SQLTEX v2.0

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1 Introduction

SQLTEX is a preprocessor to enable the use of SQL statements in LATEX. It is a perl script that reads an input file containing the SQL commands, and writes a LATEX file that can be processed with your LATEX package.

The SQL commands will be replaced by their values. It's possible to select a single field for substitution substitution in your LATEX document, or to be used as input in another SQL command.

When an SQL command returns multiple fields and or rows, the values can only be used for substitution in the document.

1.1 Known limitations

- SQLTEX reads only one input file; the LATEX \include directive is ignored.
- Currently, only 9 command- line parameters (1-9), and 10 variables (0-9) can be used in SQL statements.
- Replace files can hold only 1,000 items.
- In multidocument mode, only one parameter can be retrieved.

2 Installing SQLT_EX

Before installing SQLT_EX, you need to have it. The latest version can always be found at http://freeware.oveas.com/sqltex. The download consists of this documentation, an installation script for Unix (install), and the Perl script SQLTeX, and a replace- file (SQLTeX_r.dat) for manual installation on non- unix platforms¹.

On a Unix system, make sure the file install is executable by issueing the command:

bash\$ chmod +x install

then execute it with:

bash\$./install

The script will ask in which directory SQLTEX should be installed. If you are logged in as 'root', the default will be /usr/local/bin, otherwise the current directory.

Make sure the directory where SQLTEX is installed is in your path.

For other operating systems, there is no install script, you will have to install it manually.

On OpenVMS it would be something like:

\$ SET FILE/PROTECTION=(W:RE) SQLTEX.²

¹on Unix, this file will be generated by the install script

²Note the dot ('.') at the end of the file; on OPENVMS systems, all files must to have a file extension, which can be empty, in which case the filename ends with a dot.

- \$ COPY SQLTEX. SYS\$SYSTEM:
- \$ COPY SQLTEX_R.DAT SYS\$SYSTEM:

However, on OpenVMS you also need to define the command SQLTEX by setting a symbol, either in the LOGIN.COM for all users who need to execute this script, or in some group— or system wide login procedure, with the command:

\$ SQLTEX :== "PERL SYS\$SYSTEM:SQLTEX."

2.1 Configuration

The location where SQLTEX is installed also holds the configuration file SQLTeX.cfg. Multiple configuration files can be created, the command line option -c can be used to select the requested configuration.

<u>Note:</u> If a 1.x version of SQLT_EX is installed on your system, make sure you saved the configuration section, which was inline in older versions.

Some values can be overwritten using command line options (see section 4.2). When the command line options are omitted, the values from the requested configuration file will be used.

- dbdriver Database driver. The default is mysql. Other supported databases are Pg, Sybase, Oracle, Ingres, mSQL and PostgreSQL, but also others might work without modification.
 - If your database driver is not support, look for the function db_connect to add support (and please notify me:)
- texex The default file extension for IATEX file. When SQLTEX is called, the first parameter should be the name of the input file. If this filename has no extension, SQLTEX looks for one with the default extension.
- stx An output file can be given explicitly using the '-o' option. When omitted, SQLTEX composes an output file name using this string.
 E.g, if your input file is called db-doc.tex, SQLTEX will produce an outputfile with the name db-doc_stx.tex.
- **rfile_comment** The comment-sign used in replace files. If this is empty, comments are not allowed in the replace files.
- rfile_regexploc This must be part of the value rfile_regexp below.
- **rfile_regexp** Explains how a regular expression is identified in the replace files (see section 2.2.1).
- cmd_prefix SQLTEX looks for SQL commands in the input file. Commands are specified in the same way all LaTeX commands are specified: a backslash (\) followed by the name of the command.
 - All SQLTEX commands start with the same string. By default, this is the string sql. When user commands are defined that start with the same string, this can be changed here to prevent conflicts.

sql_open This string is appended to the cmd_prefixx to get the complete SQLTEX command for opening a database.

With the default configuration this command is "\sqldb".

sql_field This string is appended to the cmd_prefix to get the complete SQLTEX command to read a single field from the database.

