



## A COMPARATIVE ANALYSIS OF SQL SERVER AND INTERBASE SERVER

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**Abstract:** *Data storage, information management and subsequent retrieval constitute one of the ultimate goals in Computing Technology. Choosing the right Database Management System depending on the operation of the Establishment cannot be over emphasized. To select the right server for an application, two things to be considered are how data will be accessed and modified in the application, and how the server will behave in a data access or update situation.*

*This research work compares two Database Management Systems with different architecture; Interbase server with multigenerational architecture and SQL server with classical architecture. The analysis was based on Execution time (Insert time, Update time and Delete time), using Delphi 6 programming language as the platform and Open Database Connectivity (ODBC) as the Application Programming Interface (API).*

*Results obtained revealed that insert time in SQL server was in the range of 95343  $\mu$ s to 3783171  $\mu$ s when the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Interbase server. Update time for SQL server is about twice that for Interbase for number of records between 10,000 and 100,000, but about three to six times for higher number of records. The delete time for SQL server was about 5 times that of the Interbase server.*

**Keywords:** *ODBC, Multigenerational Architecture, Classical Architecture, DBMS, SQL Server and Interbase server.*

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## **1.0 INTRODUCTION**

Data provide the basis for advancements and developments in every field of study. Therefore, choosing the appropriate database management system that facilitates the ways we store, manage and process these data is very important. Due to many shortcomings of file system, people scaled to database systems. Database is a collection of logically related data. It is a source, where data are stored in an arbitrary manner to facilitate arbitrary access of the stored. (Bukhres et al, 1993). Database technologies are different techniques used in implementing different database Management systems. Thus, database is not only representing significant infrastructure for computer applications, but they also process the transactions. (Mullen et.al, 1995)

There are different categories of database management system. It ranges from Local database technologies to Remote database technologies. (Zhao et.al, 1998). Database Management systems were developed based on two different architectures, they are classical architecture and multigenerational architecture. This research work focuses on two remote database technologies, which are Interbase server database management system from multigenerational architecture and Microsoft SQL server database management system from classical architecture. This research provides a quantitative and qualitative analysis of the selected technologies.

## **2.0 RELATED WORK**

(Todd, 2003), in his paper titled "Interbase, what sets it apart" concluded that the most significant difference between Interbase and other database servers is its multigenerational architecture which is also called versioning architecture. This provides very rapid crash recovery since there is no log file to process. In (Best software, 2005), "MAS200 for SQL server introduction and overview" concluded that Microsoft SQL server is a road tested, industry standard database fully equal to the task of running mission-critical business application than any other database servers.

(Mohan, 2004), in his work "Performance Measurement and analysis of Database Interface Technologies: JDBC, EJB (CMP2.0) and Oracle Toplink" analyzed the most suitable Application Programming Interface by subjecting the three interface technologies into stress testing.

To meet the service levels demanded by your users, your database-based application needs to deliver high performance and scalability. In addition, it requires complete data availability, which includes fault tolerance, service uptime, and throughput. In short, performance and service uptime are the two most important criteria to ensure an application operates at expected levels.( MySQL Technical White Paper, 2005)

### 3.0 MATERIALS AND METHODS

Detailed study of Interbase server and Microsoft SQL server was carried out, and the evaluation criteria which is common to both DBMS( Execution time; insert time, delete time and update time) were examined and model. In order to evaluate the effectiveness and efficacy of the two DBMS, data were generated and populated in the order of between Ten thousand Records to One million records in each data base. The two DBMS were then subjected to a test and monitored.

