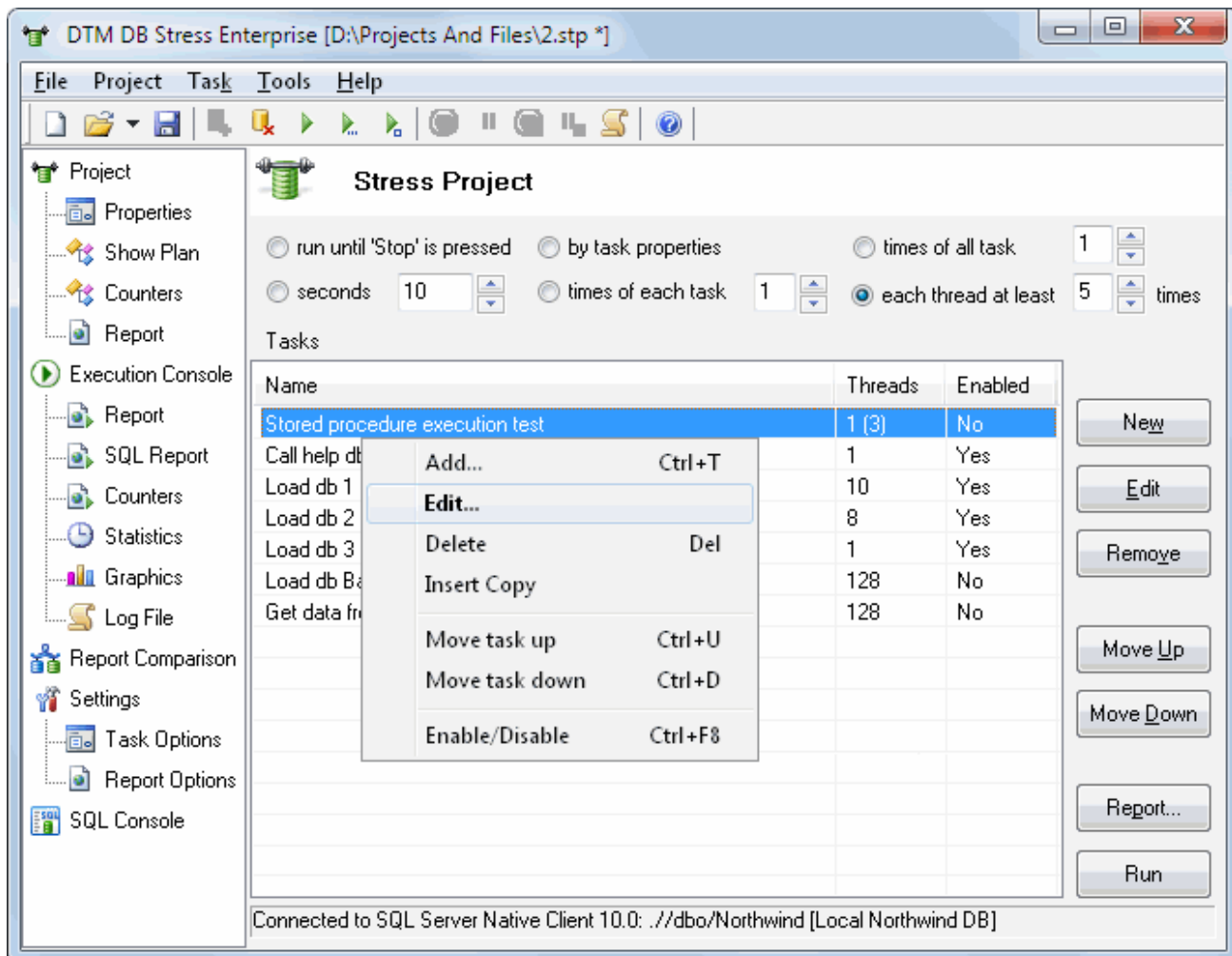


About the database stress testing tool

DTM DB Stress is a utility for stress testing the server parts of information systems and applications, as well as DBMSs and servers themselves. This tool allows you to create and configure a continuous set of requests to the server of the OLAP (query execution) and OLTP (adding, modifying and deleting data in the database) types. At the same time, the user can flexibly change both the number and the priority of this or that type of requests to a database or an application.

The program is useful for any information system developer or any QA department employee who wants to make sure the product under development can work with a large number of simultaneous connections and concurring queries and transactions. Database administrators can use this utility to evaluate the current performance of servers and to make plans about increasing processing power.

A test project consists of a set of [tasks](#). Each task is an SQL statement that will be executed in a loop in the process of testing. Each task can be run as several copies running simultaneously in separate threads. Tasks have different properties and priority. In the last three cases those iterations that are already in process are not interrupted, but executed to an end, that is why the actual number of executed iterations may exceed the specified value or time a little.



DTM DB Stress is a Windows application, known to be compatible with the following operating systems: Windows XP, Windows 2003 and newer Server family and Windows Vista, 7, 8/10 (desktop). The 64-bit edition is also available.

Product Versions

There are three versions of the software product. Please refer the following table to explore differences between the product versions.

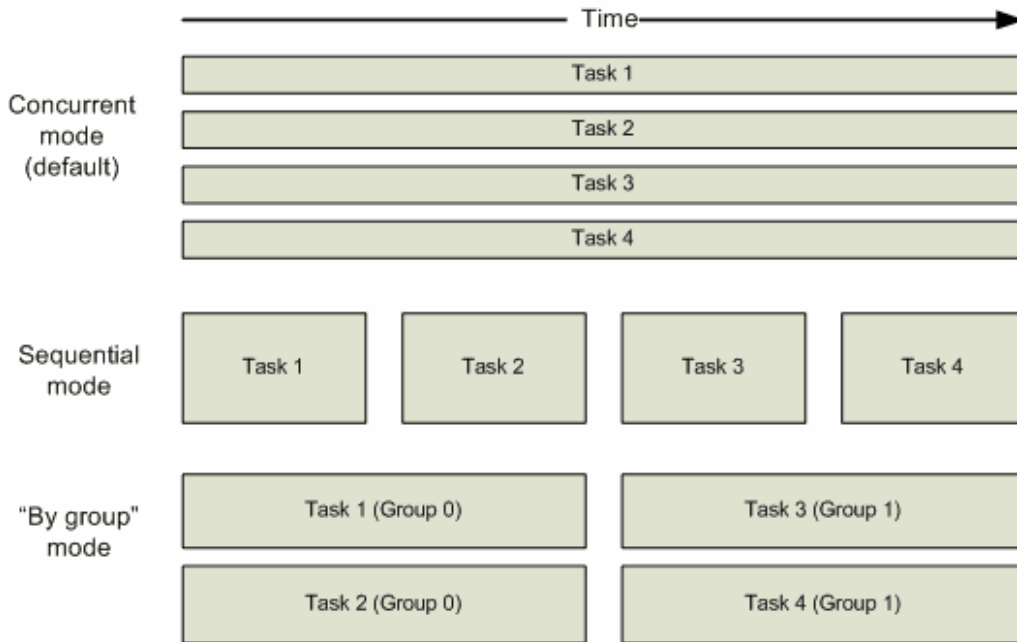
With professional and enterprise versions you can use runtime license. This license allows your team to run stress test process without full DTM DB Stress license.

Option	Standard	Professional and Runtime	Enterprise
Maximum number of concurrent threads	64	Unlimited*	Unlimited*
Maximum number of SQL parameters	10	99	99
Values file delimiter customization	No, TAB only	Yes	Yes
Product Settings export and import features	No	Yes	Yes
Statistics interval customization	No, 30 seconds only	Yes	Yes
Custom task connections	No	Yes	Yes
Import script feature	No	Yes	Yes
"By group" execution mode	No	Yes	Yes
Built-in data generator	No	Yes	Yes
Task prologue and epilogue scripts	No	Yes	Yes
Console mode	No	Yes	Yes
SQL Library	No	No	Yes
The report comparison feature	No	No	Yes
The report Visualizer	No	No	Yes
Visual Source Safe support	No	No	Yes
Performance counter feature support	No	No	Yes
The execution plan feature support	No	No	Yes

* - your operating system can limit the number of threads. For most cases, this limit is about 2028 threads.

Stress project execution modes and methods

There are three execution modes: concurrent, sequential and '[by group](#)'.



There are several methods to finish a project (job):

1. Manual, when the user himself has to click the Stop button at the execution [console](#) or toolbar.
2. According to the properties of each task - each copy of each task is executed as many times as specified in its [properties](#).
3. By time - all tasks will be running at least for the number of seconds specified by the user. The control precision is about 0.5 seconds for this method.
4. By the overall number of executed iterations. A project is finished if the overall number of iterations for all copies (threads) of all tasks exceeds the specified value.
5. By the number of times each task is executed. A project is finished when each copy (thread) of each task is executed the specified number of times.
6. By the number of times each thread is executed. A project is finished when thread copy of each task is executed at least the specified number of times.*

* - this method is not compatible with 'sequential' and 'by group' modes.

All or checked threads can be paused. To continue execution use the same Pause/Continue button.



Task Properties

This dialog box helps you to set task properties. All properties are grouped into four sets:

1. [General properties](#)
2. [Options](#)
3. [Parameters](#)
4. [Custom connection](#)*
5. [Prologue and epilogue](#)*

* - for Professional and Enterprise [versions](#) only.

The program shows connection information for this task at the bottom of the window. By default, it is same connection as specified at the main window. However, users of the professional version allowed to specify the custom connection for any individual task.

