



# DBMaster Migration User's Guide

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**Author:** DBMaster Support Team, SYSCOM Computer Engineering CO.

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# 1. Introduction

Welcome to DBMaster Migration user's guide. Along with the DBMaster upgrade, how to migrate users' database correctly and safely must be the most important thing. In this guide we have list many helpful examples and legends step by step, except some declaration the examples we give are all in windows platform. Users should read this guide carefully.

This book contains general information on the concepts and principles a database administrator should understand when users migrating database and objects from old versions (4.3, 5.0, 5.1 ,5.2) and 5.3 to 5.4. So the relative concepts and usages will be described in the following sections.

## 1.1 Additional Resources

DBMaster provides a complete set of DBMS manuals in addition to this one. For more detailed information on a particular subject, consult one of the books listed below:

- For an introduction to DBMaster's capabilities and functions, refer to the *DBMaster Tutorial*.
- For more information on designing, administering, and maintaining a DBMaster database, refers to the *Database Administrator's Guide*.
- For more information on the SQL language used in dmSQL, refer to the *SQL Command and Function Reference* manual.
- For more information on the UNLOAD/LOAD programming, refer to the *SQL Command and Function Reference* manual – dmSQL commands.
- For more information on stored procedure, refer to the *Stored Procedure User's Guide*.
- Document Conventions

This book uses a standard set of typographical conventions for clarity and ease of use. The NOTE, Procedure, Example, and Command Line conventions also have a second setting used with indentation.

CONVENTION	DESCRIPTION
<i>Italics</i>	Italics indicate placeholders for information that must be supplied, such as user and table names. The word in italics should not be typed, but is replaced by the actual name. Italics also introduce new words, and are occasionally used for emphasis in text.

CONVENTION	DESCRIPTION
<b>Boldface</b>	Boldface indicates filenames, database names, table names, column names, user names, and other database schema objects. It is also used to emphasize menu commands in procedural steps.
KEYWORDS	All keywords used by the SQL language appear in uppercase when used in normal paragraph text.
SMALL CAPS	Small capital letters indicate keys on the keyboard. A plus sign (+) between two key names indicates to hold down the first key while pressing the second. A comma (,) between two key names indicates to release the first key before pressing the second key.
NOTE	Contains important information.
Procedure	Indicates that procedural steps or sequential items will follow. Many tasks are described using this format to provide a logical sequence of steps for the user to follow
Example	Examples are given to clarify descriptions, and commonly include text, as it will appear on the screen. Other forms of this convention include Prototype and Syntax.
Command Line	Indicates text, as it should appear on a text-delimited screen. This format is commonly used to show input and output for dmSQL commands or the content in the dmconfig.ini file

*Table 1-1 Document Conventions*

## 1.2 Technical Support

DBMaster provides thirty days of complimentary email and phone support during the evaluation period. When software is registered an additional thirty days of support will be included. Thus extend the total support period for software to sixty days. However, DBMaster will continue to provide email support for any bugs reported after the complimentary support or registered support has expired (free of charges).

Additional support is available beyond the sixty days for most products and may be purchased for twenty percent of the retail price of the product. Please contact [sales@casemaker.com](mailto:sales@casemaker.com) for more details and prices.

DBMaster support contact information for your area (by snail mail, phone, or email) can be located at: [www.casemaker.com/support](http://www.casemaker.com/support). It is recommended that the current database of FAQ's be searched before contacting DBMaster support staff.

Please have the following information available when phoning support for a troubleshooting enquiry or include the information with a snail mail or email enquiry:

- Product name and version number

- Registration number
- Registered customer name and address
- Supplier/distributor where product was purchased
- Platform and computer system configuration
- Specific action(s) performed before error(s) occurred
- Error message and number, if any
- Any additional information deemed pertinent



## 2. Prepare for the migration

Here we will demo migration processes with a simple database – MIS from lower versions to 5.4.

### 2.1 Required disk space

You should make sure there is enough extra free space before doing migration. Since the temporary unload script files require disk space nearby old database size, the suggested disk space is double database size. The database size including the storage file objects.

### 2.2 Backup old DB

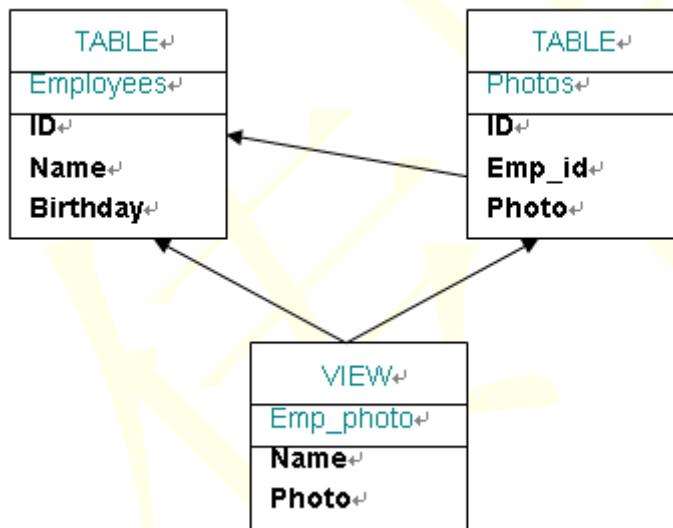
It's recommended strongly to backup the old database before starting to migrate database, no matter database files, dmconfig.ini, FO type files and so on.

### 2.3 Demo Database - MIS

Create sample database with the following configure section.

```
[MIS]
DB DBDir = C:\MIS
DB FODIR = C:\MIS\fo
DB SPDir = C:\MIS\sp
DB LbDir = C:\MIS\UDF
DB USRBB = C:\MIS\MIS.BB 2
DB USRDB = C:\MIS\MIS.DB 150
DB SvAdr = 127.0.0.1
DB PtNum = 1945
DB UsrID=SYSADM
DB_UsrFo = 1
```

## 2.3.1 TABLE AND VIEW OBJECT



### 2.3.1.1 Table Photos

Table Photos contains the photo of each employee in the Employees, if the employee has, with the primary key and foreign key.

```
CREATE TABLE Photos(
    id integer not null,
    emp id integer not null,
    photo file);
alter table Photos primary key ( id ) ;
alter table Photos foreign key emp photo (id) references Employees (id) on update no action on
delete no action;

insert into Photos values(?,?,?);
1, 1, &'C:\MIS\PHOTO.GIF';
2, 2, &'C:\MIS\PHOTO.GIF';
3, 3, 'C:\MIS\PHOTO.GIF';
```