The hardware specification used for the experimentation is as given in table 1 below. Table1 Hardware Specification

Hardware Specification	
RAM	512
Operating System	Window XP, SPII
Microprocessor	Pentium IV, 2.4 GHZ
Platform	Delphi

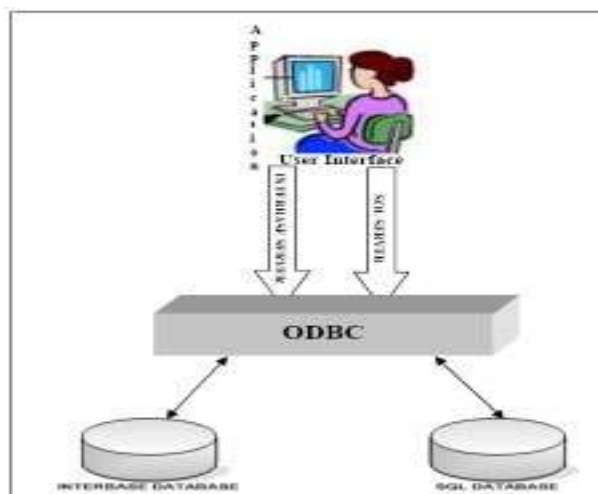
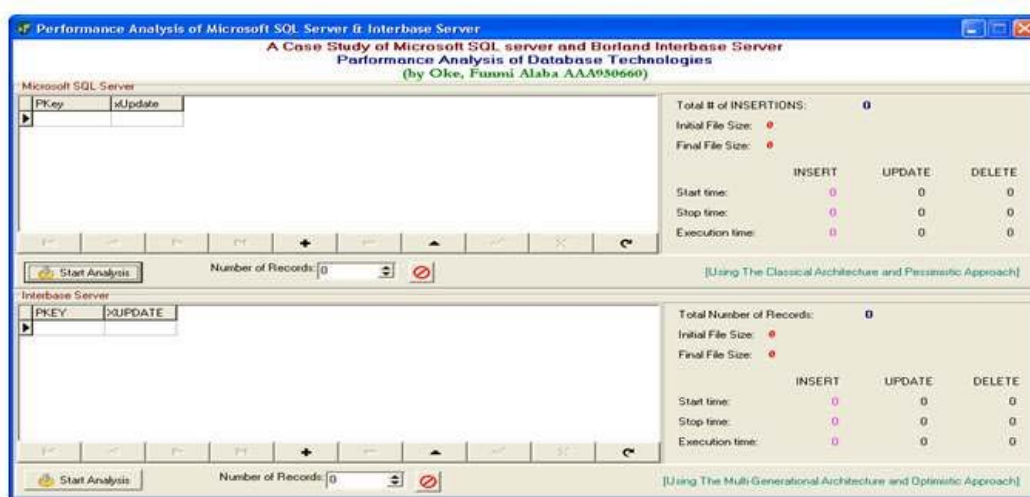


Figure 1.0 The Conceptual Framework of the designed system



Application User Interface: This is design phase that access the database via the ODBC. Delphi 6

Programming language is used as the platform. The analysis was performed by building an application that connects via ODBC to Interbase server and SQL server. The application is menu driven. it requires supplying the amount of data to be populated by each database driver. Upon supplying the data then the system is executed to perform the analysis. The application user interface design is given in figure 2.



**Figure 2.0 The Application Interface Designed for the Analyses**

ODBC: Open Database connectivity is used as the Application programming interface between the front end (Delphi) and each back end (Interbase and SQL). It has benefits of ubiquitous connectivity and platform-independence. It provides the standard of ubiquitous data access because hundreds of ODBC drivers exist for a large variety of data sources. ODBC operates with a variety of operating systems and drivers exist for non-relational data such as spreadsheet text and XML files

Interbase Database server: This is the interbase file used to connect to the Interbase database

Interbase is a Database Engine that has memory footprint, programming and cost concerned. It allows

implementation of Stored Procedures, Blobs, Database events and distributed processing; Interbase requires Windows 95/98/Me/NT/2000/XP/2003Server, or IB/Firebird Server



SQL Database server: This is the SQL file used to connect to the SQL database It is a relational database management system (RDBMS). This is also known for its support for many data types, scalability, simplicity and efficiency. It is a remote server that has support for client server and distributed computing. It also requires Windows 95/98/Me/NT/2000/XP/2003Server, or IB/Firebird Server