General Task Properties

This dialog box helps you to set general task properties. The most important properties are:

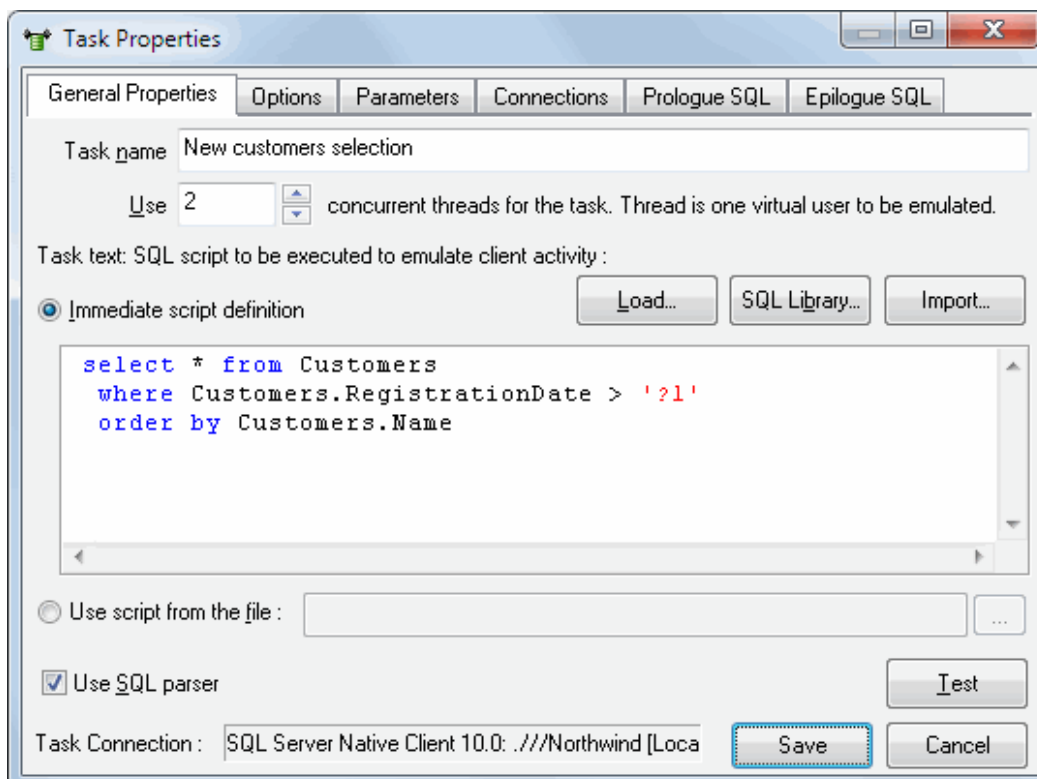
1. Task name - displayed in the task list in the main program window.
2. A number of concurrent threads the program should create for a task of this type.
3. The text of the SQL statement representing the content of the task - it is exactly what will be executed within this task. You should switch on "Use SQL parser" option in case you want to use complex script (set of SQL statements). "go" or ";" statements separators are recommended. There are two ways to specify SQL script: immediately entering or external file reference.

Also, this dialog box allows you to load an SQL statement from a file on the disk (the "Load" button), from [SQL Library](#) and to test if the current statement is correct (the "Test" button).

The stress tool allows you to select one of three ways to use the file with [data](#). In the first case, all task threads use the file with data independently. It means that they open the file on their own and sequentially process records in it. In the second case, each thread uses only one set of values (a string with data) from the file. In this case, the number of strings in the file with data must coincide with the number of threads launched for the task. The third way is when all threads read from the file sequentially.

"Use SQL parser" option instructs the tool that source SQL script should be split to a few SQL statements. The program executes it sequentially in this case. When the option is switched off (by default) DTM DB Stress passes the whole script to database directly.

"Run the whole script as a single transaction" works together with "SQL parser". If the option is switched on the stress tool start transaction at the begin of the script execution and commits it and the end. Otherwise, the program uses "autocommmmit" mode, i.e. each SQL statement is one transaction.



Note: the user can specify default values for most important task properties at [Settings](#) window.

See also: [import SQL script](#) feature.

Additional Task Properties

This tab helps the user to specify additional properties of the task. They are:

1. A number of iterations to be performed before the task is executed. Important: this option works with "by task property" [execution mode](#) only.
2. Task priority - normal, high or low.
3. The delay between iterations during the task execution. The user can specify minimum and maximum interval size. The program uses exact interval size in case right border not specified or \leq than the left border.
4. The delay between SQL statement execution (for tasks that contain more than one SQL statements). The user can specify minimum and maximum interval size.
5. The program can add a delay between the first SQL statements execution for the script mentioned above. Please set up "Initial statement delay" value (0 by default) for this purpose.
6. Fetch all obtained records into the result set or only the specified number of the first ones. This option makes sense only for tasks that produce a result set.
7. Output information for the task. The program will create data file "Task_#_Thread_#.txt" with fetched data if this option is switched on and the user provide correct output folder. The file format is tab-delimited without column header.
8. [Group](#) number (Professional and Enterprise [versions](#) only)

The screenshot shows the 'Task Properties' dialog box with the 'Options' tab selected. The dialog has several tabs: 'General Properties', 'Options', 'Parameters', 'Connections', 'Prologue SQL', and 'Epilogue SQL'. The 'Options' tab contains the following settings:

- Execute task:** 15 times. 0 is no limitation.
- Task Priority:** Normal (dropdown menu)
- Initial task delay:** 0 ms
- Task to task delay between:** 1 and 1 ms
- Statement to statement delay between:** 0 and 0 ms
- Fetching Mode:**
 - Fetch all existing data from the results set
 - Fetch top 25 rows only, use 0 for 'no rows' mode
- Save fetched data rows:**
- Output directory:** (empty text box with a browse button)
- Task Group:** 0
- Task Connection:** SQL Server Native Client 10.0: .//Northwind [Local]

Buttons for 'Save' and 'Cancel' are located at the bottom right of the dialog.

Parameters for the Task

This tab helps the user to specify parameters for dynamic SQL [statements](#). The value separator in the file with values can be specified as well.

The screenshot shows the 'Task Properties' dialog box with the 'Parameters' tab selected. The 'Use External Data File' radio button is chosen. Under 'Data File', the 'Optional Value File' is set to 'd:\results\values.txt'. The 'Value separator' is set to '<tab>'. The 'Use Generated Values' radio button is also visible. Under 'Parameter Properties', 'Parameter 1' is selected, the 'Value Type' is 'Random Integer', and the range is set to 'Between 0 and 32000'. The generated SQL expression '\$RInt(0,32000)' is shown at the bottom. The 'Task Connection' is 'SQL Server Native Client 10.0: //./dbo/NorthwindOriginal'.

Note: %PRODUCT_PATH% macro can be used to specify a relative path to the installation directory.

See also: built-in [data generator](#).

Connection Task Properties

This tab helps you to specify a custom connection for the task. This option is available in the Professional and Enterprise [versions](#) only.

The screenshot shows a Windows-style dialog box titled "Task Properties". It has several tabs: "General Properties", "Options", "Parameters", "Connections" (which is selected), "Prologue SQL", and "Epilogue SQL".

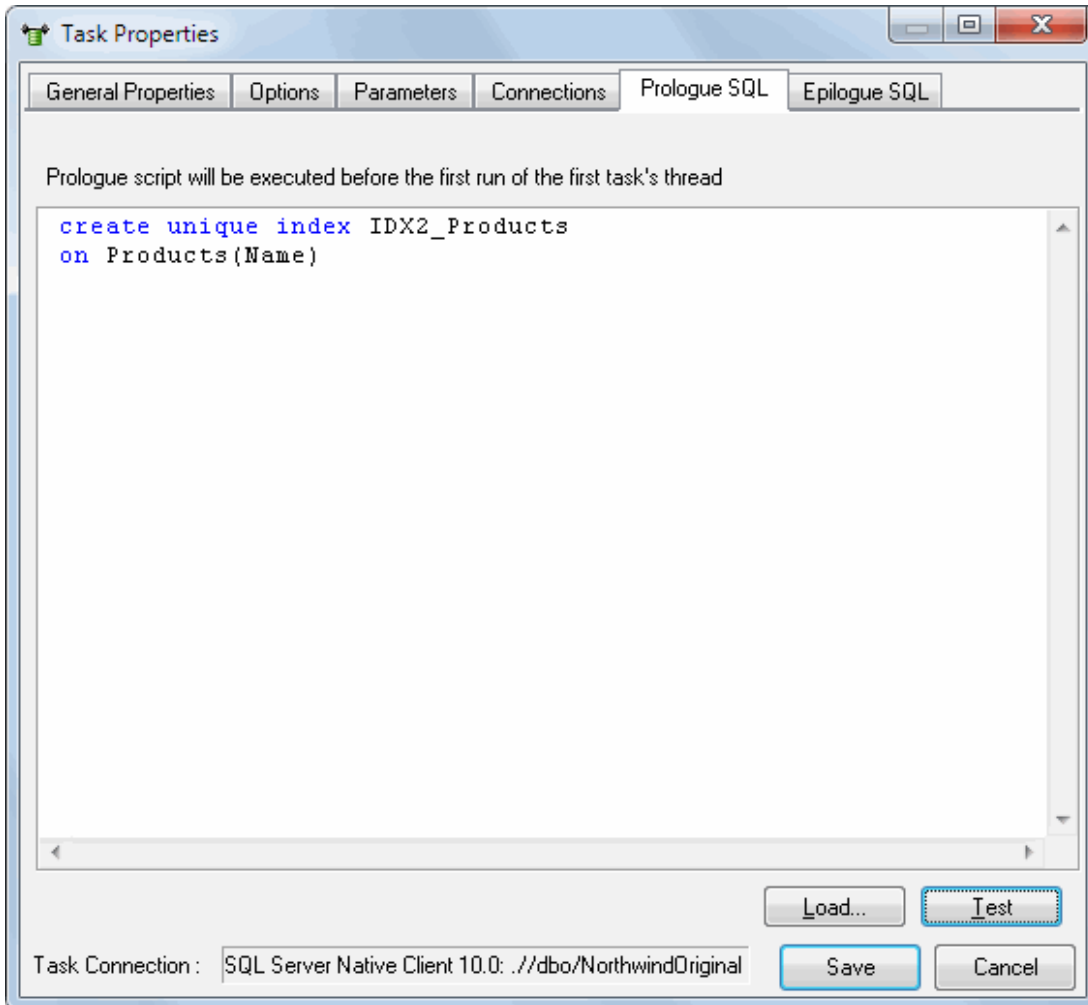
Under the "Connections" tab, there are two radio button options:


- Use default connection for this task
Below this option is a text box containing: "SQL Server Native Client 10.0: //dbo/NorthwindOriginal [Local Northwind DB]"
- Use custom connection
Next to this option is a small button with three dots "...". Below it is a text box containing: "ODBC: //"

At the bottom of the dialog, there is a label "Task Connection:" followed by a text box containing "SQL Server Native Client 10.0: //dbo/NorthwindOriginal". To the right of this text box are two buttons: "Save" and "Cancel".