With the default configuration this command is "\sqlfield".

sql_row This string is appended to the cmd_prefix to get the complete SQLTEX
command to read one or more rows from the database.
With the default configuration this command is "\sqlrow".

sql_params This string is appended to the cmd_prefix to get the complete SQLTEX command to retrieve a list if fields that will be used as parameters (\$PAR1, see section 4.1) in the multidocument environment (see section 3.6).

With the default configuration this command is "\sqlparams".

- sql_update This string is appended to the cmd_prefix to get the complete SQLTEX command to update one or more rows in the database.

 With the default configuration this command is "\sqlupdate".
- sql_start This string is appended to the cmd_prefix to get the complete SQLTEX command start a section that will be repeated for every row from an array (see section 3.5).

With the default configuration this command is "\sqlstart".

sql_use This string is appended to the cmd_prefix to get the complete SQLTEX command use a named variable from the array that is currently being processed in a loop context (see section 3.5).

With the default configuration this command is "\sqluse".

sql_end This string is appended to the cmd_prefix to get the complete SQLTEX command to end a loop context (see section 3.5).

With the default configuration this command is "\sqlend".

less_av & more_av These settings are used to determine how the help output should be displayed. If the command 'less' is available on the current system, the output will be parsed through this program. Otherwise the output will be parsed through the program 'more' if available. Both programs are usually available on Unix system (more is standard on most Unix systems), but ports for other operating systems are available as well. Set the values to "0" for the program(s) that is (are) not available, or if you don't want to use it.

If none of these programs is available, the *help* output is plain echoed to the display.

repl_step Replacing strings (see section 2.2 below) is done two steps, to prevent values from being replaced twice. This setting—followed by a three-digit

integer - "000" to "999"—is used in the first step and replaces values from the first column. In the second step, values from the second column replace the temporary value.

If the first column in the replace file contains a character sequence that occurs in this temporary value, or if query results might contain the full string followed by three digits, this value might need to be changed in something unique.

alt_cmd_prefix In loop context, this setting is used internally to differentiate between sql statements to process immediately and sql statements on stack

Normally, this setting should never change, but if the value for cmd_prefix has been changed and a conflict is found, the message "Configuration item 'alt_cmd_prefix' cannot start with <conflicting value>" indicates this setting should change as well.

2.2 Create replace files

Replace files can be used to substitute values in the output of your SQL commands with a different value. This is especially usefull when the database contains characters that are special characters in LaTeX, like the percent sign ('%'), underscore ('_') etc.

When SQLTEX is installed, it comes with a standard file—SQLTeX_r.dat—which is located in the same directory where SQLTeX is installed, with the following replacements:

```
$ \$
- \_
% \%
& \&
< \texttt{<}
> \texttt{>}
{ \{
} \}
# \#
~ \^{{}}
\ensuremath{\backslash}
```

These are all single character replacements, but you can add your own replacements that consist of a single character or a character sequence (or even regular expressions, see section 2.2.1).

To do so, enter a new line with the character(string) that should be replaced, followed by one or more TAB-character(s) (not blanks!) and the character(string) it should be replaced with.

If the first non-blank character is a semicolon (';'), the line is considered a comment line³. Blank lines are ignored.

The contents of the file are case sensitive, so of you add the line: LaTeX \LaTeX\ the word "LaTeX" will be changed, but "latex" is untouched.

Different replace files can be created. To select a different replace file for a certain SQLTEX source, use the commandline option '-r filename'. To disable the use of replace files, use '-rn'.

2.2.1 Regular expressions

The replace file can include regular expressions, which are recognized by a pattern given in the configuration setting rfile_regexp. A part of the pattern, configurable as rfile_regexploc, will be the actual regular expression.

By default, rfile_regexploc is "..." and rfile_regexp is "re(...)". If the sequence of three dots can appear anywhere else in the replace file, rfile_regexploc can be changed to any other sequence of characters, e.g. "regexpHere".