### 2.3.1.2 Table Employees

Table Employees contains the basic information of employee, say the ID, name, birthday, for simplicity.

```
CREATE TABLE Employees(
    id INTEGER not null,
    name VARCHAR(20),
    birthday DATE ,
    primary key(id) );

insert into Photos values(?,?,?);
1, 'Nash', '1902-03-02';
2, 'Hilbert', '1852-04-12';
3, 'Gauss', '1771-05-09';
```

### 2.3.1.3 Table Emp\_log

Table Emp\_log log the employees that were deleted by the trigger.

```
create table Emp_log (
    id INTEGER not null ,
    name VARCHAR(20) default null ,
    birthday DATE default null );
alter table Emp_log primary key ( id) ;
```

### 2.3.1.4 Views Emp\_Photo

The view Emp\_Photo shows the name and photo selected from the table Photos and Employees.

```
CREATE VIEW Emp_Photo AS SELECT name,photo from Photos LEFT JOIN Employees ON Employees.id = Photos.emp_id;
```

### 2.3.1.5 Foreign Key

The foreign key in Photos references from Employees, we will constraint that each photo in Photos is related to an employee.

```
ALTER TABLE Photos FOREIGN KEY emp_photo(id) REFERENCES Employees;
```

## 2.3.2 STORED PROCEDURE

The procedure Count\_emp returns the total count of current Employees.

```
exec sql create procedure Count_emp(int cnt OUTPUT)returns status ;
{
    exec sql begin code section;
    exec sql select count(*) from Employees into :cnt;
    exec sql returns status SQLCODE;
    exec sql end code section;
}
```

```
dmSQL> create procedure from C:\Countemp.ec;
```

### 2.3.3 TRIGGER

The trigger del\_emp log the deleted employee into the Emp\_log tables, which has the same schema as Employees.

```
CREATE TRIGGER del_emp BEFORE DELETE ON SYSADM. Employees FOR EACH ROW (INSERT INTO SYSADM . Emp_log
VALUES(old . id , old.
name, old . birthday) );
```

### 2.3.4 UDF

The UDF AGE return the age of the employee by subtract the birthday of that employee from the current year.

```
#include "libUDF.h"
#include <stdio.h>
#include <time.h>

/* Get the age from the birthday of the employee */
#ifdef WIN32
    declspec ( dllexport )
#endif
int AGE(int narg, VAL args[])
{
    int i,k;
```

```
int age = 0;
struct tm cur;
if (args[0].type != NULL TYP)
{
    getsystime(&cur);
    age = 1900+cur.tm_year - args[0].u.ival;
    args[0].type = INT TYP;
    args[0].len = 2;
    args[0].u.ival = age;
}
return RetVal(args, args[0]);
}
```

```
dmSQL> create function agedll.AGE(CHAR(10)) RETURNS INT;
```

# 3. Migrate DB from 4.3 to 5.4

## 3.1 Unload DB from 4.3

### 3.1.1 UPDATE STATISTICS

---

Before unload db, please do “update statistics” in order to update the DB statistics info.

```
dmSQL> update statistics;
```

### 3.1.2 DROP ALL UDF

---

UDF of 4.3 is not compatible with 5.4. User need to recompile their UDF and builds the .dll or .so with header (.h files) of 5.4. So user should drop all users' UDF in 4.3 Database before unloading db, and recreate UDF in 5.4. Otherwise loading db may show ERROR (6535) (cannot find the functions library file), and results in loading DB fail.

Although you copy functions library files to DB\_LBDIR of 5.4 and load db rightly. But UDF also cannot be called successfully.

If your DBMaster 5.4 database is in 64 bit environment and use INTEGER in UDF source code, please change INTEGER to SQLLEN, the default INTEGER is extending to 8 bytes on 64 bit environment.

If the UDF are used in the old database, please see that the name of the UDF do not conflict with the newly added UDF in DBMaster 5.4. For all the UDF defined in DBMaster 5.4, please refer the SYSUSERFUNC table.

```
dmSQL> drop function AGE;
```

### 3.1.3 CHECK STORED PROCEDURES

---

Make sure if there are some system files in DB\_SPDIR, which produced by ESQL/C when creating stored procedures.

ESQL/C stored procedure will be recompiled and created during loading Database, so user do not need to do any manual operation, but if the compiler (VC) is not installed or has something wrong for DBMaster 5.4, these system files are necessary for manual migration.

In addition, for Java stored procedures, all registered jar files must be copied to the new DB\_SPDIR\jar\UPPERCASE\_OWNERNAME\directory.

If your DBMaster 5.4 database is in 64 bit environment and using 'INTEGER' as type declare in source code, please modify 'INTEGER' to SQLLEN, because INTEGER default storage is extend from 4 bytes to 8 bytes on 64 bits environment.

### 3.1.4 UNLOAD DATABASE

---

Connected to the database in the dmSQL of DBMaster 4.3 and unload database (demo - MIS) to a target directory, for example: “C:\MIS\”.

```
dmSQL> unload db to C:\MIS\MISDB;
```

You can use default unload procedure or advanced feature – unload to split files.

```
dmSQL> set unload splitfile on;
```

```
dmSQL> unload db to C:\MIS\MISDB;
```

**Comment:**

Unload to split files only provided on DBMaster 4.3 and later version, if you want to unload db to split files, please **set unload splitfile on** (this option default is **off**) in dmSQL and all unloaded files will divide by different object (view, table by table...etc), it can help to locate problems when something wrong for loading database.

### 3.1.5 POSSIBLE ERRORS

---

- ERROR - file or directory does not exist / cannot create/open a file

If you get these finds of ERROR during unload database, it could be caused by the problem of user's file object does not exist. Please remove the incorrect file object links before unload. You can set the file object column to null such as the following example

```
dmSQL> Update Photos set photo = null where fileexist(photo) = 0;
```

- ERROR - out of DCCA memory

If there are too many tables being unloaded, for example: 100 tables, you may get "out of DCCA memory" while unloading database. This ERROR caused for the default size of SCA is too small, please enlarge DB\_SCASZ and try again.

### 3.1.6 NOTICE

---

If your version is very old (built before 2008/07/28), and your tables include serial type. It's better to upgrade the version before unloading database, because there was a unload bug - MR8501 which may cause the serial type DATA not correct after loading.

If your tables include serial type and some records had been deleted, this bug would cause max serial value reset while loading DB, then the max serial value would be not same as real value.