Prologue and Epilogue Scripts

The user can define scripts for execution before and after main task's activity. It helps the user to prepare environment like enable or disable triggers, update indexes, etc. This option is available in the Professional and Enterprise [versions](#) only.





Groups of Tasks

A few tasks can be united to a group. The only reason of this operation is "by group" [execution mode](#) usage.


When you use this execution method the [stress tool](#) runs all tasks of the first group, wait for all group tasks, runs the second group, etc. The [Standard](#) edition of the tool does not support this method.

Important note: you must enumerate groups sequentially starting from 0.

The Execution console is a window that shows the current status of the stress project execution.

It contains one line for each thread of the project. About each thread the console window shows:

- Name of the thread's task.
- A number of the threads of the task.
- Thread status.
- How many times the thread was already executed.

 **3 seconds, 140 threads executed, 35.0 per second**

Task	Thread	Status	Executed
<input type="checkbox"/> New customers selection	1	All done	15
<input type="checkbox"/> New customers selection	2	All done	15
<input type="checkbox"/> New customers selection	3	All done	15
<input type="checkbox"/> New customers selection	4	All done	15
<input type="checkbox"/> Load Customers	1	All done	10
<input type="checkbox"/> Load Customers	2	All done	10
<input type="checkbox"/> Load Customers	3	All done	10
<input type="checkbox"/> Load Customers	4	All done	10
<input type="checkbox"/> Load Customers	5	All done	10
<input type="checkbox"/> Load Customers	6	All done	10
<input type="checkbox"/> Load Customers	7	All done	10
<input type="checkbox"/> Load Customers	8	All done	10

Please note that you can run project's task sequentially or "by group" instead of concurrent with the related item in File menu or toolbar buttons.

The program can create three report types. They are:

1. HTML report contains summary information, execution times for project, tasks and threads.
2. Text/Excel report contains threads-level information in machine readable tab-delimited format. It can be open by Microsoft Excel.
3. SQL statements report. This report contains actually executed SQL statements with the time of execution and fetching.
4. Internal report. This report is suitable for report [comparison](#) and available in the Enterprise edition only.

The following table describes most important report items.

Item	Description
Project Initialization Time	Sum of initialization time of all active project's tasks
Total Project Execution Time	Actual (objective) time of the project execution including initialization and termination
Execution Mode	Please, refer to " execution modes " for details
Task Initialization Time	Actual (objective) time of the task preparation including all threads creation and run
Total Task Duration	Sum of all task's threads execution time
Executed times	Number of completed iterations of the current thread
Average Speed	Average number of completed iterations per second
Max Duration	Maximum time (seconds) was spent to current thread execution
Min Duration	Minimum time (seconds) was spent to current thread execution
Total Duration	Total thread execution time including initialization and data rows fetching

Built-in Data Generator

To make project rule more flexible the program contains simply data generator. It offers three predefined generators:

1. Random integer. The user can specify value range.
2. Random string. The user can specify length range and type of characters.
3. Random date and/or time. The user can specify value format.

Moreover, the user can specify custom pattern for data generation. There are pattern items:

- A - letter from 'A' to 'Z'.
- a - letter from 'a' to 'z'.
- N - digit from '0' to '9'.
- X - hexadecimal digit from '0' to '9' and 'A' to 'F'.
- {n} - repeater, value will be used from 1 to n times. n should be from 1 to 999.
- {=n} - repeater, value will be used n times.
- {n;m} - repeater, value will be used from n to m times. n should be less then m and both numbers from 1 to 999.
- # - copy value of the last used block of elements signed by (and).
- \$<function>(<parameters>) - call built-in generator's function.
- \$\$(<expression>) - calculate expression value.

Note: you can use '\' character for escape next mask sign. For example, \a will be used as a 'a' letter without any replacements.

Examples:

Description	Pattern	Sample results
IP address	<code>\$Rint(0,255).\$Rint(0,255).\$Rint(0,255).\$Rint(0,255)</code>	41.107.214.235 187.239.95.95 190.212.237.81
From 3 to 5 days after today	<code>\$\$(\$Today(DD.MM.YYYY)+\$RInt(3,5))</code>	14.12.2008 15.12.2008 14.12.2008 13.12.2008
One year after some date	<code>\$\$(\$Date(12.10.2008,DD.MM.YYYY)+365)</code>	12.10.2009
e-mail	<code>[a{3;6}.]a{3;7}\@a{3;8}.</code>	tlsg.psf@dpo.com xzbcoej@vpv.org ygp.eylfpbn@ljrvvipy.net


Please contact our support staff if you have difficulties during complex patterns creation or built-in functions usage.

Project Properties

The project has a few optional properties those helps stress testing process more flexible. Most important are:

1. A file what the program will use to save all executed SQL statements.
2. [Report](#) files for HTML, SQL, internal and text (Excel compatible) output.
3. Report description (note).
4. Report author.


Please note that you can use \$DATE\$ and \$TIME\$ macros in the names for all mentioned files.

 **Project Properties**


Note : Performance test #12

Author : Mark

Save executed SQL/DDDL statements to text file :


d:\stress.sql 

Write execution report to HTML document :




Open automatically after project execution

Write execution report to Excel compatible text file :

d:\stress.txt 

Write report in internal format for comparison to :

D:\report\$DATE\$.strep 

Note: \$DATE\$ and \$TIME\$ macros can be used as a part of the report file name.

Quick Start: [how to connect?](#)

There are five ways to connect to a database:

1. [Direct connection](#)
2. Connection to [desktop files](#)
3. [Data source](#) with ODBC, IDAPI or Oracle Call Interface (OCI)
4. [DSN File](#) connection
5. [OLE DB](#) connection

In all modes the "Test" and "Information" buttons, as well as tools for working with connection [profiles](#) are available. "Test" button allows you to check information you entered and/or data source (or alias) configuration.

See also:

- Troubleshooting [guide](#)
- Connection [information](#)
- Connection [profiles](#)

Connection Quick Start Guide

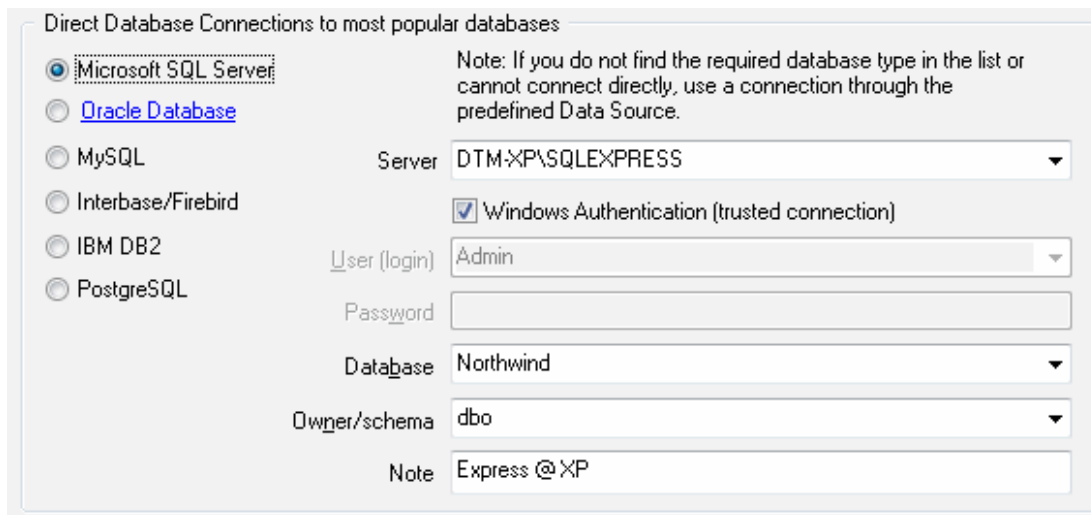
Database	How to connect
MS SQL Server	Enter or select server name at the direct connection panel
Local SQL Server Express	Enter .\SQLEXPRESS as server name at the direct connection panel
Oracle	1) Switch to data sources mode 2) select OCI as "Interface" 3) select your service name from data source drop-down menu
DB2	Use direct connection panel or Use predefined ODBC DSN for custom connection settings
MySQL	Install ODBC driver for MySQL from www.mysql.org Use direct connection panel or Use predefined ODBC DSN for custom connection settings
PostgreSQL	Use direct connection panel or Use predefined ODBC DSN for custom connection settings
Interbase/Firebird	Install ODBC driver Use direct connection panel or Use predefined ODBC DSN for custom connection settings
Microsoft Access	1) Switch to " Desktop File " panel 2) Select "Access" as file type, enter or select file name
Microsoft Excel	1) Switch to " Desktop File " panel 2) Select "Excel" as file type, enter or select file name
<i>Another database</i>	1) Install ODBC driver for your database system 2) Create ODBC data source name using Windows ODBC Administrator 3) Switch to data sources mode 4) select your data source from drop down menu

Direct Connection

The direct connection method allows you to connect to most popular databases ([MS SQL Server](#), [Oracle](#), [Interbase/Firebird](#), [MySQL](#), [PostgreSQL](#) and [DB2](#)).

Enter the server name and the database name, if required. The user name and password are optional. Their necessity depends on the settings of your database. The owner name (schema) is optional too. The list of visible database objects depends on the choice of the owner. If the owner is empty, you will access all objects. There is important that schema/owner name is case sensitive.

If you do not find the required database type in the list or cannot connect directly, use a connection through the predefined data source. If DBMS is in the list, but unavailable, it means that either the required ODBC driver is not installed or it is not configured properly. During its use, the program stores the entered values of server names, users and owners. You can select a value from the stored list using the corresponding combo box. For some DBMS types (MS SQL, for example), the program can fill the list of available databases. Use the button with two arrows for this purpose.



DBMS-specific connection options

Microsoft SQL Server

- "(local)", empty or "." server name means local server
- use <server name>\<instance name> syntax to identify instance. Example: .\SQLEXPRESS means SQL Express at the local system

Oracle

Use connect string for the Oracle Server that you want to access as a Server name.

Important: it is strongly recommended to use native Oracle Call Interface ([OCI](#)) instead of direct connection.

Interbase and Firebird

Examples:

- Server: **localhost** and Database **c:\interbase\myDb.fdb** - connect to specified DB on local system.
- Server: **172.17.2.10/3051** and Database **/usr/local/db/myDb.fdb** - connect to specified server with alternate port 3051 on remote system 172.17.2.10

MySQL

- Use **localhost** for local MySQL
- `example.com;port=3306` means MySQL at `example.com` on 3306 port

DB2

ServerName;port=5000;protocol=TCPIP as a server name means connect to `ServerName`, use 5000 port and TCP/IP protocol.

