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A Comparison of MySQL and MongoDB Databases

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Abstract *- As use of internet is increasing day by day and need of new requirements are also arising in database area in order to handle huge volume of data (Big Data) with very complex operations. In recent years, many companies have switched their databases, as earlier they were using relational databases(MySQL) and now they have adopted different-different types of non-relational databases. Types of non-relational databases are MongoDB, Cassendra, Hypertable, Hbase ,CouchDB etc and these non-relational databases are referred as "NoSQL i.e. Not Only SQL databases". In this paper, we are going to study about new technology that is NoSQL databases and makes a comparison study with MySQL databases and justify that why MongoDB is liked over MySQL. Comparison between MySQL and MongoDB databases is performed using CRUD operations with similar dataset.*

Keywords : performance comparison between MySQL and MongoDB database using same dataset.

1. INTRODUCTION

Relational databases(Traditional databases) are widely used in most of the applications to store and retrieve data. These databases work best when they handle a limited amount of data and complex queries. These databases face problems while handling a huge volume of data. As use of internet and amount of data is also increasing day by day and relational databases are not good enough to handle. So, to solve this problem non-relational databases come into existence. These databases are not replacement of relational databases but they are just an alternative to handle huge amount of data.

2. NoSQL DATABASES

The term "NoSQL" stands for "Not Only SQL" and in 2009 this term was introduced , it was chosen a title of a conference "for folks interested in distributed structured data storage" [1].These databases do not provide ACID properties but they work on BASE properties. NoSQL database, is not a tool, but a methodology composed of several complementary and competing tool. Reason to use NoSQL databases is due to big data projects you have to tackle. A big data project is typified by following:

a. **Velocity of data** : lots of data coming is very quickly from different locations.

b. **Variety of data** : data storage that is structured, semi-structured, and unstructured.

c. **Volume of data** : data involved may be terabytes or more in size.

d. **Complexity of data** : data that is stored and managed at different locations.

There are many reasons why we prefer NoSQL databases over relational databases[4]:

a. Advantage of NoSQL databases is that they can handle unstructured data efficiently such as documents, e-mail, multimedia and social media.

b. Horizontal Scalability or Scale-out means new nodes can be easily added as schema is not fixed.

c. NoSQL databases have better performance even at high volume of data.

d. Continuous Availability or Fault Tolerance means there is no single point of failure in NoSQL as it follow distribution architecture.

Thus this leads to low cost, distributed indexes are efficiently used and RAM for data storage, have ability to add new attributes to data records dynamically, replication ability and data is distributed over many servers [2] [3].Due to all these features NoSQL database systems are adopted by many companies like Google, Amazon, Twitter, and Facebook as they facing problem while dealing with relational databases.

3. COMPARITIVE ANALYSIS BETWEEN MySQL AND MONGODB

This project was created in MySQL and then imported to NoSQL database. Some entries were made manually and rest of entries later on were downloaded from free source to save time. We used MySQL and MongoDB on a machine that has a processor of Intel Core i3 2.5GHz with a dynamic memory (RAM) of 4GB. We installed version 5.5 for MySQL and version is 3.2 for MongoDB. We used the three main operations select , update and delete for Database information table/collection and the data that has been used in MySQL and MongoDB are same and output is retrieved in milliseconds. The output given by different size datasets are as following :

Table - 1 : Insertion Time

Number of records / documents selected	Time in Milliseconds	
	MySQL	MongoDB
16	0.01 sec or 10 ms	0 ms
109	0.02 sec or 20 ms	1.2 ms
200	0.03 sec or 30 ms	3 ms
600	0.09 sec or 90 ms	70 ms
1000	0.011 sec or 110ms	90 ms
5462	0.028 sec or 280 ms	150ms

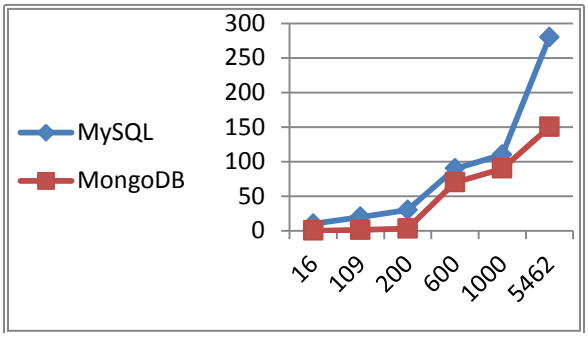

Chart - 1 : Insertion Time

Table - 2 : Updation Time

Number of records / documents updated	Time in Milliseconds	
	MySQL	MongoDB
16	0.07 sec or 70 ms	0 ms
109	0.11 sec or 110 ms	4 ms
200	0.13 sec or 130 ms	6 ms
600	0.29 sec or 290 ms	32 ms
1000	0.82 sec or 820 ms	37 ms
5462	0.99 sec or 990 ms	161 ms

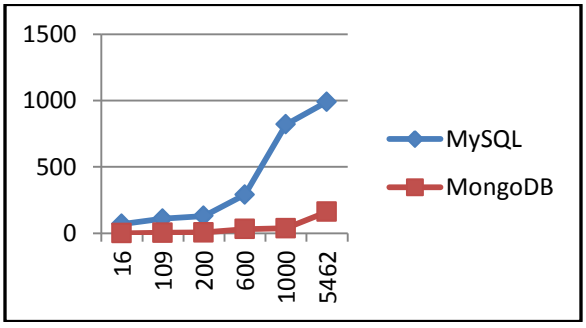

Chart - 2 : Updation Time

Table - 3 : Deletion Time

Number of records / documents deleted	Time in Milliseconds	
	MySQL	MongoDB
16	0.35 sec or 350 ms	0 ms
109	0.45 sec or 450 ms	4 ms
200	0.60 sec or 600 ms	4 ms
600	0.72 sec or 720 ms	48 ms
1000	0.77 sec or 770 ms	58 ms
5462	1.28 sec or1280 ms	133 ms

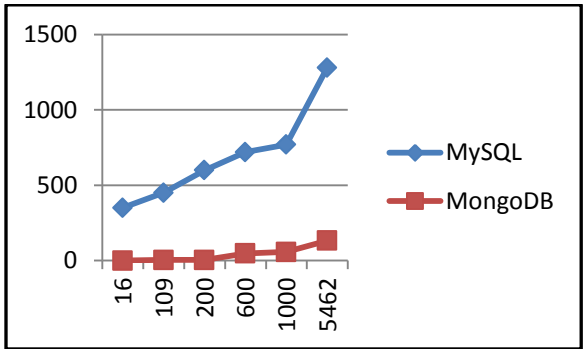

Chart - 3 : Deletion Time

4. CONCLUSION BASED ON PERFORMANCE ANALYSIS

As amount of data is increasing, time taken by MySQL to perform operations is also increasing . Above tables and charts clearly shows that MySQL is not able to handle large amount of data that's why MongoDB is preferred over MySQL.

5. REFERENCES

[1] Dominik Bruhn, "Comparison of Distribution Technologies in Different NoSQL Database Systems".

[2]Hailing Zhang, Yang Wang, Junhui Han, " Middleware Design for Integrating Relational Database and NoSQL Based on Data Dictionary" International Conference on Transportation ,Mechanical ,and Electrical Engineering(TMEE), 978-1-14577-1701,Dec 2011.

[3] Jing Han, Haihong E, Guan Le, "Survey on NoSQL Database" , IEEE 978-1-4577-0208-2,2011

[4] Neal Leavitt " Will NoSQL Databases Live Up to Their Promise ? " IEEE Computer Society 00189162/10/$26.00 © 2010 IEEE.