```

//SYSIN      DD *
  TEMPLATE TSYSLOB
    DSN( 'URADAR.&DBNAME.&TSNAME.PIPPO' )
    DISP(MOD,CATLG,CATLG)
    DSNTYPE(PDS)
UNLOAD FROM TABLE
        &OWNAME.&FILENAME      HEADER NONE      LIMIT 0
&FLDLST
&DBNAME.&TSNAME

```

Process Identifier Limitation

Data Express needs a specific Process Identifier in order to works properly with DB2 Large Object data type.

Since Data Express doesn't have a pre-loaded Process Id for this kind of data, we recommend creating a new Process Identifier following these specific properties:

- Access Type: Unload File Access (UNLOAD)
- I/O Program Name: KURFIO.

For information about the Process Identifier structure, see the section *Process Identifier and Databases Type Relationships* in the chapter *Getting Started with Data Builder* in the *Front End Guide*.

DB2 VARBINARY Data Types restrictions

When Data Express accesses DB2 by direct access, it does not work directly with the execution of sub-extraction query created when applying a method's filter criteria if the filter is applied to a VARBINARY column or to a combined field containing VARBINARY column.

In general, when Data Express accesses DB2 by direct access, it creates a `SELECT *` statement with a `WHERE` clause in order to apply the appropriate filters.

For VARBINARY data type, Data Express will not generate this `WHERE` condition, but just the `SELECT *` statement.

The access to data in this case is done by a sequential access and the application of filter's criteria is done by Data Express in a transparent way, applying the filter criteria to each record and discarding this record not satisfying the filter.

For information about the Filter properties, see the chapter *Work with Method - Selection Class/Filter properties* in the *Data Subset Extraction Guide*.

AS/400 Data Stores

There are several alternatives to mask and subset AS/400 data stores.

ODBC connection to AS/400

Access via ODBC to AS/400 data via ODBC driver has the following limitations:

- DB2 connect 9 is needed in order to guarantee compatibility with AS/400 of Data Express.
- Flat files created by the CRTPF command without DDLs cannot be accessed via ODBC. This access work if there is a DDL or if the file is created via SQL.
- The target database needs commitment control and so it needs to be created and journaled before Data Express runs.
- Performance is slow because each row moves from AS/400 to windows (where the engine runs), this is mainly true for masking process (while for subsetting this is mitigated by the fact the reduction criterion can use local AS/400 indexes, differently to other two alternatives).

The following native AS/400 column data types are supported (in parenthesis the corresponding SQL ones)

- Character (character, varchar)
- Packed decimal (decimal)
- Zoned decimal (numeric)
- Binary (integer, smallint, bigint)
- Floating point (float, real, double)
- Date
- Time
- Timestamp
- Hexadecimal
- Binary Character (binary)

The following native AS/400 column data types are not supported:

- DBCS-Only
- DBCS-Either
- DBCS-Open
- DBCS-Graphic (graphic, vargraphic, long vargraphic)

The following SQL column data types not having a correspondence with native AS/400 types are not supported:

- long varchar
- varbinary
- decfloat
- blob
- clob
- dbclob
- datalink
- rowid

Details about how Data Express deals with ODBC data stores are available in the documentation, in particular in *Getting started with distributed data stores*.

MVS flat files based approach

Engine can run on MVS. Flat files containing AS/400 data are handled as MVS sequential files. FTP is used in order to move data from AS/400 to MVS and vice versa. It is needed providing copybook mapping file layout.

Details about how Data Express deals with z-OS data stores are available in the documentation, in particular in *Getting started with z-OS data stores*.

Windows flat files based approach

Engine can run on windows. CPYTOIMPF is used in order to generate a delimited file, to be sent via FTP to a windows machine. Here it is processed via DataDirect ODBC 6.0 driver, provided by Progress. It is needed to provide a file structure in a native DataDirect format dictionary. Then masked data is sent via FTP back to AS/400, and restored with CPYFRMIMPF to target AS/400 table

Details about how Data Express deals with ODBC data stores (in this case with flat files) are available in the documentation, in particular in *Getting started with distributed data stores*.

Comparison between approaches

- MVS flat file approach is preferred if an MVS is available. It requires copybooks, normally already available in the application
- Windows flat file based approach requires more manual work than ODBC approach, and it is faster than it for masking and slower than it for subsetting (comparison of performances are strictly related to characteristics of the machines)

Readme Help

The `Readme Help` is a file containing extensive advice on possible problems and troubleshooting. The on-screen installation instructions include an opportunity for you to look at it. If you want, you can see the `Readme Help` even before starting to install Data Express.

Contact Information

If ever you have any problems or you would like additional technical information or advice, there are several resources.

Help with Problems

In some countries, product support from Micro Focus may be available only to customers who have maintenance agreements.

If you obtained this product directly from Micro Focus, contact us as described below. If you obtained it from another source, such as an authorized distributor, contact them for help first. If they are unable to help, contact us as described below.

Before you ask for help, try and find answers in the `Product Information` folder of the `Help` or in the main body of the `Help`.

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 product support 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 version of the product that you are using. You can locate the version number:
 - Windows: from the **Help > About**.
 - z/OS: from the **Main Menu** panel.
 - ODBC/Oracle Extension: from the banner displayed when executing the Extension.
- Your operating system and version number.
- The data stores you are working with, including client-side and server-side versions where appropriate. If using ODBC data stores, also include details of the vendor and version of the ODBC driver(s) being used, as well as the equivalent information about the RDBMS.
- If using Data Express for z/OS, indicate whether you are using the Standard or Client/Server configuration.
- An explanation of what you are trying to do and step-by-step instructions needed for reproducing the issue, including any error messages received.
- Diagnostic information:
 - z/OS: Screenshots, log files, JCL scripts, output, and dumps
 - ODBC Extension/Oracle Extension: Contents of the `config` and `log` directories. We may request that you change the setting of the `LogLevel` parameter with the `dxeconfig.cfg` file to provide additional diagnostic information. See the chapter *Using Extension Technology* of the *Getting Started with Distributed Data Stores* for further details on the `LogLevel` parameter.
- Details of the data store contents, for example:


```
DDL, DCLGEN, or SYSPUNCH (for SQL data stores)
Copybooks (SEQ, VSAM, GDG, DL/I)
FDT (ADABAS)
DBD (DL/I)
```

Contact Information

Our Web site gives up-to-date details of contact numbers and addresses. The product support pages contain considerable additional information, including the WebSync service, where you can download fixes and documentation updates. To connect, enter `http://www.microfocus.com` in your browser to go to the Micro Focus home page.

If you are a Micro Focus product support customer, please see your product support Handbook for contact information. You can download it from our web site or order it in printed form from your sales representative.

Support from Micro Focus may be available only to customers who have maintenance agreements.

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