Messing with SQL in Dataflex

- What is available in Dataflex 19.0
  - cConnection.pkg
    - Lots of useful stuff in there. Will take some time to sort.
  - DataDict.pkg
    - Some calls in the dd for SQL
    - It has a helper class.
    - Does a few things needed for DD
    - I came in trouble when creating filters with dates or datetime You cannot just constrain with the DF date in SQL filters. Needs to be converted to SQL format
  - Sql.pkg
    - Lots of stuff
    - and has DFDate to SQL and vs conversions
  - Cli.pkg
    - Lot of definitions lower level
    - Also, the DFDate sql Data Conversions, but in this case also dealing with null dates
  - DbSuggestionForm.pkg
    - Actually, it is WinSuggestion.pkg uses the SQL filters
    - Can be used as Sample to look at.
  - Samples
    - Stored procedure sample is from the old days.
    - Sample in StoredProcedureMSSQL.vw in the "Specialized Components"

```
#Replace CS_CONNECT "SERVER=(local);Trusted_Connection=yes;Database=Order"
//*** The SQL handle manager object
Object oSQLHandler Is A cSQLHandleManager
  Move Self To hoSQL
End_Object // oSQLHandler
```

- - Does not use the new cConnection class.
    - The Dataflex install does not deploy a sample working with MSSQL database

Maybe I am wrong but you are very much on your own.

SQL Stuff to give some attention. (look in code library forum)

- Raveen Ryan Sundram
  - SQL Functions for DataFlex Connectivity Kits (2012)
  - Nice stuff but 2012. A lot has been added to the df drivers since.
  - Written for DB2.
- Matt Davidian
  - SQL Lab (2014)
  - Take a look, run it and look at the code generated.

SQL - Structured Query Language

- Readability ???, well readability of SQL is not always as great, for sure if the statement gets bigger and more aliases are used, for sure if one letter alias name sort of randomly picked or not just use a, b, c, d, e, f,……… Do not know why that is needed with current auto complete editor. But maybe you can call yourself at that moment a "die-hard SQL programmer".
- Yes, I did mess around with SQL
  - who remembers FlexQL?
  - in Btrieve to speed stuff up, created a that time some classes. Mainly to remove all the recurring code to connect and disconnect.
- In general, I do not know SQL that well, can do queries and when I need something I sort it out.

Df application released in a full window version in 1998

- Time and Attendance, Human Resource and Payroll.
- Incremental updates over time. And many of those updates because the government decided something needed to be changed. [Read we need more money so we are going to change the tax rules] Even nicer if they do it retro.
- Using databases for each company. So, the user had to have multiple applications open at the same time if she wanted to work in more the one company
- Because of the multiple databases maintenance tables had to be kept up to date in all those databases.
- Was using the embedded database.
-

But Needed a bigger update. Started long ago.