## RESULTS

**Table 2.0. Execution Time for Interbase Server and SQL Server**

TYPE OF SERVER						
	INTERBASE SERVER			SQL SERVER		
No of Record	Insert	Update	Delete	Insert	Update	Delete
10,000						
Start time(μs) Stop time(μs)	6:47:18	6:48:54	6:50:26	6:45:09	6:46:01	6:46:47
50,000						
Start time(μs) Stop time(μs)	7:00:26	7:05:02	7:08:49	7:10:50	7:12:05	7:12:57
100,000						
Start time(μs) Stop time(μs)	7:38:11	7:46:33	7:54:05	75:8:30	8:10:20	8:10:48
500,000						
Start time(μs) Stop time(μs)	8:14:58	8:57:57	9:22:09	11:20:06	12:30:14	12:32:22
1000,000						
Start time	9:27:23	10:21:08	10:47:35	12:50:14	2:35:06	2:38:13



The table 2 shows the results of the analysis for Interbase and SQL servers. The two DBMSs were populated with varying number of records ranging between 10,000 records and 1,000,000 records. The system was monitored and start time and stop time were recorded to get the execution time for both Interbase and SQL database management systems. Execution time for each Database management system was analyzed so as to know how each behaved in update, insert and delete execution time. Figure 3.0 and figure 4.0 shows graphical representation for Interbase server and SQL server respectively.

#### INTERBASE SERVER

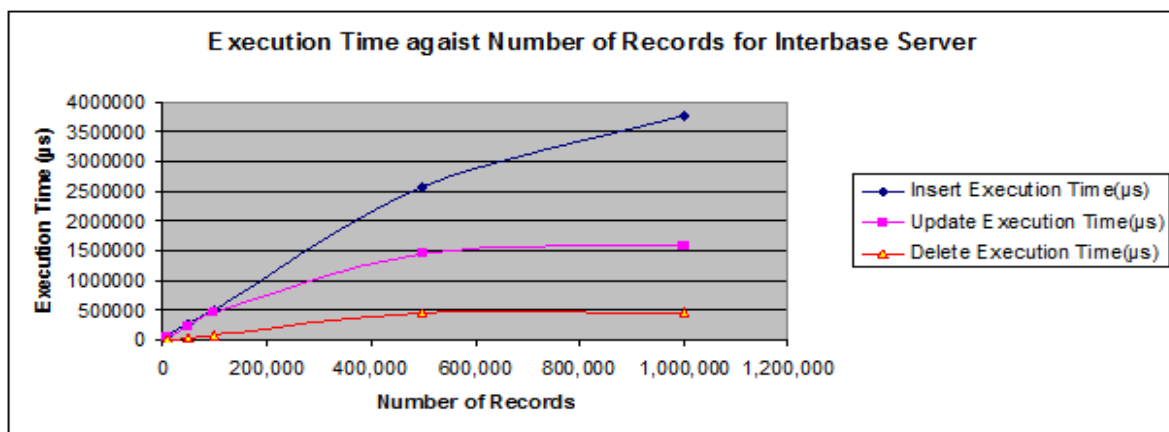


Figure 3.0 Graph of Interbase Database Server Execution Time

For Interbase server, Delete time execute faster than both Update and Insert time, while Update time is faster than Insert time.