PostgreSQL

ServerName as a server name means connect to `ServerName`, use 5432 port and TCP/IP protocol. Database name is required. `localhost` as a server name is acceptable. To specify custom port you should add `";port=NNNN"` string to server name.

server_name_or_ip-address;port=5432;DATABASE=dbname

Desktop Files

The second way is designed for connecting to desktop data files. Select the required format and specify the file name or the directory where the data is located. Other parameters are optional.

Connections to Desktop Data File

Text file (*.txt, *.csv) Format: CustomDelimiter ANSI Delimiter: |

Microsoft Access file (*.mdb, *.accdb) use Microsoft Jet (ODBC by default)

dBase, FoxBase or FoxPro file (*.dbf)

Microsoft Excel file (*.xls, *.xlsx, *.xlsb)

Paradox file (*.db)

FoxPro database container (*.dbc)

SQLite database

Location: D:\Projects And Files\tickets.mdb Browse...

Authentication information, optional: Read Only mode

User / Login:

Password: Note: Tickets

Predefined data sources: ODBC, IDAPI, Oracle Call Interface

A connection with the use of a data source is the most universal. You can select ODBC, IDAPI or OCI (if installed) interface and the preconfigured data source name. In this case, other options are similar to those of a direct connection. The "Manage" button allows you to get access to the external configuration utility if it is available. When you want to access the tables belonging to the single database schema (or owner), you should fill the "owner" entry; otherwise, all tables will be accessed.

Connections to existing and configured data sources

Interface	<input type="text" value="ODBC"/>	<input type="checkbox"/> Manual commit
Data source	<input type="text" value="localserver"/>	<input type="button" value="Manage..."/>
User (login)	<input type="text" value="sa"/>	
Password	<input type="text" value="xxxxxx"/>	
Database	<input type="text" value="Northwind"/>	
Owner	<input type="text" value="dbo"/>	
Note	<input type="text" value="Local SQL Server"/>	

DSN File

The fourth way is using a DSN file. For this case, just select the file name with DSN definition.

Connections to existing and configured file DSN

File DSN name

Note

OLE DB connection

Use 'Configure' button to specify connection information. Password and owner fields are optional.

Connections using OLE DB providers

Connection properties Configure...

```
Provider=SQLOLEDB.1;  
Persist Security Info=False;  
User ID=sa;  
Initial Catalog=Northwind;  
Data Source=DTM-ACER2;  
Use Procedure for Prepare=1;  
Auto Translate=True;  
Packet Size=4096;
```

Password

Owner

Note

Connection Profiles

Connection profile helps you to save information about your connection (interface, data source or alias name, user name (login), password and database name, etc) and get access it by the one click.

Please fill connection properties and press "Add as new" to add a new profile. To modify the profile you should select it from the list at the top of the window, modify properties and press "Update". "Delete" button works when you select the profile to be deleted in the list.

"Save" and "Load" buttons allow you to save profiles to the disk file or load them. The "Export one" button helps to save single currently selected profile.

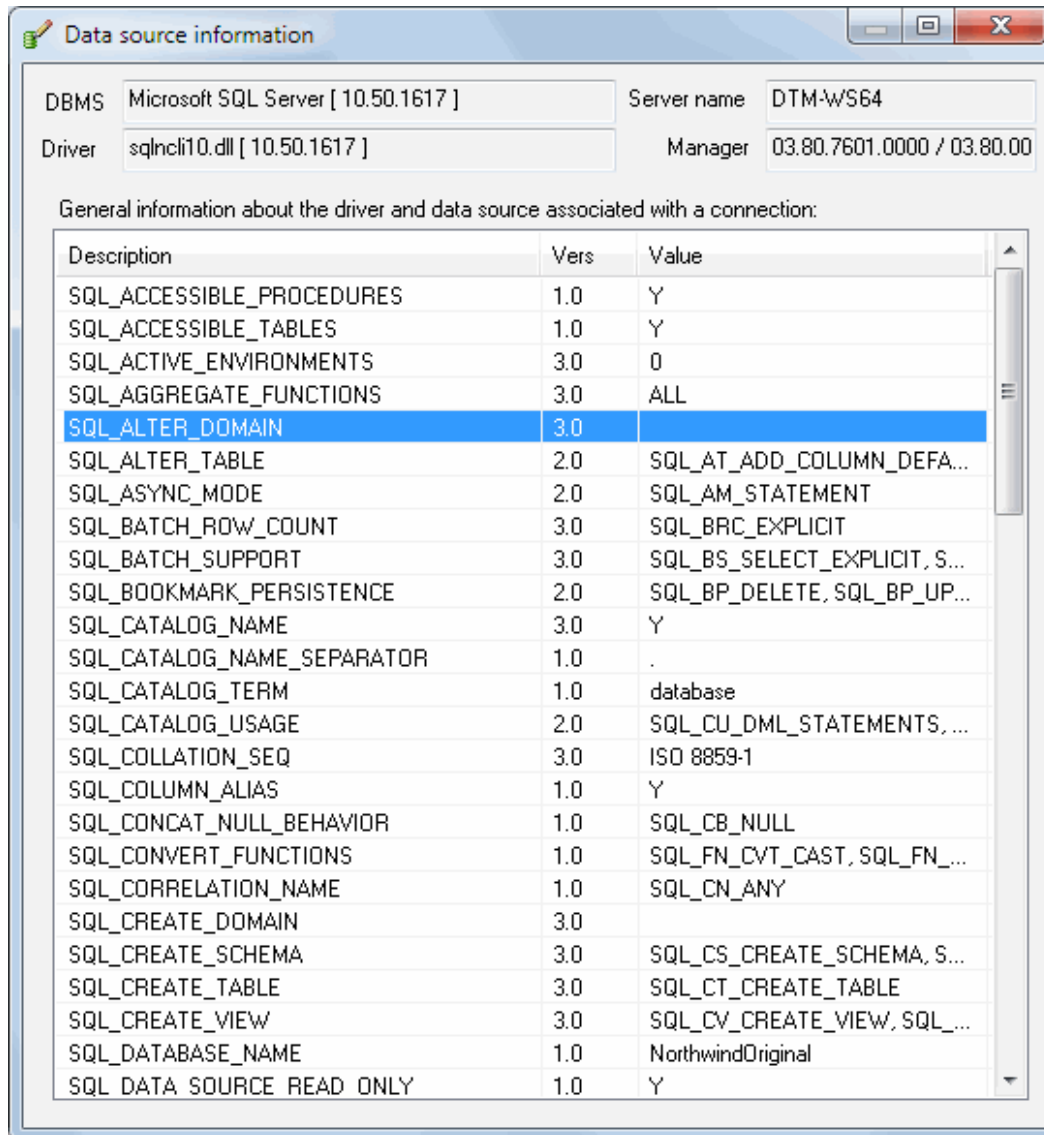
Important: all profiles are shared between all installed DTM soft products. That means once created profile can be used with any tool. At the other side if you remove the profile from the list you can't use it with DTM soft's products anymore.

Mode	Interface	Source or Server	User	Owner	Database	Note
Direct	ODBC	.			Northwind	Local server
Direct	ODBC	DTM-XP	sa		AdventureWorks	
Direct	ODBC	.		dbo	NorthwindOriginal	Local Read Only DB
DSN	ODBC	Saramdb				SaraMDB
DSN	ODBC	test_new				Test MDB
Desktop	ODBC	ACCESS				Test MDB
DSN	ODBC	test_old				Test MDB
Direct	ODBC	.		dbo		
Direct	ODBC	.		dbo		2
DSN	OCI	ORCL	OE			ORCL/OE
DSN	ODBC	ORCL_ODBC	OE	OE		ORCL/ODBC
DSN	OCI	10G	OE			Oracle 10g (VM)

Buttons: Add as New, Update profile, Remove profile, Export One..., Save..., Load...

Connection Information

The program provides detailed database, connection and driver information and properties. The "Information" button at the connect window allows you to view it.



The screenshot shows a window titled "Data source information" with the following fields:

- DBMS: Microsoft SQL Server [10.50.1617]
- Server name: DTM-WS64
- Driver: sqlncli10.dll [10.50.1617]
- Manager: 03.80.7601.0000 / 03.80.00

General information about the driver and data source associated with a connection:

Description	Vers	Value
SQL_ACCESSIBLE_PROCEDURES	1.0	Y
SQL_ACCESSIBLE_TABLES	1.0	Y
SQL_ACTIVE_ENVIRONMENTS	3.0	0
SQL_AGGREGATE_FUNCTIONS	3.0	ALL
SQL_ALTER_DOMAIN	3.0	
SQL_ALTER_TABLE	2.0	SQL_AT_ADD_COLUMN_DEFA...
SQL_ASYNC_MODE	2.0	SQL_AM_STATEMENT
SQL_BATCH_ROW_COUNT	3.0	SQL_BRC_EXPLICIT
SQL_BATCH_SUPPORT	3.0	SQL_BS_SELECT_EXPLICIT, S...
SQL_BOOKMARK_PERSISTENCE	2.0	SQL_BP_DELETE, SQL_BP_UP...
SQL_CATALOG_NAME	3.0	Y
SQL_CATALOG_NAME_SEPARATOR	1.0	.
SQL_CATALOG_TERM	1.0	database
SQL_CATALOG_USAGE	2.0	SQL_CU_DML_STATEMENTS, ...
SQL_COLLATION_SEQ	3.0	ISO 8859-1
SQL_COLUMN_ALIAS	1.0	Y
SQL_CONCAT_NULL_BEHAVIOR	1.0	SQL_CB_NULL
SQL_CONVERT_FUNCTIONS	1.0	SQL_FN_CVT_CAST, SQL_FN_...
SQL_CORRELATION_NAME	1.0	SQL_CN_ANY
SQL_CREATE_DOMAIN	3.0	
SQL_CREATE_SCHEMA	3.0	SQL_CS_CREATE_SCHEMA, S...
SQL_CREATE_TABLE	3.0	SQL_CT_CREATE_TABLE
SQL_CREATE_VIEW	3.0	SQL_CV_CREATE_VIEW, SQL_...
SQL_DATABASE_NAME	1.0	NorthwindOriginal
SQL DATA SOURCE READ ONLY	1.0	Y

Troubleshooting Guide

Problem description	Possible reason	Solutions
Required database type not present in the list at Direct Connection and Desktop Connection pages		Switch to "data source" connection mode and select data source from the list or configure new one with "Manage" button.
Required format is in the direct connection list, but not available (disabled).	ODBC driver for your database does not installed or not configured properly.	Install required driver. If it is already present in the system, please contact our support staff .
Errors during direct connection.	Compatibility problems.	Try to create data source for your database connection.
Login error for correct user name and password.	Read-only desktop data file.	Try to change file mode to 'read and write'.
I can't see relationships, defaults, etc in my Access Database.	Access interface.	Try to switch on "Use Microsoft Jet" check box at the "Desktop File" page of the Connect Window.