This also requires rfile_regexp to be changed. Its new value has to be "re(regexpHere)"

Both in the default configuration and with the modification example given above, the key for regular expressions is re(<regular expression>), e.g.: re(<p\.*?>) \paragraph*{} will replace all HTML variants (, etc)

An example replacement file using regular expressions to handle HTML codes could look like this:

```
\&
&
<strong>
                 \textbf{
                 }
</strong>
                 \textit{
<em>
</em>
                 }
re(<br.*?/?>)
                 //
re(<p.*?>)
                 \paragraph*{}
\\[0pt]
                 $^{
<sup>
</sup>
                 }$
re(<span.*?>)
                 \text{textsl}
</span>
re(<h1.*?>)
                 \section{
```

 $^{^3}$ in the default configuration. See the description for rfile_comment in section 2.1 to change of disable comment lines.

```
re(<h2.*?>) \subsection{
re(<h3.*?>) \subsubsection{
re(</h\d>) }
```

3 Write your SQLT_EX file

For SQLT_EX, you write your I^AT_EX document just as you're used to. SQLT_EX provides you with some extra commands that you can include in your file. The basic format⁴ of an SQLT_EX command is: \sqlcmd[options]{SQL statement}

All SQLTEX commands can be specified anywhere in a line, and can span multiple lines. When SQLTEX executes, the commands are read, executed, and their results—if they return any—are written to the output:

Above you see the SQLTEX command \sqldb was removed. Only the command was removed, not the newline character at the end of the line, so an empty line will be printed instead. The example below shows the output is an SQLTEX command was found on a line with other LATEX directives:

In these examples the SQLTEX commands did not return a value. When commands actually read from the database, the returned value is written instead:

```
Input file: Output file: This invoice has \sqlfield{SELECT} This invoice has 4 lines COUNT(*) FROM INVOICE_LINE WHERE INVOICE_NR = 12345} lines.
```

⁴in this document, in all examples will be assumed the default values in the configuration section as described in section 2.1, have not been changed

3.1 SQL statements

This document assumes the reader is familiar with SQL commands. This section only tells something about implementing them in SQLTEX files, especially with the use of command parameters and variables. Details about the SQLTEX commands will be described in the next sections.

Let's look at a simple example. Suppose we want to retreive all header information from the database for a specific invoice. The SQL statement could look something like this:

```
SELECT * FROM INVOICE WHERE INVOICE_NR = 12345;
```

To implement this statement in an SQLTEX file, the \sqlrow command should be used (see section 3.4):

First, it is important to know that SQL statements should *not* contain the ending semicolon (;) in any of the SQLTEX commands. The command in SQLTEX would be:

```
\sqlrow{SELECT * FROM INVOICE WHERE INVOICE_NR = 12345}
```

Next, SQLTEX would be useless if you have to change your input file every time you want to generate the same document for another invoice.

Therefore, you parameters or variables can be used in your SQL statement. Parameters are given at the command line (see section 4.1), variables can be defined using the \sqlfield command as described in section 3.3.1.

Given the example above, the invoice number can be passed as a parameter by rewriting the command as:

```
\sqlrow{SELECT * FROM INVOICE WHERE INVOICE_NR = $PAR1} or as as variable with the code line:
\sqlrow{SELECT * FROM INVOICE WHERE INVOICE_NR = $VARO}
```

Note you have to know what datatype is expected by your database. In the example here the datatype is INTEGER. If the field "INVOICE_NR" contains a VARCHAR type, the \$PARamater or \$VARiable should be enclosed by quotes:

```
\sqlrow{SELECT * FROM INVOICE WHERE INVOICE_NR = '$PAR1'}
```

3.2 Opening the database

Before any information can be read from a database, this database should be opened. This is done with the \sqldb command. \sqldb requires the name of the dabatase. Optionally, a username and password can be given. When omitted, SQLTEX assumes no username and password is required to connect to the database (the user that executes SQLTEX should have access to the specified database).

The format of the command is:

```
\sqldb[username,password]{database}
```

The command can be used anywhere in your input file, but should occur before the first command that tries to read data from the database.

3.3 Reading a single field

When a single field of information is to be read from the database, the command \sqlfield is used. By default, the command in the inputfile is replaced by its result in the outputfile.

The SQL command is enclosed by curly braces. Square brackets can optionally be used to enter some extra options. Currently, the only supported option is setvar (see section 3.3.1).