**Comment:**

>>4.3.x, 5.0.x, 5.1.x built before 2008/07/28.

```
dmSQL> create table test (id serial unique,name varchar(20),primary key (id));
```

```
dmSQL> insert into test(name) values('AA');
```

```
dmSQL> insert into test(name) values('BB');
```

```
dmSQL> insert into test(name) values('CC');
```

```
dmSQL> select * from test;
```

```
   ID      NAME
-----
1 AA
2 BB
3 CC
```

```
dmSQL> delete from test where id=3;
```

```
1 rows deleted
```

```
dmSQL> unload db to test;
```

>> DBMaster5.4

```
dmSQL> load db from test;
```

```
dmSQL> insert into test(name) values('DD');
```

```
dmSQL> select * from test;
```

ID	NAME
1	AA
2	BB
3	DD

<---- expected ID is 4, not 3

So if your versions (4.3.x, 5.0.x, 5.1.x) build date before 2008/07/28, you need to upgrade version at first, then unload DB.

## 3.2 Load DB to 5.4

### 3.2.1 CONFIGURATION SETTING

Make configuration setting for new DB of 5.4 referring to the old dmconfig.ini of 4.3, you can adjust some keyword setting values manually (for example: modify the DB directory for DB\_DBDIR).

**Note:** *dmconfig.ini locates in ..\DBMaster\5.4\, which is different with 4.3*

The following keywords need to pay attention to specially:

- DB\_USRBB

Can't set "DB\_USRBB = C:\MIS\MIS.BB 2" for new DB, because the minimal page of a data/blob file is "3" in 5.4 instead of "2" in 4.3.

- DB\_FLTDB

If you want use the old float type (the storage for the FLOAT column is 4 bytes), please add DB\_FLTDB=0 into dmconfig.ini, because after 5.0 version, the storage for FLOAT column is 8 bytes by default (DB\_FLTDB=1).

- DB\_PGSIZ and DB\_BfrSz

If you want the page size keeps same as before, please set DB\_PGSIZ=4, because after 5.0 version, page size can be set with 4K/8K/16K/32K, default DB\_PGSIZ=8; In addition, BLOB frame can be set with 8~256K, default DB\_BfrSz=32K(About 4.3, default value: 16 KB), same as before.

- DB\_RESWD

From DBMaster 5.1, there's a new reserved word list for identifier name. To avoid any problem occur during migration, please add 'DB\_RESWD=0' in dmconfig.ini. You can check SQL manual to check the reserved word list. If your database does not have any schema object named in the reserved word list, please ignore it.

### 3.2.2 CREATE AND START NEW DB

If DB\_DBDIR is same as before, please move 4.3 old database files to other folder or delete all the files (before delete operation, please check database had been backup).

Create DB MIS for 5.4, then disconnect DB and restart it with dmserver.

```
dmSQL> create db MIS;
```

**Note:**

- *If you didn't start DB with dmserver and load DB directly after you create new DB (database is single-user mode), the following error maybe occurs: ERROR (6265): cannot set this option because database is started in single-user mode or already in multi-user mode*

- You must start DB with client/server mode for loading db if there is stored procedure in old database. Then load db in dmSQL.

### 3.2.3 COPY THE FILE OBJECT

---

Copy all the Files in DB\_FoDir from 4.3 to the directory C:\MIS\. Because System FO type DATA need these files when loading db.

If old database has some **USER FO** records, you must make sure the Files Object exist in same directory as before.

### 3.2.4 LOAD DB FROM UNLOADED FILES

---

Connected to the new 5.4 database and load MIS from unloaded files.

```
dmSQL> load db from C:\MIS\MISDB;
```

**Note:**

When load db, make sure that all system file objects of old database are in the same directory with MISDB.s0 and MISDB.b0, for example: in directory C:\MIS\.

### 3.2.5 POSSIBLE ERRORS AND WARNING

---

#### 3.2.5.1 ERROR (101): not enough space to insert object

You may meet ERROR (101) during load db; it could be caused by following.

In 4.3, the data in an indirect BLOB column is stored in a data file when its size is equal to or less than 3950 bytes. But in 5.4, the data in an indirect BLOB column is stored in a data file when its size is equal to or less than 16240 (This value is 3952 bytes in 4 K page size, 8048 bytes in 8 K page size, 16240 bytes in 16 K page size and 32624 bytes in 32 K page size, respectively. In 5.3, the default page size is 8K) bytes. Otherwise, it is stored in a BLOB file.

So according to its size, an indirect BLOB may be stored in a DATA file or in a BLOB file in the same Tablespace as the table. This induce ERROR (101) occurred very possibly when you load db from 4.3 to 5.4.

Of course, if the data in an indirect BLOB column is stored in a data file, then it's increased efficiency because the BLOB data is also fetched when DBMaster fetches a tuple.

If the error occurs, please increase the page number of data files in a regular Tablespace, and in the same time, decrease the frame number of blob files to save disk space.

#### 3.2.5.2 ERROR (6520): base table or view already exists

If you load DB to an existent DB or you execute loading once more for not successful last time, maybe you will see ERROR (6520).

You need delete all DB files (include Store Procedure files produced by loading) and load DB again, although **WARNING (9702): load command rollbacked** has been shown, some object had been created.

#### 3.2.5.3 ERROR (6590): source compiling error

If the compiler hasn't been installed or there is something wrong, you may meet the ERROR (6590). Please confirm the compiler (VC) has been installed rightly in your environment.



#### **3.2.5.4 WARNING (9703): commit work in load command**

This kind of WARNING can be ignored, because loading processes cannot be finished in a long transaction, so need to be automatically committed many times.

#### **3.2.5.5 WARNING (63): data truncated when converting from different type**

This kind of WARNING maybe encountered when you load a not-UTF8 DB to UTF8 DB, and you have to extend the Character Type columns length to fix it.

# 4. Migrate DB from 5.x to 5.4

5.x means 5.0 ,5.1 5.2 or 5.3, migration don't need unload/load process because the DB files format are similar as 5.4.

## 4.1 Normal version DB

### 4.1.1 SERVER SIDE

---

- Step (1) Shutdown and backup all DB
- Step (2) Uninstall 5.x modules
- Step (3) Install 5.4 modules with Install Guide
- Step (4) Copy DB files and configures the dmconfig.ini
- Step (5) Activate 5.4 with license NO
- Step (6) Try to start DB.