Execution Statistics

The program allows you to collect and display statistics about the execution of several tasks or threads. Not more than 5 by default. If there are more tasks or threads, the first ones are only used. This statistical information is used for evaluating changes in the performance over time. You can set a period for the statistics to be refreshed and some [other options](#).

Period#	Item 1	Item 2	Item 3	Item 4	Item 5
0	101	100			
1	93	93			
2	97	99			
3	93	94			
4	94	94			
5	96	95			
6	21	21			
7	78	77			



Product Settings

The program has some settings and options to make your work more comfortable. The settings collected to three pages: [general settings](#), [report properties](#), and [task properties](#).

The export and import settings features (Menu->Tools->Export/Import Settings) help users to move the software to another system.

The general settings page contains following items:

- "Stop on error" interrupts thread (virtual user) execution on the error when switched on.
- Statistics mode: by the task or by the thread. In the first case, the program calculates a total value for all task's threads.
- Statistics update: per period or per second. In the first case, the program updates the graph and statistics panel after each task's iteration.
- Statistics update interval, seconds. The save interval will be used for performance counter report.
- SQL library location (directory).
- Logging mode: disable, normal or full.
- Log file location.



General Product Settings

Stop thread on the first error; continue with error ignoring otherwise

Statistics

show statistics by task

show statistics by thread

show per period

show per second

Statistics and counters collection interval: seconds, 0 means disable statistics

SQL Library location :



Log level :

Core (default) ▼

Log File Location :

C:\Users\Wohn\AppData\Roaming\str.log



Task Settings

The general settings page contains default task properties i.e. properties of new task:

- A number of iterations. If the task created with "by task properties" option, this value defines a number of executions of the task script.
- A number of threads. It is a number of concurrent virtual users defined by this task script.
- Iteration interval between N and M. The program will add fixed (N equals M) or random (N<M) interval between script executions.
- Number of rows to be fetched
- Thread of the task priority (normal, low or high).
- Initial delay. The delay before the first iteration.
- The maximum size of a large object to be fetched.



Task Settings

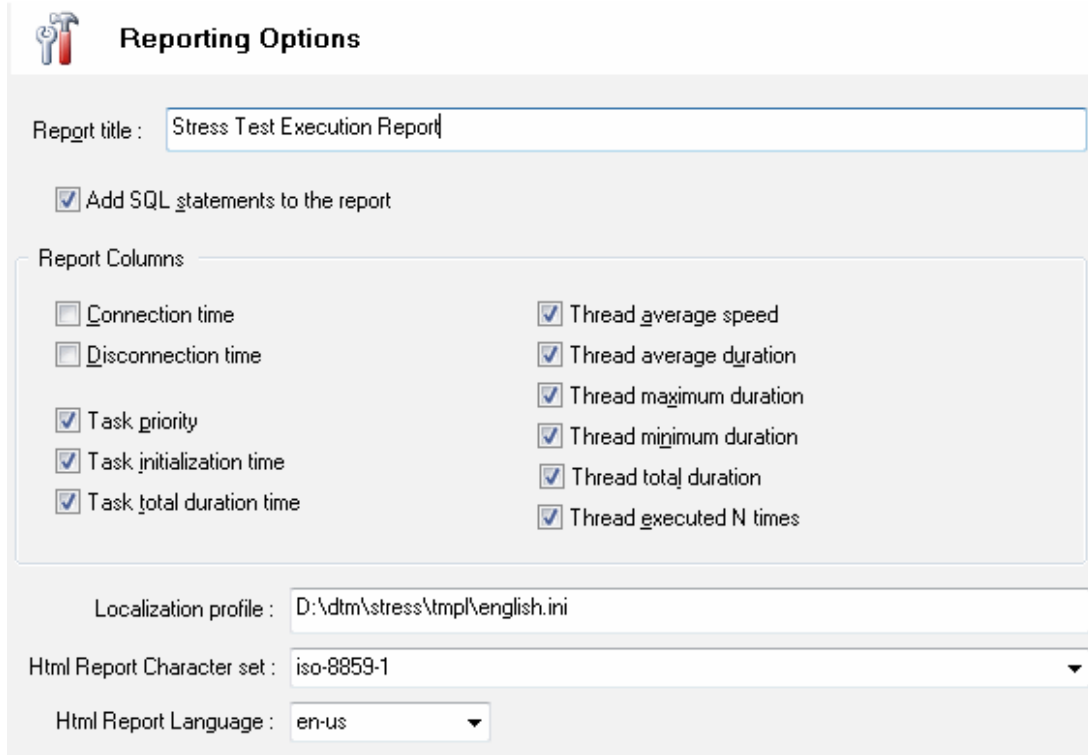
Default task properties

New task will be created with following properties :

Number of iteration for each thread :	<input type="text" value="0"/>
Number of threads for task :	<input type="text" value="1"/>
Delay between iterations from :	<input type="text" value="1"/> to <input type="text" value="1"/> ms
Number of rows to fetch :	<input type="text" value="25"/>
Task priority :	<input type="text" value="Normal"/>
Initial statement delay :	<input type="text" value="0"/> ms
Maximum BLOB/CLOB size to fetch :	<input type="text" value="1024"/> Kbytes

Reporting Options

The report page of the settings allows the user to define columns to be included in the HTML report. Also, the user allowed to define a title for the report and let the program know to include SQL statement's text to the report.



The image shows a software dialog box titled "Reporting Options" with a wrench and screwdriver icon. It contains several configuration fields and checkboxes. The "Report title" field is set to "Stress Test Execution Report". The "Add SQL statements to the report" checkbox is checked. The "Report Columns" section contains two columns of checkboxes: "Connection time", "Disconnection time", "Task priority", "Task initialization time", and "Task total duration time" are unchecked, while "Thread average speed", "Thread average duration", "Thread maximum duration", "Thread minimum duration", "Thread total duration", and "Thread executed N times" are checked. The "Localization profile" field is set to "D:\dtm\stress\tml\english.ini". The "Html Report Character set" dropdown is set to "iso-8859-1". The "Html Report Language" dropdown is set to "en-us".

Reporting Options

Report title :

Add SQL statements to the report

Report Columns

<input type="checkbox"/> Connection time	<input checked="" type="checkbox"/> Thread average speed
<input type="checkbox"/> Disconnection time	<input checked="" type="checkbox"/> Thread average duration
<input checked="" type="checkbox"/> Task priority	<input checked="" type="checkbox"/> Thread maximum duration
<input checked="" type="checkbox"/> Task initialization time	<input checked="" type="checkbox"/> Thread minimum duration
<input checked="" type="checkbox"/> Task total duration time	<input checked="" type="checkbox"/> Thread total duration
	<input checked="" type="checkbox"/> Thread executed N times

Localization profile :

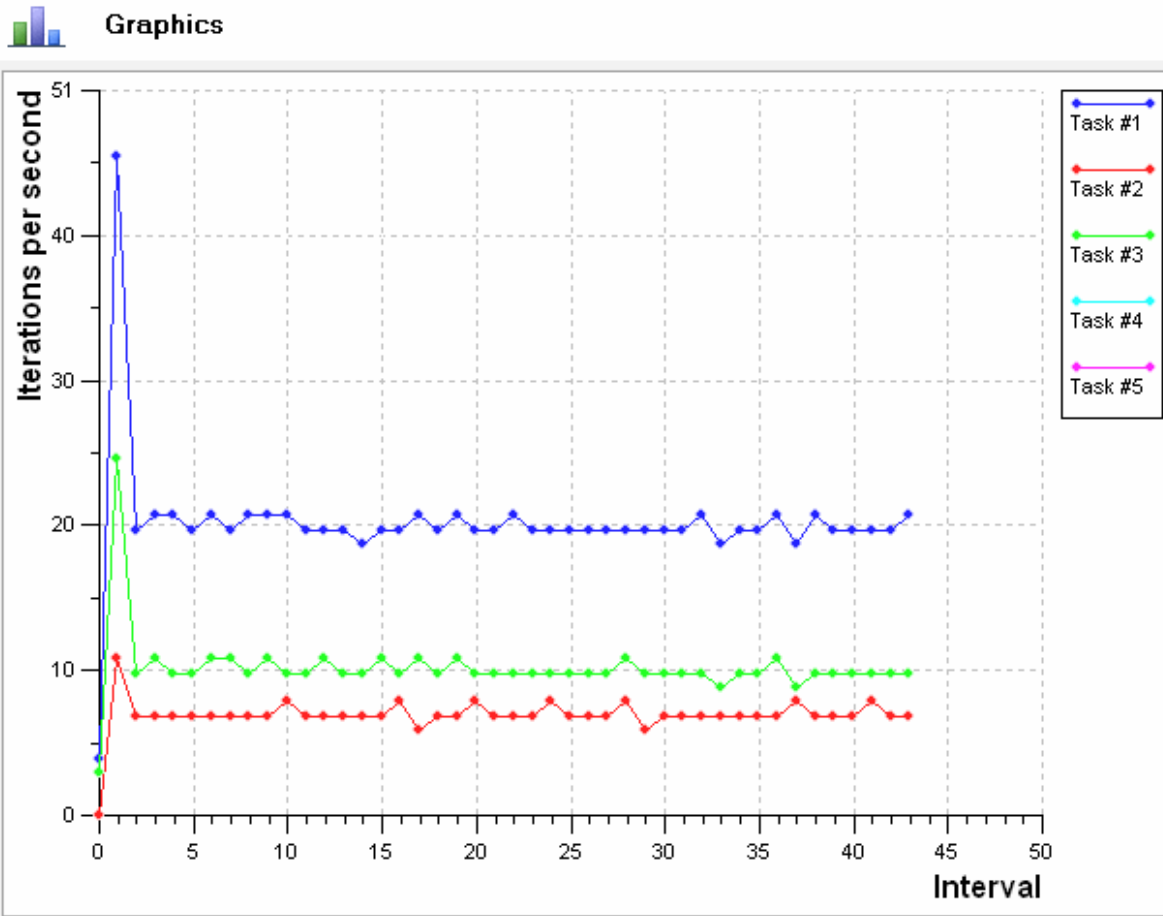
Html Report Character set :

Html Report Language :

See also: HTML report [customization and localization](#).