- On several areas, like the cjGrid, cjMenu, but never ended in a final release.
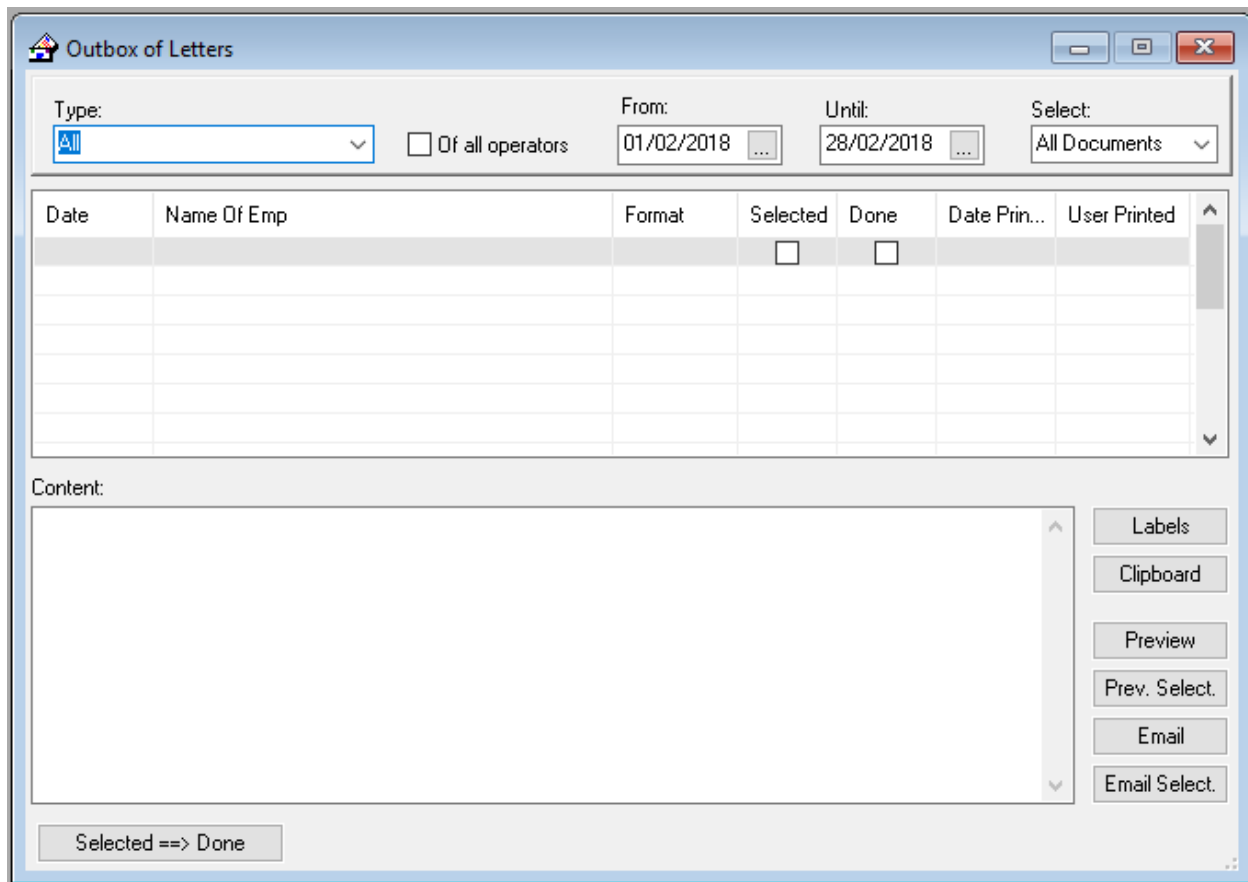
- Old dbGrid, limited filter possibilities, had several operator rights limitations but was coded as "Constraint AS".
- What to use for database.
- Stay with embedded?

Than the need to update.............

- What to add.
  - Request for multiple companies in one database.
  - Multi Currency Application for payroll
    - We work in the Caribbean and have to deal with multiple countries so multiple tax regimes and by that the local tax currency. But the head company wants consolidation reports in one currency
  - Give more features by having them all in one app.
  - Reporting
  - Rewrite major parts of the system
    - Code was way too old, very hard to maintain.
    - Many limitations.

- And after 25 years it is needed.
  - Clean code and proper File and field names we have a bigger length now is it not?
    - Question to conference room, who has all the right and perfect naming for tables and fields?
    - Think there was one finger.
    - When working on a new release I change any name which is not a 100% clear to me anymore. Compile and fix the incorrect field name errors. Just do that during the whole developing. At conversion time I deal with it. I do keep cross reference list.
  - Add Webservices for additional functionality.
- **What to do with the database.**
  - Stay with embedded. Lest be honest that is very end of life.
  - Move to SQL?
    - Nice for new sales. More credibility and all the other common arguments.
    - But for current users. Do they want to fork out more for the same functionality?
    - Embedded is working is it not? Why buy SQL server, cost for a License if express is not enough? What is there to gain? Cost vs Extra
- **So, start to use SQL within Dataflex to make use of the backend.**
  - Use filters to do security when not all users are allowed to work in all companies.
  - Use filters in processes to speed up where indexes are limited.

```
Set_Attribute DF_FILE_SQL_FILTER of (RefTable (Emp_Head)) to sSQL_Where
Set_Attribute DF_FILE_SQL_FILTER_ACTIVE of (RefTable (Emp_Head)) to True
Clear Emp_Head
Find Ge Emp_Head by Index.1
```

  - Reporting by using SQL view.
    - We have Transactional and history tables
    - Reporting is harder to show information from both and slow, reads way too many records.
  - Make use of Blobs in SQL for requested security of files and the documents the system creates.

```
Move vTxText to ucFile
Reread Merge
  Set_Field_Value (RefTable (Merge)) (RefTable (Merge.Document)) to ucFile
  SaveRecord Merge
Unlock
```

  - Embedded SQL to give more features and more speed.

Outbox of Letters Extended

☑ All Employees Employee: [   ] [...]   ☐ Mass Merge   Mass merge: [   ] [...]