### 4.1.2 CLIENT SIDE

---

- Step (1) Disconnect DB
- Step (2) Delete DSN for ODBC Application
- Step (3) Uninstall the client Module for 5.x
- Step (4) Install the client for 5.4 with Install Guide.
- Step (5) Register DSN and test connection

## 4.2 Bundle version DB

### 4.2.1 SERVER SIDE

---

- Step (1) Shutdown DB and backup all DB
- Step (2) Remove 5.x modules
- Step (3) Unzip 5.4 modules
- Step (4) Copy DB files and configures the dmconfig.ini
- Step (5) Copy activation.dat to 5.4 install directory
- Step (6) Try to start DB.

## 4.2.2 CLIENT SIDE

---

Step (1) Disconnect DB

Step (2) Delete DSN for ODBC Application

Step (3) Remove the client module for 5.x

Step (4) Unzip 5.4 module

Step (5) Register ODBC Driver and DSN by hand, and test connection

## 4.3 Migration for Application side

### 4.3.1 ODBC APPLICATION

---

- ODBC Driver

If application refers to Driver name (such as “Driver={DBMaster 4.3 Driver}”), Please modify it to “Driver={DBMaster 5.4 Driver}”.

- Data Source Name

If application refers to DSN, Please recreate the DSN with 5.4 Driver.

- Link native ODBC LIB

If dmapi43.lib is used for linking, please replace it with dmapi54.lib.

If 4.3 header (.h) files are included, please replace them with 5.4 header (.h) files.

### 4.3.2 JAVA APPLICATION

---

If CLASSPATH, PATH and LD\_LIBRARY\_PATH are set for 4.3, Please modify these environment variables for 5.4.

*Note: 5.4 can support JDBC type 3 Driver.*

### 4.3.3 USE DDL IN APPLICATION

---

When used DDL, user should adjust length size of each column depending on UTF8 DB. For example: please change INTEGER to SQLLEN for the default INTEGER is extending to 8 bytes on 64 bit environment.

## 4.4 Notice

Please pay attention to the following notices which can avoid some exceptions for the migration.

- It's better to Start and Stop original DB normally

Starting and stopping DB can make the DB status stable if there are some pending transactions not finished, especially for backup an online DB.

- It's better to Start new DB with the same setting in dmconfig.ini

For example: With a same DB\_JnlSz.

- It's better to do any modifications after the migration had been finished.

For example: *rename DB or change journal size.*

# 5. Activation for License

From 5.0 versions, we amended the license upgrade procedure, and our product need activating online with the Internet.

## 5.1 Difference with 4.3

Before 4.3 version, as you learned from its manual, the License Key is only one line in the DBMaster.Lic. Therefore, you could use any Editor to “upgrade” the license key easily.

From 5.0 versions, a file named **activation.dat** is needed to correspond to the unique serial number under the DBMaster home directory, and the customers must run the Upgrade tool step by step to generate the **activation.dat** file.

## 5.2 Activation for Normal Version

- a) Select **Programs** from the Windows **Start** menu, select the **DBMaster** program group, and then choose **Upgrade**. The upgrade program will start.
- b) Click the License button to show the current license information. Click OK to return to upgrade program.
- c) Click the Upgrade button. The CASEMaker End-User License Agreement will appear.
- d) Read the End-User License Agreement carefully and click I Agree if you agree to abide by the terms and conditions of the agreement. The CASEMaker Product Activation Introduction will appear.
- e) Click the Next button. The Product Activation will appear.
- f) Enter the upgrade serial number and proxy information in the appropriate locations, and click Next. The Activation Information dialog box with Installation ID will appear.
- g) Click OK if the upgrade program can access the internet. If the activation process correctly, it will show "Your product is now activated".

**Note:** If the activation process fails or you cannot access the internet, please save the “Installation ID”, and copy it to another machine in which can access <http://activate.dbmaker.com.tw/>, then get **activation.dat** file and copy it back to install home directory.

- h) Click OK button. The Support Information dialog box will appear. Contact information for DBMaster Technical Support will be displayed.
- i) To exit, click Finish. Use the new license number the next time you start DBMaster.

## 5.3 Activation for Bundle Version

If you want to upgrade your bundle version, please contact to the Marketing to get the new serial number and the corresponding **activation.dat**, and put the **activation.dat** file or replace old one under the bundle home directory.

## 6. Start and check new DB

### 6.1 Start new DB

- If DB\_SMODE=4, change to DB\_SMODE=2

If the DB is the master side of **database replication environment**, need to change the primary database start mode to **startup with new journal** (DB\_SMODE=2).

After migrate old DB to 5.4 successfully, and then recreate the database replication based on new master DB.

- Recreate User Defined Function - UDF

Before start DB, need to rebuild DLL/so for UDF base on 5.4 versions, recreate all the Function Object in new DB, for example.

```
dmSQL> create function agedll.AGE (CHAR(10)) RETURNS INT;
```

- Auto add DB\_MAXCO = 220 in dmconfig.ini

If upgrade Database from 5. x version to 5. 3. x/5. 4. x (later than 2014-7-22), after started new Database, Keyword DB\_MAXCO = 220 will be automatically added into dmconfig.ini. The reason is some default rules were adjusted in the new versions

If you want to use more connections, you may need to reset the DB MaxCo, then to restart Database with the new journal mode.

### 6.2 Check new DB

- Test connection from Client

To check connection with dmSQL or other GUI tools.

- Verify all DB objects

Include Table and View, Stored Procedure, UDF and so on.

- Test Application connection

To connect to DB with Application at first, even to execute Application simply.

### 6.3 Execute “update statistics”

After upgrading from 5.x to 5.4 without using unload/load method, only starting same DB files with the higher version modules, due to the system catalog's differences between 5.x and 5.4, will face poor performance. To solve this problem, the customers need to execute “update statistics” to upgrade the entire system catalog.

## 6.4 Error Log

If any error happened when you start or execute some operations, you can check more detail information in ERROR LOG.

From 5.1 versions, Database warning information will be recorded in **DMEVENT.LOG**, and error information will be recorded in **DMERROR.LOG**. The messages related to backup server will be recorded in **DMBACKUP.LOG** which located in directory of DB\_BkDir.

Before 5.0, there is only a file - **ERROR.LOG**.

# 7. Appendix

## 7.1 Migrate DB from 32bit to 64bit

If you want to upgrade to 64 bit database, the only way is load/unload.

In other words, when users want to migrate 32bit 4.3/5.x to 64bit 5.4, they can refer to steps in **chapters - 3. Migrate DB from 4.3 to 5.4**. The following points need to be pay attention to.

### 7.1.1 ESQL/C STORE PROCEDURE

---

Migration for Store Procedure maybe occur errors, please confirm the compiler (VC) in 64bit environment works correct and ESQL/C program is correct for 64bit porting.