The full syntax or the \sqlfield command is:

\sqlrow[options]{SELECT fieldname FROM tablename WHERE your where-clause} By default, the SQLTEX command is replaced with the value returned by the SQL query. This behaviour can be changed with options.

3.3.1 Define variables

The \sqlfield can also be used to set a variable. The value returned by the SQL query is not displayed in this case. Instead, a variable is created which can be used in any other SQL query later in the document (see also section 3.1).

Therefore, the option $[\mathtt{setvar}=n]$ is used, where n is an integer between 0 and 9.

Suppose you have an invoice in IATEX. SQLTEX is executed to retrieve the invoice header information from the database for a specific customer. Next, the invoice lines are read from the database.

You could pass the invoice number as a paramater to SQLTEX for use in your queries, but that could change every month. It is easier to:

- pass the customer number as a parameter,
- retrieve the current date (asuming that is the invoice date as stored in the database by another program), and store it in a variable:
 \sqlfield[setvar=0]{SELECT DATE_FORMAT(NOW(), "%Y-%m-%d")}
 This creates a variable that can be used as \$VARO,
- retrieve the invoice number using the customer number (a command line parameter, see also section 4.1) and the variable containing the invoice date. Store this invoice number in \$VAR1:

```
\sqlfield[setvar=1]{SELECT INVOICE_NR FROM INVOICES
WHERE CUST_NR = '$PAR1' AND INVOICE_DATE = '$VARO'}
```

• use \$VAR1 to retrieve all invoice information.

The SQL queries used here do not display any output in your LATEX document.

3.4 Reading rows of data

When an SQL query returns more information than one single field, the SQLTEX command \sqlrow should be used. As with the \sqlfield, command, SQLTEX

replaces the command with the values it returns, but \sqlrow accepts different options for formating the output.

By default, fields are separated by a comma and a blank (', '), and rows by a newline character ('\\'). To change this, the options "fldsep" and "rowsep" can be used.

e.g. In a tabular environment the fields should be seperated by an amphesand (&), perhaps a line should seperate the rows of information. (\\ \hline). To do this, the options can be used with \sqlrow as shown here: \sqlrow[fldsep=&,rowsep=\\ \hline]{SELECT I.LINE_NR, A.ARTICLE_NR, A.PRICE, I.AMOUNT, (A.PRICE * I.AMOUNT) FROM ARTICLE A, INVOICE_LINE I WHERE I.INVOICE_NR = \$VAR1 AND I.ARTICLE_NR = A.ARTICLE_NR}

This will produce an output like:

```
1 & 9712 & 12 & 1 & 12 \\ hline
2 & 4768 & 9.75 & 3 & 29.25 \\ hline
3 & 4363 & 1.95 & 10 & 19.5 \\ hline
4 & 8375 & 12.5 & 2 & 25 \\ hline
```

3.4.1 Output rows on seperate lines

Some IATEX packages require input on a seperate line. If this output is to be read from a database, this can be set with the rowsep option using the fixed text "NEWLINE".

3.4.2 Store data in an array

The \sqlrow command can also be used to store the data in an array. The value returned by the SQL query is not displayed in this case. Instead, an array is created which can be used later the document in a loop context (see section 3.5).

Therefore, the option $[\mathtt{setarr} = n]$ is used, where n is an integer between 0 and 9.

3.5 Loop context

In a loop context, an array if filled with data from the database using \sqlrow. Later in the document, the data can be used in a textblock that will be written to the outputfile once for every record retrieved.

The textblock is between the $\operatorname{sqlstart}\{n\}$ and $\operatorname{sqlend}\{n\}$ commands, where n is the sequence number of the array to use⁵.

Multiple textblocks can occur in the document, but they can *not* be nested!