Execution Diagram

Besides using text for displaying [statistics](#), the program allows you to build a diagram on how many times this or that task or thread is executed for the specified period. This diagram is not precise and can be used only for evaluation. Currently, available version of the program shows the diagram for 50 intervals and up to 5 first tasks or threads. The period and information type (tasks or threads) are used the same as for statistics.



Please use report [visualizer](#) for the detailed presentation of execution or [comparison](#) reports.

Built-in log viewer

This panel shows last rows of the [program](#) log.
To view complete one please use "Tools->Log" menu item or Ctrl+L [hotkey](#).



Log File

```
2011-03-29 08:49:33 > << DTM DB Stress Enterprise 1.13.01 ,ANSI, x86, 6C3CC05DFFC767A0>>
2011-03-29 08:49:33 > << build: Mar 24 2011 15:58:49,OS=6.01.7601 [Windows 7] Service Pack 1 >>
2011-03-29 08:49:34 > Connected to ODBC-0 Microsoft SQL Server [ 10.00.4000 ],sqlncli10.dll [ 10.00.4000 ] as 'f',

2011-03-29 08:51:02 > << DTM DB Stress Enterprise 1.13.01 ,ANSI, x86, 6C3CC05DFFC767A0>>
2011-03-29 08:51:02 > << build: Mar 24 2011 15:58:49,OS=6.01.7601 [Windows 7] Service Pack 1 >>
2011-03-29 08:51:04 > Connected to ODBC-0 Microsoft SQL Server [ 10.00.4000 ],sqlncli10.dll [ 10.00.4000 ] as 'f',

2011-03-29 08:51:43 > << DTM DB Stress Enterprise 1.13.01 ,ANSI, x86, 6C3CC05DFFC767A0>>
2011-03-29 08:51:43 > << build: Mar 24 2011 15:58:49,OS=6.01.7601 [Windows 7] Service Pack 1 >>
2011-03-29 08:51:45 > Connected to ODBC-0 Microsoft SQL Server [ 10.00.4000 ],sqlncli10.dll [ 10.00.4000 ] as 'f',

2011-03-29 08:53:52 > << DTM DB Stress Enterprise 1.13.01 ,ANSI, x86, 6C3CC05DFFC767A0>>
2011-03-29 08:53:52 > << build: Mar 24 2011 15:58:49,OS=6.01.7601 [Windows 7] Service Pack 1 >>
2011-03-29 08:53:53 > Connected to ODBC-0 Microsoft SQL Server [ 10.00.4000 ],sqlncli10.dll [ 10.00.4000 ] as 'f',
```

Hot Keys

Hotkey	Function or Option
Ctrl+A	Open "About" window
Ctrl+E	Run the Project sequentially
Ctrl+D	Move the task down
Ctrl+G	Run the Project by group
Ctrl+L	View log file
Ctrl+N	Create new empty project file
Ctrl+O	Load Project file from the disk
Ctrl+Q	Quit the program
Ctrl+R	Run the Project
Ctrl+S	Save Project file to the disk
Ctrl+T	Add new task
Ctrl+U	Move the task up
F1	Open help
F2	Open the connect window
F3	Close the database connection (disconnect)
Ctrl+F4	Save HTML report for the current project
Ctrl+F8	Enable or disable currently selected task

Dynamic SQL Statements

The program supports dynamic statements as well as static statements. Their final state will be defined at the moment of execution. To make it possible, special tags (like ?1, ?2, etc.) are inserted into the text of a statement. Those tags will be replaced with the values from the [file](#) or [generated](#) randomly. They are always replaced, even inside string constants.

The file with values is a text file. Each line in it corresponds to one statement (single thread execution), while values are separated by the separator character specified in the [task properties](#). By default, columns should be separated by <tab> sign but professional and enterprise [versions](#) users can select or define custom columns separator. If there are more values in the file than in a statement, extra values are ignored. If there are more tags than values, tags with bigger numbers will not be replaced with any values.

There are three ways to share values file between task's threads. They are:

- Independently. In this case, each thread uses rows line by line.
- Sequentially. A thread uses next row after last used by same or another task's thread.
- Fixed. Each thread uses the unique line: the first thread uses first line, the second uses second, etc.

Examples:

SQL statement template	Values file content	Actual statements
select * from ?1	table1 table2 table3	select * from table1 select * from table2 select * from table3 select * from table1 etc.
select ?1 from ?2 order by ?1	field1<tab>table1 field2<tab>table2	select field1 from table1 order by field1 select field2 from table2 order by field2 select field1 from table1 order by field1 etc.
?1	select * from table1 insert into table2 values (getdate()) sp_helptext 'dbo.tr12_t'	select * from table1 insert into table2 values(getdate()) sp_helptext 'dbo.tr12_t' select * from table1 insert into table2 values(getdate()) sp_helptext 'dbo.tr12_t' etc.

DTM DB Stress supports following command line switches:

-r - if present, run specified or recent project at program startup;

-q - quit application after project execution.

-@ - use custom connection profile.

-c - console mode*.

-x - disable connection restoring. Please use it for corrupted profiles or incorrect connections only.

* - supported by Professional and Enterprise [versions](#) only.

You can use project name as a command line parameter.

Connection profile can be created by Export button at the Connect Window.

The console mode is a mode when the program doesn't open any dialogs and doesn't need any interference from the user. A project file for the console mode must be prepared and tested beforehand. The program will use the recent database connection in console mode.

Example:

```
"C:\Program Files\DTM DB Stress\stress.exe" -r -@d:\acc.conprof "d:\MyProjects\Clients Activities.stp"
```

Important: you should quote executable and project name if spaces are present in the path.

Performance Counter Support Option

The Performance Counter support provides a module that can work with DTM DB Stress Enterprise [editions](#). This module allows the user to create an HTML report based on system performance counters. An important option of the module is support remote system as well as local counters.

Also, performance counter value or values can be added to SQL report or text/Excel report.

The user can select counter name from predefined drop-down menu or enter it manually. The counter's name format is **\\<group name>(<instance name>)\<counter name>** (please refer to predefined definitions for examples).

To specify remote system name, please use **\\<server name>** notation.



Performance Counters Settings

##	Machine, empty for local	Counter	Report
<input checked="" type="checkbox"/> 1	<input type="text"/>	\\Memory\\Available KBytes	Free Mem, KB
<input checked="" type="checkbox"/> 2	<input type="text"/>	\\System\\Threads	All Threads
<input type="checkbox"/> 3	\\DTM-GATE	\\Processor[_Total]\\% Processor Time	Server CPU Loading, %
<input type="checkbox"/> 4	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> 5	<input type="text"/>	<input type="text"/>	<input type="text"/>

Save performance counters HTML report to :

Add performance counters to SQL report

Add performance counters to text/Excel report

Show Execution Plan Feature

The Show SQL Statement Execution Plan feature is a component of DTM DB Stress tool. Only Enterprise [version](#) provides users with this functionality.

This component enables the user to optimize SQL statements by execution details analyzing. A query execution plan outlines how the Microsoft SQL Server or Oracle's query optimizer actually ran task's statement. This information is valuable when it comes time to find out why a specific SQL statement is running slow.

Task #1 execution plan

Statement Text	Physical Operation	Logical Operation	Estimate Rows	Estimate IO	Estimate CPU	AvgRowSize	Subtree Cost
select * from "Summary of Sales by Quarter"			46.421978				6.0743228E-2
--Nested Loops(Inner Join, OUTER REFERENCES:([Order Details].[OrderID]) WITH PREFETCH)	Nested Loops	Inner Join	46.421978	0.0	1.9404387E-4	88	6.0743228E-2
--Compute Scalar(DEFINE:([Expr1002]=If ([Expr1009]=0) then NULL else [Expr1010]))	Compute Scalar	Compute Scalar	46.421978	0.0	6.2498623E-3	19	5.2203286E-2
--Stream Aggregate(GROUP BY:([Order Details].[OrderID]) DEFINE:([Expr1009]=Count(*), [Expr1010]=SUM(Convert(Convert([Order Details].[UnitPrice]*Convert([Order Details].[Quantity]))*(1-[Order Details].[Discount])/100)*100.00)))	Stream Aggregate	Aggregate	46.421978	0.0	6.2498623E-3	19	5.2203286E-2
--Clustered Index Scan(OBJECT:([NorthwindOriginal].[dbo].[Order Details].[PK_Order_Details]), ORDERED FORWARD)	Clustered Index Scan	Clustered Index Scan	2155.0	4.3504424E-2	0.002449	49	4.5953427E-2
--Clustered Index Seek(OBJECT:([NorthwindOriginal].[dbo].[Orders].[PK_Orders]), SEEK:([Orders].[OrderID]=[Order Details].[OrderID]), WHERE:([Orders].[ShippedDate]<>NULL) ORDERED FORWARD)	Clustered Index Seek	Clustered Index Seek	1.0	3.2034251E-3	7.9603E-5	75	8.3236145E-3

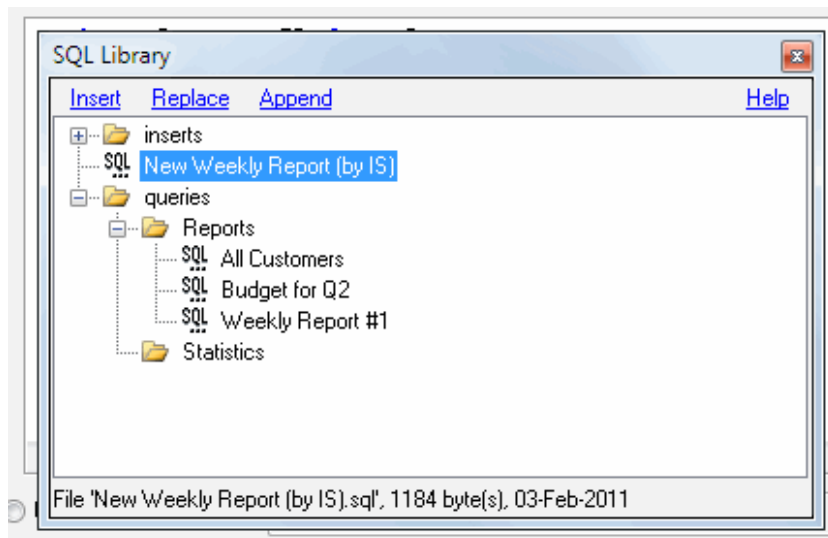
The SQL Library is a perfect way to organize or share your SQL scripts. The SQL Library is a hierarchy of files and folders. You can add your script to the library using Windows explorer. You can also save the script from [DTM SQL editor](#) into SQL library.