For example:

- ESQL/C indicator should be replaced by SQLLEN type
- "x64 Compiler and Tools" option should be chose while install Microsoft VS

### 7.1.2 JAVA STORE PROCEDURE

---

For Java Store Procedure, user must use 64bit JVM to recompile the java programs and copy the jar files to corresponding location.

### 7.1.3 USER DEFINED FUNCTION - UDF

---

UDF should be recompiled and relink with the 64-bit libraries, pay attention to whether should replace ESQL/C indicator with SQLLEN type and should change include header definition.

## 7.2 Migrate non-UTF8 to UTF-8 DB

Non-UTF8 DB can be migrated to UTF-8 DB with **load/unload**, but there have risks for losing some data, because each UTF8 character occupy 3 bytes, and the same records need more interspaces than before.

If the customers want to migrate Non-UTF8 DB to UTF-8 DB, they can refer to steps in **chapters - 3. Migrate DB from 4.3 to 5.4**.

### 7.2.1 EXTEND THE COLUMNS LENGTH

---

If user defines the table column type with CHAR, VARCHAR and LONG VARCHAR in database (the type size is bytes in DBMaster). For example, the database encoding is Shift-JIS, each character size is *double-bytes*, but when converted to UTF-8 encoding, each record will occupy 3 bytes in database storage.

So need to modify these columns definition, for example: if **c1** is **char(20)**,  $20 * 3 / 2 = 30$ , should be modified to **char(30)** for UTF8 DB



Otherwise, maybe get warning message like **WARNING (63): [DBMaster] data truncated when converting from different type.**

## 7.2.2 EXTEND THE OBJECT NAME LENGTH

---

For DB object names -Table name, view name, index name, synonym name, user name, group name and so on. There also are length limits, for example: Table name is 128 bit as most, for  $128 \times 2/3 = 85.3$ , so table name can't exceed the 85 bit.

**Note:** Because maximal length for DB objects name 4.3 versions is 32 bit. Even change to UTF-8 format; also don't need to care about length limits.

## 7.2.3 UTF8 CONFIGURE SETTING

---

For more information on UTF-8, please refers to the Database Administrator's Guide

- DB\_LCODE=10

To create UTF-8 DB with setting DB\_LCODE=10 in server side.

- DB\_CLILCODE

This keyword is for client side, which can specify language code. If not setting, the language code will be same as Operation System.

- DB\_ERRLCODE

This keyword is for client side, which can set locale codes of error message. If not setting, the language code will be same as Operation System.

## 7.3 Not re-order FILE OBJECT during migration

About SYSTEM FILE OBJECT, default setting is [*set unload fileobj on*], and all of FILE OBJECT will be unload to current working directory. We explained something in [Copy the file object](#) chapter.

When loading these unloaded files to new DB, all of SYSTEM FILE OBJECT would be reordered and the names would be changed as following samples.

In old DB before unloaded

```
ZZ000000.txt
ZZ000002.txt
ZZ000006.txt
```

In new DB after loaded

```
ZZ000000.txt
ZZ000001.txt
ZZ000002.txt
```

If the customers had quoted these FO names in their applications (for example: some pictures Link in Web Page), and don't want to reorder these SYSTEM FILE OBJECT when migrating to new DB. They can set [*set unload fileobj name*] as following steps.

### 7.3.1 SET UNLOAD FILEOBJ NAME FOR FILE OBJECT

---

*set unload fileobj name* before unload DB or tables to current working directory, and the data includes FO files would be unloaded, then load these files to new DB.

FILE OBJECT can be checked, and would be listed as same as before:

```
ZZ000000.txt
ZZ000002.txt
ZZ000006.txt
```

**Note:** [set unload fileobj name] is supported in 4.3.4, 5.x which built after 2015/4/20 only. So please upgrade your current versions firstly if you want to use this feature.

## 7.3.2 SET UNLOAD FILEOBJ OFF FOR FILE OBJECT

---

If the customers don't want to upgrade their versions, or they don't want to unload all the FO files to the working directory for poor disk space, and they can use the specific feature of USER FO with setting [set unload fileobj off].

### <limitations>

- The FO in old DB must be SYSTEM FO, it cannot work if parts of FO are USER FO type
- Don't permit to do any DML operations in old or new DB during migration

### 7.3.2.1 Backup whole DB

### 7.3.2.2 Modify SYSTEM FO to USER FO, then unload old DB

```
dmSQL> set unload fileobj off;
dmSQL> set init on;
dmSQL> update SYSFILEOBJ set FILE TYPE = '01'x;
dmSQL> set workdir 'c:\DBMaker\4.3\bin\fo';
dmSQL> unload db to testdb;
dmSQL> update SYSFILEOBJ set FILE TYPE = '00'x;
dmSQL> set init off;
```

### 7.3.2.3 Create new DB, and set dmconfig.ini for FO

```
DB USRFO=1
DB_FODIR=c:\DBMaker\4.3\bin\fo ;old DB FODIR
```

### 7.3.2.4 Load new DB

```
dmSQL> set workdir 'c:\DBMaker\4.3\bin\fo';
dmSQL> load db from testdb;
```

### 7.3.2.5 Modify USER FO back to SYSTEM FO for new DB

```
dmSQL> set init on;
dmSQL> update SYSFILEOBJ SET FILE TYPE='00'x;
dmSQL> set init off;
```

## 7.4 Change lists of Features

Because there are too many changes from 5.1 to 5.4, we only list some main feature in this document. You also can get these kinds of information with README or Release Note document for each version. Besides some new features, we also enhanced some features and fixed many failures 5.3 versions. So it's more stability.