Date From: 01/01/2018 [...] Until: 30/03/2018 [...]   ☑ All Documents   Document: [   ] [...]   Show

Companies | Sector | Branch | Department | Location | Section

Process	Employee	Contents Short	Created	Level	Word	Pdf	To Word	Print	Email	Attach
☐	Almanzar, Belcalis	Salary Advice	06/03/2018 14:00	99	☑	☑	☑	☐	☐	☐
☐	Corbie, Raquel	Warning Letter	26/02/2018 11:09	50	☑	☐	☑	☐	☐	☐
☐	Corbie, Raquel	Happy Birthday	28/02/2018 14:13	50	☐	☐	☐	☐	☐	☐
☐	Decker, Chloe	Salary Advice	05/03/2018 14:16	99	☑	☑	☐	☐	☐	☐
☐	Demon, Marzikeen	Salary Advice	05/03/2018 14:10	99	☐	☐	☑	☐	☐	☐
☐	Des Vignes, Hans	Grievance Acknowledgement	01/03/2018 10:17	99	☐	☐	☐	☐	☐	☐
☐	Des Vignes, Hans	Happy Birthday	05/03/2018 10:45	50	☑	☑	☑	☐	☐	☐
☐	Des Vignes, Hans	IT Tech Job Description	23/02/2018 08:54	99	☐	☐	☐	☐	☐	☐
☐	Des Vignes, Hans	Salary Advice	23/02/2018 11:04	99	☐	☐	☐	☐	☐	☐
☐	Doe, Jane	Dates Test	01/03/2018 15:23	50	☐	☐	☐	☐	☐	☐
☐	Doe, Jane	IT Tech Job Description	01/03/2018 14:58	99	☐	☐	☐	☐	☐	☐
☐	Doe, John	Dates Test	01/03/2018 15:23	50	☐	☐	☐	☐	☐	☐
☐	Forrester, Ridge	Salary Advice	27/02/2018 14:48	99	☐	☐	☐	☐	☐	☐
☐	Forrester, Ridge	Happy Birthday	26/02/2018 13:37	50	☐	☐	☐	☐	☐	☐
☐	Friend, Daniel	Dates Test	02/03/2018 13:51	50	☐	☐	☐	☐	☐	☐
☐	Friend, Daniel	Salary Advice	09/03/2018 15:55	99	☐	☐	☐	☐	☐	☐
☐	Greaves, Kriston	Dates Test	02/03/2018 14:12	50	☐	☐	☐	☐	☐	☐
☐	Greaves, Kriston	Dates Test	05/03/2018 10:45	50	☐	☐	☐	☐	☐	☐
☐	Greaves, Kriston	Dates Test	05/03/2018 10:45	50	☐	☐	☐	☐	☐	☐

Preview | Create Word | Create Pdf | To Word | Print | Email | Email Pdf

- o Example: Same view as above but now a cjGrid which get filled by SQL
- o On the right there is a docking view where end users can make all kind of selections to dynamic limit data shown

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☐	Greaves, Kriston	Dates Test	05/03/2018 10:45	50

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Department

Select	Department
☐	Administration
☐	e
☐	Finance
☐	Human Resources
☑	Infomation Technology
☑	IT Literacy & Walk In Center
☐	Medical Transcription
☐	Not Defined
☑	Operations
☐	t
☐	TEST

Companies | Sector | Branch | Department | Location | Section

- It is clear that this will not be an optimizable selection for indexes.
- But SQL has no problem with that, and is fast to perform the query.
- So, more features for the end user.

How to do embedded SQL?

- Code wise

```
String sSql

Move (sSQL * 'SELECT "Skl_Tble"."Description",'    ) to sSQL
Move (sSQL * '"Skl_Tble"."Skl_Tble_ID"'            ) to sSQL
Move (sSQL * 'FROM "Skl_Tble"'                      ) to sSQL
Move (sSQL * 'WHERE "Skl_Tble"."Dropped" = 'N''    ) to sSQL
Move (sSQL * 'ORDER BY "Skl_Tble"."Description"'   ) to sSQL

Should be:
Move (sSQL * 'WHERE "Skl_Tble"."Dropped" = ' + "'N'") to sSQL
```

Pretty hard readable and maintainable.
Well the sample is in fact pretty ok. Only the yellow will no work to well.

- Resources or the use of the old images.
  - Did read on the newsgroup to work that way.
  - How much different is that from the above?
- Read them in
  - Read the SQL file in and make the call? A bit risky someone can change the SQL code
- Stored procedures
  - Nice but then if you have to work against another SQL engine, you will have to code it there too.