To access SQL Library click arrow "From Library" button at the main task properties page. Please note that this option is supported by Enterprise [edition](#) of the stress test tool only.

The default location of the library is "library" subdirectory in the product folder. For example, "C:\Program Files\DTM DB Stress\Library". You can change this value using [settings](#) dialog

The SQL script selected in the library can be saved using one of the following methods:

- **Insert** - insert the file at the current cursor position.
- **Append** - append the SQL file to the end of the script currently being edited.
- **Replace** - replace the current script.



Report Comparison

The report comparison feature of the Enterprise [edition](#) is a perfect way to analyze results of a few stress tests. To compare results:

- Define report file name for "internal format" at the [project properties](#) page. This file must have ".strep" extension. We recommend using \$DATE\$ and/or \$TIME\$ macros to get different reports automatically.
- Run the project a few times or run different projects.
- Specify report files to be compared by "Add" button.
- Click "Compare" button to run report comparison.
- "Save" button allows you to save the report to the disk file.



Execution Report Comparison

List of execution reports to be compared

D:\9.strep
D:\91.strep

Add Report

Compare

Save Report...

Execution Comparison Report

Summary

Property	Value
Project	Performance test #12
Report created	29-Mar-2011 09:46:58
DTM DB Stress version	1.13.01, build: Mar 24 2011 15:58:49, ANSI, x86
Number of reports to be compared	2
Report #1	D:\9.strep [SQL 2]
Report #2	D:\91.strep

Comparison Results



HTML Report, customization and localization

The installation folder of DTM DB Stress has TMPL subfolder. This subfolder contains files for HTML report customization and localization.

The HEAD.HTM file is a report header. The user can modify CSS items definitions to customize the report.

The ENGLISH.INI file is a text file that contains strings to be used in the report. The user can create another file with localized or modified strings. The [report settings](#) allow the user to assign alternate string file instead of ENGLISH.INI

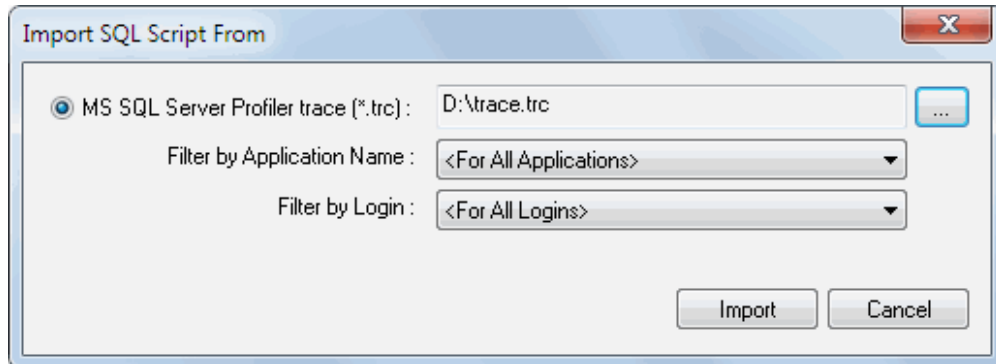
The Enterprise [version](#) of the [stress tool](#) supports a basic level of the integration with MS Visual Source Safe. You can:

- Check out project file from VSS.
- Undo Check out the module.
- Check in the project file to VSS.
- Add a new item to VSS project.

Import SQL Script Feature

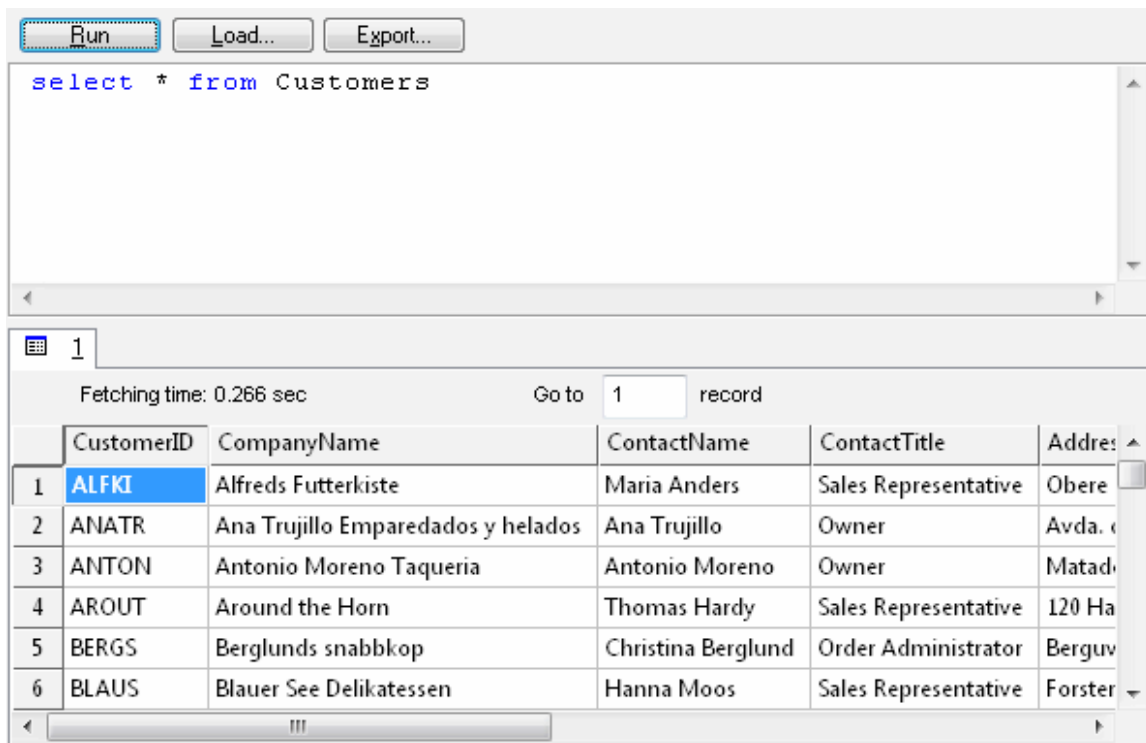
This window helps the user to import SQL script from trace file (.trc) produced by Microsoft SQL Server Profiler. It is a perfect way to create realistic task definition based on existing application activity.

Just catch a stream of the executed SQL statements and load the list to DTM DB Stress by one click.



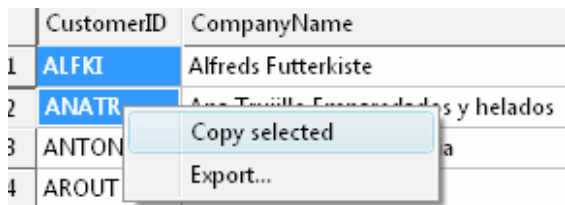
Run SQL statements

The program has a special window where you can specify and execute any SQL statements. You can copy the results of executing a statement onto the clipboard or export it into various formats (text, SQL, HTML, XML or Microsoft Excel). Placing the mouse cursor over the column header will tell you the type of data stored in this field.



Menu item "Load" allows you to read SQL script from external file.

There is a picture of local menu accessed by the right click inside the results window.



The header image shows a close-up of a computer keyboard with a blue background overlay. The text 'Report Visualizer' is centered in white.

Report Visualizer

DTM DB Stress Report Visualizer is a supplemental utility that provides information from the report in a visual manner. Currently, it is available in Enterprise [edition](#) only.

Important: the visualizer has own system requirement: you need Microsoft .NET 3.5 SP1 or newer to run the utility.



Program Installation

To run installation program:

- Open the windows Start menu and select "Run" item
- Select or enter installation file name and path (stress.exe or stress_d.exe)* and click OK

* - professional and enterprise editions of the tool may have another suffix.

Notes:

- Please be sure that existing version of the tool is not running when you install a new version.
- We recommend to [uninstalling](#) old version of the DTM DB Stress before new version installation.
- Installation by administrator for another user is supported for most environments.



Uninstall the Software

The Uninstall feature removes all installed DTM DB Stress components and all records in the Windows registry made by the installation script. You can uninstall this program by selecting the "**DTM DB Stress**" item in "**Add/Remove Programs Dialog**" in "**Control Panel**".

Another uninstallation way is to run "unins000.exe" from the product's folder directly.

Important! Uninstall feature of the program does not remove files and objects created by users such as configuration files, registry records etc.


Log file

When running the program, you have to select one of menu items from "**Tools->Log file**" in order to view or truncate your Log file. The log file contains the detailed description of any errors and other events that occurred while processing script.

Default log file location is product's directory and the name is ERROR.LOG. When the user has no enough permissions DTM DB Stress saves log to typical path like C:\Documents and Settings\\Application Data\stress.log or C:\Users\\AppData\Roaming\stress.log

The log file is a text file that contains three type of records:

1. The software product identification block: product name version and operating system information.
2. Error records: wrong SQL statements, exceptions, etc.
3. Notification and statistics.



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What differences between the demo and full versions of the DTM DB Stress?

General functions

- Demo version allows the user to create only two tasks per project with up to 2 threads per task.
- Demo version shows nag screen with each 4 minutes of the project execution.

Supplemental functions

- SQL console partially replaces result values to DEMO string.

No other demo limitations are present except nag-screen at program shutdown.

If you have some question or unusual problem feel free to contact the DTM DB Stress technical support at support@sqledit.com

When you contact technical support, you should be prepared to provide the following information:

- DTM DB Stress version (you can find this information from About menu item of Help menu).
- Type and version of the ODBC or IDAPI driver or OLE DB provider.
- DBMS version and operating system version (including service pack version, if applicable).
- DTM DB Stress Log file.
- A description of what you do before the problem occurs.
- Error messages you see when the problem occurs.
- Your name, company name and how to contact you.