### 7.4.1 VERSION 5.4.0

---

- Change Linux 64bit glibc version's requirement from 2.3 to 2.7, Linux 32bit glibc version's requirement remains 2.3

- Support highlight function with media type and change return type from CLOB to NCLOB
- Support jsoncols and dynamic columns
- Support insert or replace into syntax
- Support default column attribute for insert/update
- Add SYSDBA privilege as SYSADM
- Support access control with allow and block list
- Support schedule daemon
- Support auto index
- Support implicit type casting
- Support set fastcopy option with alter table to another tablespace
- Support check whether datafile exist when start db
- Enhance autoextend tablespace to average file extend

### **7.4.2 VERSION 5.3.2**

---

- Support install 32bit setup on windows 64bit system
- Support client lcode BIG5-HKSCS for utf-8 database
- Support VS2012 compiler for Stored Procedure
- Fix concurrent update record may cause database inconsistent
- Fix concurrent create/drop/alter view may cause dmserver crash and database inconsistent
- Fix incremental backup may fail when number of journal file > 1
- Fix shrink tablespace may report invalid blob frame error
- Fix unload db or select from SYSUSERFUNC may cause dmserver crash
- Fix select view get internal error when user create view and projection list has subquery
- Fix PDFTOTXT() may return invalid or unsupported media version error
- Fix create SQL stored procedure may cause dmserver crash

### **7.4.3 VERSION 5.3.1**

---

- Support user license with maximum 4800 connections
- Enlarge network listen() backlog to increase concurrent user connection
- Fix shrink tablespace may get internal error or incorrect NUM\_PAGES in SYSTABLESPACE
- Fix DB replication may fail and cause RP.LOG file size increasing until disk full
- Fix DBNAME.SBB file size may extend too big when user repeatedly drop/recreate replication
- Fix dmserver may hang up when executing subquery
- Fix that the index crashes under concurrent stress testings
- Fix when multi-user insert blob may cause incorrect blob file extend
- Fix query slow with where c1 like '%abc%' clause
- Fix dmserver crashed when executing DOCTOTXT(), PDFTOTXT() or create text index

## 7.4.4 VERSION 5.3.0

---

- Enhance SQL stored procedure
  - . Creating SQLSP in script
  - . Temp stored procedure
  - . Support goto statement
  - . Enhance data type handling
- Enhance update statistics daemon
  - . Support runtime setting to turn on/off update statistics schedule
  - . Support runtime setting update statistics option for database or for each table
  - . Support status for user to monitor the update statistics progress
  - . Support stored procedure for user to abort update statistics
- Support SETAFFINITY and SETPRIORITY stored procedure to set affinity and priority on a multiple CPU environment
- Support Alter table to another tablespace
- Support CREATE OR REPLACE and DROP IF EXIST for schema object
- Support window function for ROW\_NUMBER(), RANK() and ENSE\_RANK()
- Enhance UDF to support new format
  - . PDF support 1.7 format
  - . DOC, XLS, PPT support office 2007-2010 format
- Support full backup on master database
- Add new system tablespace "TMPTABLESPACE" to store user's temp table, the temp tablespace will be cleared when user start or shutdown database
- Restrict resource and connect user's privilege for system catalog
- Support XML Functions
  - . XMLCOMMENT
  - . XMLELEMENT
  - . XMLFOREST
  - . XMLAGG
- Support JDBC type 3 driver

## 7.4.5 VERSION 5.2.4 (EXPRESS FIX)

---

- Fix can't get right precision through JDBC getPrecision(...) function
- Fix DCI generate wrong table definition with DCI\_XML\_XFD 1
- Fix create table with column decimal (12,10) default 2147483648, but no error return
- Fix \$XFD WHEN with AND/OR condition for ISCOBOL
- Fix the dbsql come out "application happen abnormality" when select strtoint
- Fix sqlsp return "result set" causes db crash and exists memory leaks

- Fix dmserver crash when many user execute trigger with java stored procedure
- Fix crash when using \$XFD WHEN OTHER with AND condition and TABLENAME for ISCOBOL
- Fix app cannot connect to DB via ODBC
- Fix create tablespace return sql internal error
- Support option for user to unload server fileobj as user fileobj in dmsql tool
- Fix call javasp > 257 times, it returns error "allocated too many command handles, allowed maximum is 257"
- Fix dmppspc core dump when create SP
- Fix dmSQL32 TOOL occur APPCRASH
- Fix update trigger may get error "record size is too big to store" when column has blob and varchar
- Fix lock Behavior with DCI WRITE on Referenced tables
- Fix index column is varchar type and with sapce padding may cause index crash
- Fix update error for DECIMAL type
- Fix set unload fileobj off, not display system file name in .s0 file
- Fix insert file with host variable in subblob will return ERROR (9629): value list syntax error
- Fix ERROR 1205 will be faced when user move the Journal Files on "n:\" of Windows Server
- Fix execute SQL Statement cause DB crash
- Fix dmserver core dump related backup server
- Fix group by + subquery + index scan may get wrong result
- Fix use dmjdbc30.jar as driver return error number
- Fix DB can't write log with setting DCI\_LOGFILE Dynamic
- Fix run select distinct with subquery may get limitation or not support error
- Fix RETURN FILE STATUS MF DCI
- Fix PreparedStatement setBigDecimal after setShort get data conversion overflow
- Fix Error 5510 on remote Tables DCI isCOBOL
- Fix setting DB\_TmoFm=hh:mm:ss.fff in client not works for getTimestamp
- Add keyword DB\_USMOD for ignore judgment rule of update statistics
- Fix function arguments do not match definition
- Fix CALL "DCI\_SET\_WHERE\_CONSTRAINT" does not work when running with thin client mode
- Fix ISDCI cannot get the setting of iscobol.file.index.lock\_read\_anyhow
- Fix select user\_name from sysuser table,no SERVICE\_SERVER user name

### **7.4.6 VERSION 5.2.3**

---

- Support client lcode BIG5-HKSCS for utf-8 database

- Fix that the index crashes under concurrent stress testing
- Fix concurrent update record may cause database inconsistent
- Fix concurrent create/drop/alter view may cause dmserver crash and database inconsistent
- Fix shrink tablespace may report invalid blob frame error or incorrect NUM\_PAGES in SYSTABLESPACE
- Fix when multi-user insert blob may cause incorrect blob file extend
- Fix DBNAME.SBB file size may extend too big when user repeatedly drop/recreate replication
- Fix unload db or select from SYSUSERFUNC may cause dmserver crash
- Fix dmserver crashed when executing XLSTOTXT, PDFTOTXT() or create text index
- Fix dmserver may hang up when executing subquery

### **7.4.7 VERSION 5.2.2**

---

- Support DB\_TCPIP=1 to force tcpip connection only
- Enlarge max number of host variable from 2000 to 16000
- Server will update SYSINDEX's CREATE\_TIME field when user rebuild index
- Fix left join query or where column is null may get incorrect result after user update statistics
- Fix update statistics may get out of memory error when database has many tables
- Fix sometimes dmserver crash when update record with VARCHAR column
- Fix incorrect DB\_LGZIP behavior when multi-user access database or the number of log files > 255
- Fix database may crash after many user access database concurrently on 64bit Fedora14
- Fix index lock behavior with different isolation level
- Fix DOCTOTXT(),XLSTOTXT(),PPTTOTXT() function may cause server crash enhance backup and rollover's stability and error handling
- Enhance backup and rollover's stability and error handling
- Fix JDBC ResultSet rs.next(), getBytes() get error with clob/blob type
- Fix Jdata Transfer Tool error when import a UTF8 format CSV file or NVARCHAR data to UTF8 database
- Fix Jdata Transfer's import odbc function will import incorrect NCHAR/NVARCHAR data
- Fix memory leak when many user select from SYSINFO
- Fix MFDCI with LOCK MODE's behavior

### **7.4.8 VERSION 5.2.1**

---

- DCI support Microfocus NetExpress 5.1 windows 32/64bit
- DCI support ACU 9.0
- Fix cannot correctly restore the database with huge journal
- Fix dmsql cannot load a table due to syntax error
- Add "set unload browse on/off" syntax in dmsql to let user can unload table with browse mode.