#### SQL SERVER

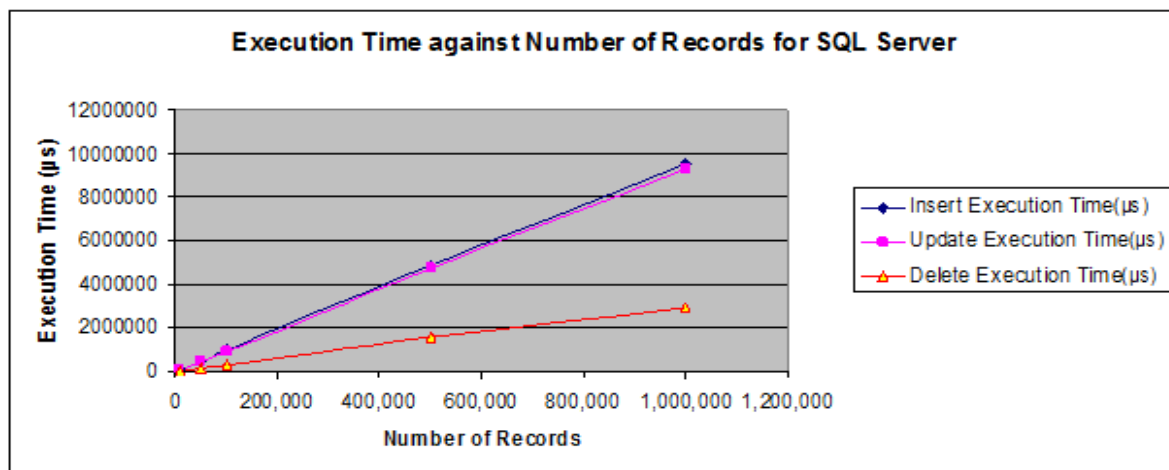


Figure 4.0 Graph of Microsoft SQL Database Server Execution Time



For SQL server, Update and Insert execution time were almost the same in fastness while Delete time execute faster than both Update and Insert time.

#### SQL SERVER VS INTERBASE SERVER.

From the result gotten in table 2.0, the execution time (Insert, Delete and Update) from each of the database server were compared and analyzed with each other, figure 5.0, figure 6.0 and figure 7.0 show the graphical representation for insert time, update time and delete time for both Interbase and SQL

servers respectively.

#### INSERT EXECUTION TIME (SQL VS INTERBASE)

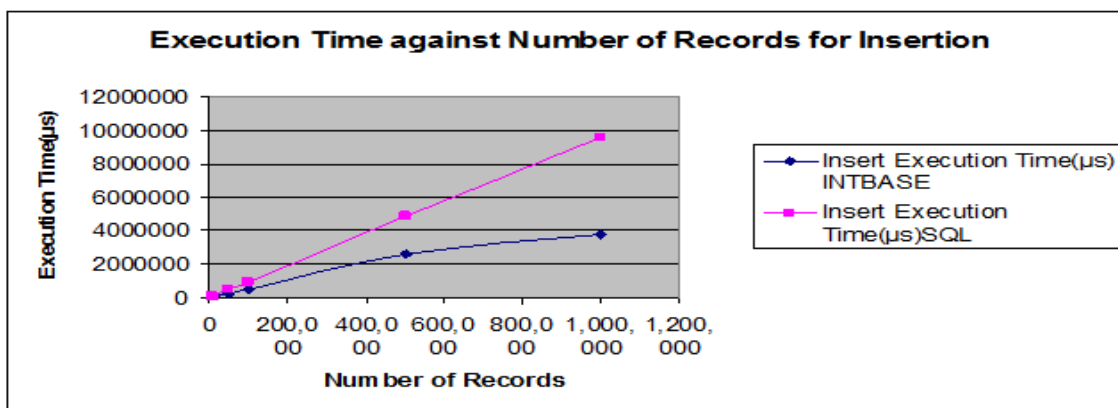
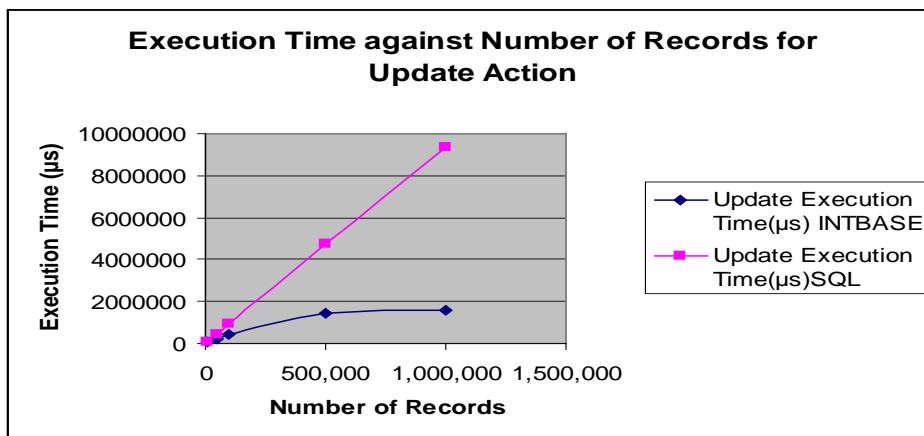


Figure 5.0 Insert execution time against number of records for both Databases

From figure 5.0 that shows the comparison analysis for Insert execution time for Interbase and SQL Servers, it was found out that Insert time in SQL server was in the range of 95343  $\mu$ s to 3783171  $\mu$ s when the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Interbase server. Therefore, insert execution time in Interbase is faster than insert execution time in SQL.