See Also: [log_file](#)



How can I order DTM DB Stress software?

The software is available worldwide via the Internet. Secure online, mail/check and corporate purchase order options are available. For detailed information please click following link to open [order page](#) or copy <http://www.sqledit.com/stress/order.html> to your web browser.

If you have any payment questions feel free to contact the DTM DB Stress technical support at support@sqledit.com



How to upgrade your copy of DTM DB Stress?

The user can refer to "Check for Update" features to get information about available updates.

Please contact our support staff at support@sqledit.com to upgrade commercial version of the tool.

Demo version is available for [download](#) free of charge.

When you upgrade your copy of DTM DB Stress please send us the following information:

- You name, company name and how to contact you
- Payment information (at least "ORDER No" and "Date")



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[DTM SQL Editor](http://www.sqledit.com/editor) (www.sqledit.com/editor) is a set of powerful database management tools that allow you to achieve two goals - to have unified access to different types of databases and to have a set of solutions that makes processing your data easy. DTM SQL Editor gives database users, developers and administrators an ability to access different databases, whether desktop or client-server ones (provided you have ODBC driver installed). This is very convenient, since most organizations use several different types of databases installed and each stores data in different formats and with varying parameters. Having a program that can get data from various sources is often essential. Furthermore, in addition to letting you quickly switch between different data sources, DTM SQL Editor lets you see database schema and results of the query execution.

[DTM Migration Kit](http://www.sqledit.com/mk) (www.sqledit.com/mk) is a powerful yet simple data migration tool that comes in handy if you run multiple databases. Use it to import, export or migrate data between different data sources (ODBC, OLE DB, or Oracle Call Interface supported). The program is fully automatic and supports all popular database formats. Simple visual interface lets you set own transformation and flow control rules to give you added flexibility.

[DTM Schema Reporter](http://www.sqledit.com/sr) (www.sqledit.com/sr) is a reporting tool for database schema. The program creates reports in RTF, HTML, XML or plain text formats and supports all common database interfaces - ODBC, OLE DB, or even Oracle Call Interface. This utility helps technical writers and database administrators create a report of any complexity level within seconds. Also, you can alter table order in the report and manually add annotations to the individual tables.

[DTM Data Generator](http://www.sqledit.com/dg) (www.sqledit.com/dg) is a simple, powerful and fully customizable utility that generates data for database testing purposes. Currently, database developers and administrators often have to spend hours of dull work to create test data sets before examining database performance. This tool makes all this unnecessary by automatically creating database objects AND sets of SQL statements, if necessary.

[DTM Data Editor](http://www.sqledit.com/de) (www.sqledit.com/de) is a data viewer and editor for database professionals who are tired of wasting their time on mundane tasks. The program uses form-based interface and works with any ODBC data source. SQL statements are generated automatically and can be modified later. For data that has foreign key - primary key relation, there are options to enter values manually or select them from a list, which is much faster.

[DTM DB Stress](http://www.sqledit.com/stress) (www.sqledit.com/stress) is a utility for stress testing the server parts of information systems and applications, as well as DBMSs and servers themselves. This tool allows you to create and configure a continuous set of requests to the server of the OLAP (query execution) and OLTP (adding, modifying and deleting data in the database) types. At the same time, the user can flexibly change both the number and the priority of this or that type of requests to a database or an application.

[DTM Data Modeler](http://www.sqledit.com/dm) (www.sqledit.com/dm) is a CASE tool for database developers that supports both forward and reverse engineering. It is an easy-to-use tool allowing you to work both with logical and physical data models in the form of an entity-relationship diagram. The product is intended for database architects and developers and works with data sources via the ODBC interface, which means compatibility with all modern DBMS. Along with basic model properties (sets of entities and relationships between them), the program allows you to create indexes and triggers on the physical level corresponding to the tables of the database that is modeled.

[DTM Data Scrubber](http://www.sqledit.com/scr) (www.sqledit.com/scr) is a set of intelligent tools for data verification (audit) and scrubbing (cleaning). Depending on user-defined rules and data properties, the program either creates a report about the actual state of affairs or performs database data correction.

[DTM Data Comparer](http://www.sqledit.com/dcmp) (www.sqledit.com/dcmp) is a visual tool for data compare and synchronization. The program successively views the contents of both tables basing on the order of ascending of unique key values and shows differences or creates synchronization script.

[DTM Schema Comparer](http://www.sqledit.com/scmp) (www.sqledit.com/scmp) is a tool for database schemas comparison and synchronization. The comparison process supports tables, views, indexes, triggers and stored procedures. The visual representation of database schemas as a tree makes the comparison process more comfortable.

[DTM Query Reporter](http://www.sqledit.com/qr) (www.sqledit.com/qr) is a reporting tool for database query. This utility helps technical writers, developers and database administrators create a report based on database query within seconds.

[DTM Schema Inspector](http://www.sqledit.com/si) (www.sqledit.com/si) is a database schema browsing and management tool that let you work with database schemas more effectively.

[DTM DB Event](http://www.sqledit.com/event) (www.sqledit.com/event) is a database monitoring and management tool. This utility allows the user to define a few situations (events). For each event the user can define what the program should do if the event is occur.

[DTM Flat File Generator](#). Easy to use tool that helps any developer or QA engineer to create test data file. It supports tab-delimited, CSV, fixed width and custom separated output files. The generator has powerful import and export file structure features.

[DTM Test XML Generator](#). The tool is powerful generator for XML documents with structure defined by user and random but realistic data. More than 30 predefined generators with powerful pattern engine. The rich import XML structure options are available.

[DTM Data Generator for Excel](#) is a tool for text Excel spreadsheet population. Easy to use interface based on predefined generators, rich value library and high performance.

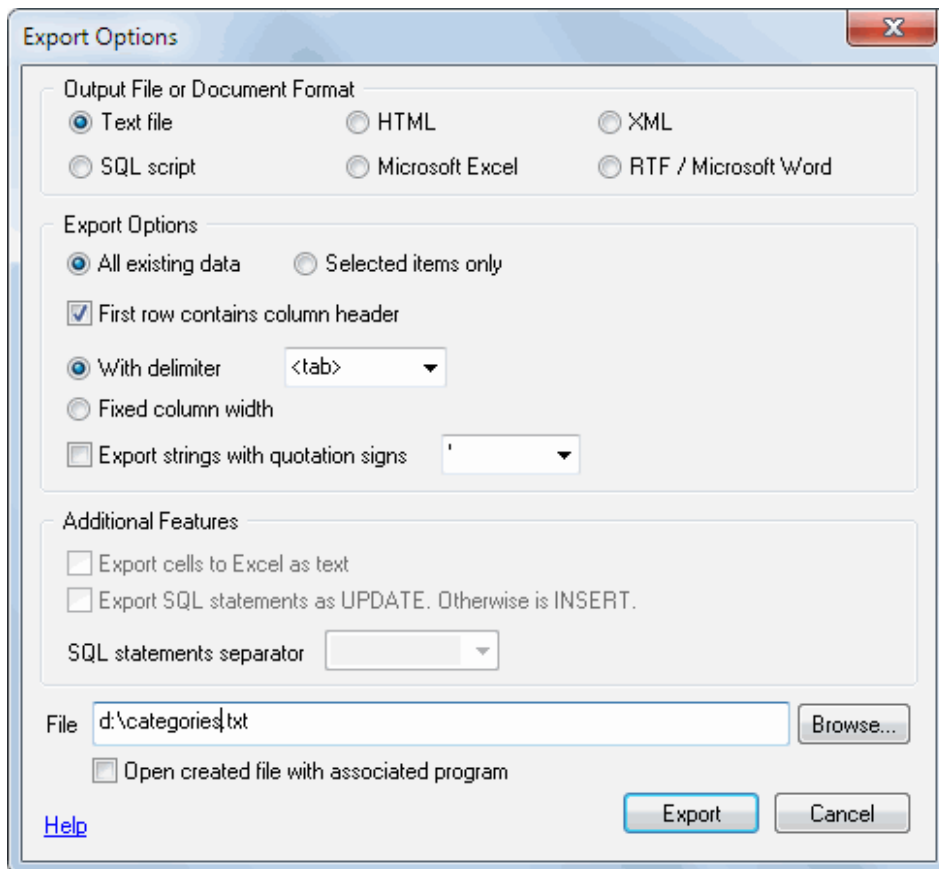
[DTM Data Generator for JSON](#) produces JSON files with defined structure in a bulk manner. Fast and easy structure editor and smart import options helps the user to generate test set in a few clicks only.

[DTM Database Content Analyzer](#) is a statistical tool for database content. It collects a few dozens of most interesting data: database objects size, value frequency, clusters, etc. This tool replaces and extends "Statistics" report of obsolete versions DTM Schema Reporter.

Export results of Query Execution

Types of export:

- text file with separators or with fixed columns width.
- HTML file
- XML document
- RTF document
- set of SQL statements (INSERT or UPDATE)
- direct to Microsoft® Excel (installed Microsoft Excel required)



Warning! Export for long binary data types (also known as BLOBs) is not supported.

Clipboard support

Copy selected text onto Clipboard	Ctrl-Ins, Ctrl-C
Cut selected onto Clipboard	Shift-Del, Ctrl-X
Insert text from clipboard into cursor position	Shift-Ins, Ctrl-V

Database catalog - The collection of system tables, tables that store metadata about that specific database.

Database record - one row in a table (table can be a result of SQL-query).

Database schema - logically connected, usually owner-based, set of DBMS objects (tables, views, procedures etc).

DBMS - database management system.

DBMS connection - the fact that both client and DBMS server have signed a contract and ready to query and data communications.

Drag-n-drop - the file manipulation technique when the mouse is used to move the file from the place of storage to the program, which performs processing.

SQL language - the declarative language used to manipulate the data and its' structure in the modern DBMS and their client applications.

IDAPI - Integrated Database Application Program Interface, unified DBMS access interface.

OCI - Oracle Call Interface, access interface for Oracle Server.

ODBC - Open Database Connectivity, unified DBMS access interface.

Metadata - information about data. See also: database schema

SQL statement - single SQL operator having the complete role in a data manipulation script.

SQL-server - program or program complex, which is able to execute the SQL-queries.