- Fix multi-thread connection may get connection refused with "TCPIPCreate's thread failed" error
- Reduce lock time out situation when update record with varchar column
- Reduce deadlock situation with insert/delete/update/select for update command

### **7.4.9 VERSION 5.2.0**

---

- Support BIGINT and BIGSERIAL data type
- Support SQL stored procedure
- Support UTF8 database with more client encoding setting
- Support shared memory > 2GB under 64bit OS
- Support differential backup
- Support runtime setting backup server's option without shutdown the database
- Support SYSCONFIG table to display server site's dmconfig setting

### **7.4.10 VERSION 5.1.2+EXPRESS FIX (2015/3/8)**

---

As other chapters, we only list some new features, or some significant fixed bugs in this document, but since version 5.1.2 is special for some important customers, so we list all the fixed issues from 5.1.2 release version to latest express fix version as following.

- Enhance check db
- fix LG\_TIME did not record correct execution time for odbcblog
- fix fk check error when fk index exists
- fix cannot create stored procedure on bundle version
- fix forbid slave db starting update statistics daemon
- fix when DB\_LCODE=10,docx/xlsx/pptx/pdf file is not convert to txt file by saving as clob
- fix call getsystemoption('startbackup','3') got the error1319
- define the trace LOG name more reasonable
- fix creating procedure must set PATH env value in the linux bundle version
- fix when select doctotxt 40M word file will cause dmserver core dump
- fix create text index on msppttype data type return error
- fix DB\_LBDIR is disabled in 64bit OS
- fix Call DatabaseMetaData.getIndexInfo(null,null,null,false,false) for large db will cause hang up.
- fix backup jnl removed before applying to all Slave DB successfully
- optimize odbc log to check multi-thread problem
- fix View can be used after revoking the select from the table
- fix for ddb, master db can not access remote db after remote db restart
- fix incorrect Sort Result Between DCI and VISION
- fix create db with lcode different with language in DBMaster.lic, jdba return 8066 when connect to server

- fix update blob column with char column get function return value do not match definition error
- fix dmsql tool do not response while executing sync replication
- fix The type of output parameter is nvarchar, but the length of returned is not long enough.
- fix dmsql occurs the error 25350 because of xlstotxt
- fix set showtime on , but not see the execution time returned
- fix index scan lost data when isolv=4
- fix dmserver crash when select trim() with UTF8 database
- support bundle version support vs2008 and vs2010
- fix import from odbc got incorrect data on Linux 64 OS
- fix ACCESS VIOLATION when testing hibernate + gradle
- fix JDBC EXCEPTION in JdbcOdbcAPI.sqlFreeHandle()
- fix create text index face hang problem and memory problem
- fix shrink deftablespace shows error 6104
- fix an error occurs when Using JDBC driver to get Timestamp value.
- fix dmserver core dump when call pdftotxt(pdffiletype)
- Support option to prevent return media udf error when create text index
- fix check some logic errors in socket NETWORK
- fix .BB file expanded abnormally
- fix dmserver core dump while calling java sp
- fix When unload fileobj failed should give more clear message and should not stop unload
- fix the dump file of bundle version generated in driver C:
- fix dmserver core dump while writing crash log
- fix connection pooling problem Error: can not alloc stmt
- fix JDBC test the interface found error when call PreparedStatement.setObject()
- fix insert blob data cause col's bbid->btyp different
- fix cast functions returns is not correct
- fix DB Crash when update misuse other data's offset.
- Fix concurrent update record may cause database inconsistent  
Note: This issue is same as [DBMR2603] - mr9985: concurrent delete and insert may cause lost record
- Fix b-tree index crash.
- Fix concurrent create/drop/alter view may cause dmserver crash and database inconsistent  
Note: This issue is same as [DBMR2603] - mr9982: DB Crash
- Fix update record get ERR\_NO\_SPACE when table space is autoextend.  
Note: This issue is same as [DBMR2603] - Mr9998



### 7.4.11 VERSION 5.1.2

---

- Fix join on different char size get wrong results
- Fix order by with dblink query may get internal error
- Fix import command crash with FIXED\_FORMAT
- Upper/Lower function support double-byte character
- Fix OLE DB Provider can't work with Microsoft Analysis Services
- Fix dmsrvr cannot connect or start daemon when DB\_UMODE=0
- Fix crash when calling PDFTOTXT or PPTTOTXT function
- DCI support ACU 8.0 64bit
- Fix DCI may get record not found error when user delete some record and start <= key

### 7.4.12 VERSION 5.1.1

---

- Support subquery in projection list
- Support Heterogeneous Asynchronous Table Replication on non-windows platform
- Support VC2008 for create stored procedure
- Enhance OLEDB compatibility
- DCI support ACU 8.0
- Fix import/export with NCHAR, NCLOB, CLOB and BLOB data
- Fix crash in odbc driver manager when setting wrong DB\_CLILCODE

### 7.4.13 VERSION 5.1

---

- Support linux/windows 64bit (x86-64)
- glibc version support changed from 2.1 to 2.3
- Support UTF-8 LCODE
  - . user can define client lcode and error message lcode when database lcode is UTF-8
- Server log enhancement
  - . support compress server log
  - . support remove server log after n days
- support rollover command line utility

### 7.4.14 VERSION 5.0

---

- Support index row level lock
- System limitation enhancement:
  - . Enlarges page size: The default is 8k User can define 4k, 8k, 16k or 32k before create db
  - . Enlarges identifier name length to 128
  - . Enlarges maximum column number to 2000