In the example below, data for unpaid invoices is stored in an array identified with sequence number 0:

⁵ in \sqlend, the sequence number is ignored, but required by syntax.

```
\sqlrow[setarr=0]{SELECT I.INVOICE_NR AS nr
, I.DUE_DATE AS date
, I.TOTAL AS amount
, C.NAME AS customer
FROM INVOICES I
LEFT OUTER JOIN CUSTOMERS C
    ON C.CUST_NR = I.CUST_NR
WHERE I.PAY_DATE = NULL}
```

To use this data, a textblock must start with: \sqlstart{0}
Between this command and the first occurrence of \sqlend{}, an unlimited
amount⁶ of L^AT_EX text can be. Within this text, every occurrence of \sqluse{<field
name>} will be replaced with the matching field from the current row, e.g.:

```
\sqlstart{0}
\begin{flushright}
Regarding: invoicenumber \sqluse{nr}
\end{flushright}
Dear \sqluse{customer},
```

On \today , the invoice with number \sqluse{nr} , payable before \sqluse{date} , was not yet received by us.

We kindly request you to pay the amount of \texteuro\sqluse{amount} as soon as possible.

\newpage
\sqlend{}

3.6 Output multiple documents

A single input file can be created to generate more output files. This option retrieves the first parameter (see section 4.1) from the database (ignoring any parameters that where given on the command line!).

The input document must contain the command \sqlsetparams (in the default configuration) without any options. The query that follows can return an unlimited number of rows all containing exactly 1 field:

\sqlsetparams{SELECT INVOICE_NR FROM INVOICES WHERE PAY_DATE = NULL}

By processing this command, SQLTEX builds a list with all values retrieved and processes the input file again for each value.

In those runs, the queries are executed as described in the previous sections, using the value as a parameter:

\sqlrow{SELECT * FROM INVOICES WHERE INVOICE_NR = \$PAR1}

⁶ limited by your computer's memory only

To enable the multidocument mode, the command line switch -m or -M must be given and no parameters are allowed. The switches -m and -M cannot be used together.

Without the -m or -M switch, a parameter can be given and a single output document will be created, ignoring the \sqlsetparams command.

With the -m switch, output filenames will be numbered $filename_1.tex$ to $filename_n.tex$.

With the -M switch, output filenames will be numbered *filename_parameter*.tex, where *parameter* is the value taken from the database (invoice_nr in the example above). Note the parameter will not be formatted to be filename-friendly!

3.7 Update database records

Since version 1.5, SQLTEX supports database updates as well: \sqlupdate{UPDATE INVOICES SET REMINDERS = REMINDERS + 1, LAST_REMINDER = NOW() INVOICE_NR = \$VAR1}

This command accepts no options.

4 Process your SQLT_EX file

To process you SQLTEX file and create a LATEX file with all information read from the database, call SQLTEX with the parameter(s) and (optional) command-line options as described here:

4.1 Parameters

SQLTEX accepts more than one parameter. The first parameter is required; this should be the input file, pointing to your LATEX document containing the SQLTEX commands.

By default, SQLTEX looks for a file with extension '.tex'.

All other parameters are used by the queries, if required. If an SQL query contains the string $PARn^7$, it is replaced by that parameter (see also section 3.1).

4.2 Command line options

SQLT_FX accepts the followint command- line options:

-c file SQLTEX configuration file. Default is SQLTeX.cfg in the same location where SQLTEX is installed.

 $^{^{7}}$ where n is a number between 1 and 9. Note parameter '0' cannot be used, since that contains the filename!

-e string add string to the output filename: input.tex will be inputstring.tex.
This overwrites the configuration setting stx
In string, the values between curly braces {} will be substituted:

 $\mathbf{P}n$ parameter n

 \mathbf{M} current monthname (Mon)

 \mathbf{W} current weekday (Wdy)

 \mathbf{D} current date (yyyymmdd)

DT current date and time (yyyymmddhhmmss)

T current time (hhmmss)

e.g., the command 'SQLTeX -e _{P1}_{W} my_file code' will read 'my_file.tex' and write 'myfile_code_Tue.tex' The same command, but with option -E would create the outputfile myfile._code_Tuesday By default (without -e or -E) the outputfile myfile_stx.tex would have been written. The options -E and -e cannot be used together or with -o.