#### UPDATE EXECUTION TIME

Figure 6.0 shows the comparison analysis for Update execution time for Interbase and SQL Servers.

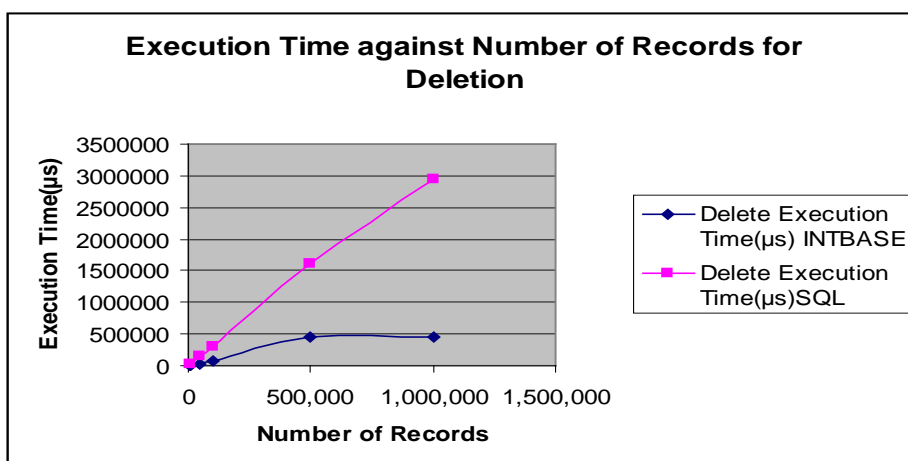


**Figure 6.0 Update Execution time against number of records for both Databases**

Update time for SQL server is about twice that for Interbase for number of records between 10,000 and 100,000, but about three to six times for higher number of records. Therefore, Update Execution time in Interbase is faster than Update Execution Time in SQL Server.

#### DELETE EXECUTION TIME

Figure 7.0 shows the comparison analysis for Delete execution time for Interbase and SQL Servers. The delete time for SQL server was about 5 times that of the Interbase server.



**Figure 7.0 Delete Execution time against number of records for both Databases.**

Delete Execution Time in Interbase is faster than Delete Execution Time in SQL Server.

#### RESULTS DISCUSSION

Interbase server with multigenerational architecture and SQL server with classical architecture were analyzed based on Execution time (Insert time, Update time and Delete time), using Delphi 6 programming language as the platform and Open Database Connectivity (ODBC) as the Application Programming Interface (API). Results





obtained revealed that insert time in SQL server was in the range of 95343  $\mu$ s to 3783171  $\mu$ s when the record size ranged from 10,000 to 1,000,000 which almost doubled the insert time for Interbase server. Update time for SQL server was about twice that for Interbase for number of records between 10,000 and 100,000, but about three to six times for higher number of records. The delete time for SQL server was about five times that of the Interbase server.

Moreover, the results revealed in the two database management systems considered, delete execution time is the fastest, followed by update execution time then insert execution time.

## **CONCLUSION**

SQL and Interbase database management systems are good database systems widely used in computing because of the possibilities of services they offer. Therefore, to select the right server for an application, the following must be understood; how data will be accessed and modified in the application developed? and how the server will behave in each data access, update, and insert situation. It was found out that the database server with multigenerational architecture (Interbase) performed better in terms of execution time to database server with classical architecture (SQL) .

With this result , System procurers can make a more informed decision in choosing appropriate database management system from the option considering the benchmark used to evaluate them.

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