- . Enlarges maximum index column number to 32
- . Enlarges maximum SQL statement length to 2097152
- . Enlarges maximum tables in a SQL query to 127
- Support xml type, index and predicate
- Support media class
  - > Support user defined function for full text index
  - > Support new system domain
    - . MSEXCELTYPE and MSEXCELFILETYPE
    - . MSPPTTYPE and MSPPTFILETYPE
    - . PDFTYPE and PDFFILETYPE
  - > Support new user define function
    - . DOCTOTXT
    - . XLSTOTXT
    - . PPTTOTXT
    - . PDFTOTXT
    - . HTMTOTXT
- Support new log system to replace audit trail
- Support word sorting order
- Support network compression

#### **7.4.15 VERSION 4.3.4**

---

- Fix fail to report error when start db by dmservic (service) and start db by dmserver on WIN2003 and VISTA.This may cause db crash.
- Fix sometimes cannot unload table when data exceed 1G
- Fix executing a stored command get access violation after execution plan has changed
- Fix MS-Access cannot link to a view when the view reference a serial type's column
- Fix unload db get access violation when there are many stored command
- Fix execute nested join query with index may get access violation
- Fix group by expression may get access violation
- Fix dmserver may get access violation when system out of memory
- Fix cannot unload some table after set unload splitfile on

#### **7.4.16 VERSION 4.3.3**

---

- Fix unable to import some Japanese characters
- Fix rebuild ivf text index problem when there's error during rebuilding text index
- Fix rollover database or rollback transaction sometimes cause core dump

- Refine optimizer cost function for choosing better execution plan
- Limit the DB\_NJNLB to 16128 for windows
- Fix JDBC exception with invalid handle error
- Fix update statistics sometimes get system internal error
- Fix select into with table replication get out of memory error
- Change update statistics daemon's sample rate to 100
- Support addon UDF U8TOU16 and U16TOU8
- Support DB\_RSTSN to auto reset serial number to 1 when it exceed max serial number. The default is off.

#### **7.4.17 VERSION 4.3.2**

---

- New JDBC methods
- Support Unicode in ESQL/C
- Fix Out of Memory issue when selecting VIEW
- Performance enhancement for SELECT INTO with BLOB
- Fix Export to Text causing core dump if the SQL command is too long
- Fix index on expression causing system internal error
- Fix outer join with SELECT FROM result set returning wrong result
- Fix idle connection issue
- Fix unable to connect after connect/disconnect through Driver Manager for several times
- Support EUC-JP and GB18030 encodings
- OLEDB enhancement

#### **7.4.18 VERSION 4.3**

---

- Support syntax optimizer
- Support index on expression
- Support access control list
- Transaction Isolation Level enhancement
- Java Stored Procedure
- Java Query By Example (QBE) enhancement
- Java Query Tool
- Support compressed backup files
- Support multiple-tape backup
- Support read-only table space
- Support INFORMATION SCHEMA syntax
- Support USING and NATURAL JOIN syntax
- Support DROP object RESTRICT/CASCADE

- Support user-defined stopword
- Native OLE DB Provider for DBMaster

## 7.5 Benchmark compare testing

You can check the simple testing result for performance. If you want to check more information for Benchmark testing, please contact with Support Team.

About performance, 5.1 and 5.2 is very close according to the test result, 5.3 is better than 5.2, and 5.4 and 5.3 is very close.

Because 4.3 and 5.0 is too old, we cannot provide the testing result base on the same platform and same configure setting (include the data amount, testing times and so on).

### 7.5.1 COMPARE 5.1 AND 5.2

---

The result is for 100,000 records and test 3 times.

#### 7.5.1.1 Windows Platform – Insert, Update and Delete

		DBMaster 5.1.2	DBMaster 5.2.2
N=		10,0000	10,0000
Insert	AVG	6.579	6.667
Update	AVG	7.079	7.413
Delete	AVG	4.000	4.000

#### 7.5.1.2 Windows Platform –Select

		DBMaster 5.1.2	DBMaster 5.2.2
N=		10000	10000
tuples=		100000	100000
Select1 [N/10 times]	AVG	28.089	29.057
Select2 [N/10 times]	AVG	4.000	4.149
Select3 [N/10 times]	AVG	23.123	23.974
Select4 [N/100 times]	AVG	352.667	357.359
Select5 [N/10 times]	AVG	326.617	330.303
Select6 [N times]	AVG	3.000	3.087
Select7 [N/10 times]	AVG	24.443	26.336

### 7.5.2 COMPARE 5.2 AND 5.3

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The result is for 50,000 / 100,000 records and test 3 times.

#### 7.5.2.1 Windows Platform – Insert, Update and Delete

		DBMaster 5.2		DBMaster5.3	
N=		50,000	100,000	50,000	100,000
Insert	AVG	15.384	32.359	8.964	19.843
Update	AVG	16.241	33.667	9.333	19.704
Delete	AVG	9.807	19.354	6.000	12.277

### 7.5.2.2 Windows Platform –Select

		DBMaster 5.2		DBMaster 5.3	
N= tuples=		10000	10000	10000	10000
		50000	100000	50000	100000
Select1 [N/10 times]	AVG	24.000	45.21	17.000	31.155
Select2 [N/10 times]	AVG	13.000	13.000	5.85	4.966
Select3 [N/10 times]	AVG	23.269	34.149	16.816	26.142
Select4 [N/100 times]	AVG	227.706	877.844	110.634	322.917
Select5 [N/10 times]	AVG	273.745	550.268	184.625	310.012
Select6 [N times]	AVG	17.866	19.000	8.496	7.903
Select7 [N/10 times]	AVG	35.457	68.947	17.100	26.000

### 7.5.3 COMPARE 5.3 AND 5.4

The result is for 50,000 / 100,000 records and test 3 times.

#### 7.5.3.1 Windows Platform – Insert, Update and Delete

		DBMaster 5.3.2		DBMaster5.4	
N=		50,000	100,000	50,000	100,000
Insert	AVG	18.000	35.000	17.333	33.000
Update	AVG	17.667	35.667	17.333	35.000
Delete	AVG	10.333	22.000	10.000	20.000

#### 7.5.3.2 Windows Platform –Select

		DBMaster 5.3.2		DBMaster 5.4	
N= tuples=		5000	10000	5000	10000
		50000	100000	50000	100000
Select1 [N/10 times]	AVG	10.667	39.333	10.667	40.000
Select2 [N/10 times]	AVG	3.667	13.000	4.000	13.000

Select3 [N/10 times]	AVG	7.333	26.000	7.333	27.000
Select4 [N/100 times]	AVG	109.000	860.000	109.667	866.333
Select5 [N/10 times]	AVG	121.667	486.667	122.000	490.667
Select6 [N times]	AVG	9.333	20.000	9.000	19.333
Select7 [N/10 times]	AVG	17.333	67.000	17.667	68.000