And then the always changing file and field names,

yes maybe a bad … habit, you should not do that in SQL but I stick to it

So how about the following code:

```
Procedure InitializeGrid
  tDataSourceRow[] stDataSourceRows

  Handle  hoSQL_ResultSet

  Get Create (RefClass (HRp_cSql_ResultSet)) to hoSQL_ResultSet

  Send doAdd_Select_FileField of hoSQL_ResultSet (RefTable (Skl_Tble)) (RefTable Skl_Tble.Description))
  Send doAdd_Select_FileField of hoSQL_ResultSet (RefTable (Skl_Tble)) (RefTable Skl_Tble.Skl_Tble_ID))

  Send doAdd_FromFile of hoSQL_ResultSet (RefTable (Skl_Tble))

  Send doAdd_Where of hoSQL_ResultSet (RefTable (Skl_Tble))           ;
                                      (RefTable (Skl_Tble.Dropped))   ;
                                      ""                              ;
                                      False                           ;
                                      c_Select_EQ                     ;
                                      "N"                             ;
                                      ""                              ;
                                      ""

  Send doADD_Order_by of hoSQL_ResultSet (RefTable (Skl_Tble)) (RefTable (Skl_Tble.Description))

  Get giveDataSourceRows of hoSQL_ResultSet to stDataSourceRows

  Send Destroy of hoSQL_ResultSet

  Send InitializeData stDataSourceRows
End_Procedure
```

- If naming of files and fields are changing, this way it gives a compiler error
- Fairly easy readable, maintainable, easy extendable code
- Creates a tDataSource for me.
  - Deals hidden in the class automatically with all the conversions needed, like DateTime and Date fields. The SQL result cannot be used directly to fill the grids.
- Yes it does Joins too.
- Does it do all? No way, there is so much possible in SQL but every time I need something new, I just add it. At the moment it does what I need.
- It creates one-line long SQL string statement and I use:
  - http://www.sql-format.com/
- To format it properly for possible use in the SQL Management Studio.

Other SQL stuff

- Copy records

```
Get Create (RefClass (HRp_cSQL_Copy_Records)) to hoCopy_Records
Set piTable_From of hoCopy_Records to Ded_Tran.File_Number
Set piTable_To   of hoCopy_Records to Ded_Hist.File_Number

Send doAdd_Where of hoCopy_Records (RefTable (Ded_Tran))          ;
                                   (RefTable (Ded_Tran.Company_ID)) ;
                                   ""                               ;
                                   False                            ;
                                   c_Select_EQ                      ;
                                   GLBS_CompanyPayroll              ;
                                   ""                               ;
                                   ""

Send doAdd_Where of hoCopy_Records (RefTable (Ded_Tran))           ;
                                   (RefTable (Ded_Tran.Emp_Head_ID)) ;
                                   ""                               ;
                                   False                            ;
                                   c_Select_EQ                      ;
                                   sEmp_Head_Id                     ;
                                   ""                               ;
                                   ""

Send doProcessCopy of hoCopy_Records
Send Destroy of hoCopy_Records
```

- Delete records

```
Send doSQL_DeleteRecords_Multi_Where stSQL_Wheres
```

- Both calls are performing very fast in the SQL engine

Conversion.

- Needed to combine multiple databases in to one
- Renaming of many table and field names.
- Also, many functionality changes, additions, remove of not used fields
- Remove of "outdated historic garbage" information in fields, so conversion of data
- At first copy data over record by record from Dataflex to SQL table.
  - Way to slow
- Now exporting to a CSV file.
- Then use the SQL import called Bulk Insert.

```
Bulk insert [dbo].[my_Table]
from 'c:\data\Import\My_Csv_File.csv'
With (FIELDTERMINATOR = '|', ROWTERMINATOR = '\n')
```

- This is blazing fast.
- Worked with Dave Robinson during the conference on an import which took hours by using dbImport to a few minutes with the bulk insert
-
- After the import data gets checked by a utility I wrote in the begin stages when the application was moved from dos to windows. Validates every record every field through the datadictionairy.

Future with messing with SQL.

- Well first finish
- SQL in memory Temp tables feature of SQL 2016 and up if I am correct.
- Use connection ID to switch databases, not needed at the moment for first release.
- Reporting only with SQL statements
- Further speed optimizations.
- More nice options.

Summarizing

- It is harder to push current embedded customer to SQL database without giving more advantages.
- SQL can be used to speed up processes
  - o Use SQL Filters. (on file and in dd's)
  - o Use SQL calls for delete and copy records
  - o Use Bulk Insert for you own stuff
- SQL filters can be used in dd's in your views to do more.
- Reporting
  - o Views
  - o SQL query
- Give more features to your customers by using SQL calls.

But again, you are on your own.
Vdf 19.0 does not give you too much help.

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