- -E string replace input file extension in outputfile: input.tex will be input.string

 For further notes, see option -e above.
- -f force overwrite of existing files. By default, SQLTEX exists with a warning message it the outputfile already exists.
- -h print this help message and exit.
- -m Multidocument mode; create one document for each parameter that is retrieved from the database in the input document (see section 3.6). This option cannot be used with -o.
- -M Same as -m, but with the parameter in the filename instead of a serial number (see section 3.6).
- -N NULL return values allowed. By default SQLTEX exits if a query returns an empty set.
- -o file specify an output file. Cannot be used with -e or -E.
- -p *prefix* prefix used in the SQLTEX file. Default is sql (see also section 2.1 on page 3. This overwrites the configuration setting cmd_prefix.
- -P prompt for database password. This overwrites the password in the input file.
- -q run in quiet mode.
- -r replace Specify a file that contains the replace characters (see section 2.2). This is a list with two TAB- seperated fields per lione. The first field holds a string that will be replaced in the SQL output

- -rn Do not use a replace file. -rn and -r file are handled on the same order in which they appear on the commandline and overwrite each other.
- -s server SQL server to connect to. Default is localhost.
- -U user database username. This overwrites the username in the input file.
- -V print version number and exit.

5 SQLTEX errors and warnings

no input file specified

SQLTEX was called without any parameters.

Action: Specify at least one parameter at the commandline. This parameter should be the name of your input file.

File input filename does not exist

The input file does not exist.

Action: Make sure the first parameter points to the input file.

outputfile output filename already exists

The outputfile cannot be created because it already exists.

Action: Specify another output filename with command line option -e, -E or -o, or force an overwrite with option -f (see also section 4.2).

no database opened at line line nr

A query starts at line $line\ nr$, but at that point no database was opened yet. Action: Add an \sqldb command prior to the first query statement.

insufficient parameters to substitute variable on line line nr

The query starting at line $line\ nr$ uses a parameter in a WHERE- clause with PARn, where n is a number bigger than the number of parameters passed to $SQLT_{EX}$.

Action: Specify all required parameters at the command line.

trying to substitute with non existing on line line nr

The query starting at line $line\ nr$ requires a variable \$VARn in its WHERE-clause, where n points to a variable that has not (yet) been set.

Action: Change the number or set the variable prior to this statement.

trying to overwrite an existing variable on line line nr

At line line nr, a \sqlfield query tries to set a variable n using the option [setvar=n], but \$VARn already exists at that point.

Action: Change the number.

no result set found on line line nr

The query starting at line $line\ nr$ returned a NULL value. If the option -N was specified at the commandline, this is just a warning message. Otherwise, SQLT_FX exits.

Action: None.

result set too big on line line nr

The query starting at line *line nr*, called with \sqlfield returned more than one field.

Action: Change your query or use \sqlrow instead.

no parameters for multidocument found on line $line\ nr$

SQLTEX is executed in multidocument mode, but the statement on line $line\ nr$ did not provide any parameters for the documents.

Action: Check your query.

too many fields returned in multidocument mode on line nr

In multidocument mode, the lis of parameters retrieved on line $line\ nr$ returned more than one fiels per row.

Action: Check your query.

start using a non-existing array on line line nr

An \sqlstart command occurs, but refers to a non-existing array.

Action: Check the sequence number of the array filled with $\sqlrow[setarr=n]$ and retrieved with $\sqlstart\{n\}$ in your input file.

\sqluse command encountered outside loop context on line line nr

Data from array is used, but the current input file position is not in the context where this data is available.

Action: Check the presence and positions of the \sqlstart and \sqlend commands in your input file.

unrecognized command on line line nr

At line line nr, a command was found that starts with "\sql", but this command was not recognized by SQLTEX.

Action: Check for typos. If the command is a user- defined command, it will conflict with default SQLTEX commands. Change the SQLTEX command prefix (see section 2.1).

no sql statements found in input filename

SQLTFX did not find any valid SQLTFX commands.

Action: Check your input file.

6 Copyright and disclaimer

The SQLTEX project is available from GitHub: https://github.com/oveas/sqltex The latest stable release is always available at http://freeware.oveas.com/sqltex For bugs, questions and comments, please use the issue tracker available at https://github.com/oveas/sqltex/issues

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