

#### S4 - Limited Literature Review, DBMS Performance

If a database implemented in one DBMS is more performant on reads, or on writes / updates, then this may be crucial information in selecting the correct DBMS. Performance analysis is extremely challenging. Different assumptions, conditions, hardware, etc. can change the results and bias the analysis.

Therefore, we review performance analyses completed by others, and compare the results. If there is general agreement on performance characteristics, then we can have confidence that these results are “real”.

Summary of Findings:

Report	Benchmark	"Winner"
1	bolanchor	MongoDB
1	msiecount	PostgreSQL
1	eolanchor	MongoDB
2	select	MySQL / PostgreSQL
2	insert	MongoDB / PostgreSQL
2	update	MongoDB
Overall		MongoDB

Academic Integrity Note: The summaries below include thoughts from a CSC 510 team member, as well as direct quotes from the sources. These may not be explicitly quoted or cited, as this is a working document for the team's review. The reader should assume that most of the content below is NOT represented as the work of team c\_aqogom.

# Report1 Regex Performance

<http://conecuh.com/blog/2013/12/18/database-regex-performance/>

Regex(regular expression) is a powerful way of specifying a pattern for a complex search.

Regex query strings used to compare MongoDB, MySQL and PostgreSQL:

- bolanchor - "Regex Query with a beginning of line anchor - only matches at the beginning of the line"
- msiecount - "Regex Query to select lines with matching characters in the middle of the line"
- eolanchor - "Regex Query with a end of line anchor - only matches at the end of the line"

Query	MongoDB Pattern	MySQL/PostgreSQL Pattern
<b>bolanchor</b>	/^66\.249\.65\.20/	^66\.249\.65\.20
<b>msiecount</b>	/MSIE [0-9]{1,}[\.0-9]{0,}/i	MSIE [0-9]{1,}[\.0-9]{0,}
<b>eolanchor</b>	/baidu\.com\search\spider\.html\)"\$/	baidu\.com\search\spider\.html\)"\$

Results:

"Millisecond timings of regex queries performed in MongoDB, MySQL and PostgreSQL"

Query	Rows	MongoDB ms	PostgreSQL ms	MySQL ms	Winner
<b>bolanchor</b>	128	295ms	2768ms	7769ms	MongoDB
<b>msiecount</b>	371217	8512ms	5278ms	48027ms	PostgreSQL
<b>eolanchor</b>	566760	3190ms	15892ms	61951ms	MongoDB

"MongoDB wins on the second execution, once it caches some of the data in memory. MongoDB doesn't have a query cache like MySQL, so you can't get instant results for the exact same query."

"So, MongoDB wins handily in two cases. PostgreSQL makes a mostly respectable showing, but MySQL (MariaDB in this test) brings up a distant third place."

## Report2 NoSQL Performance

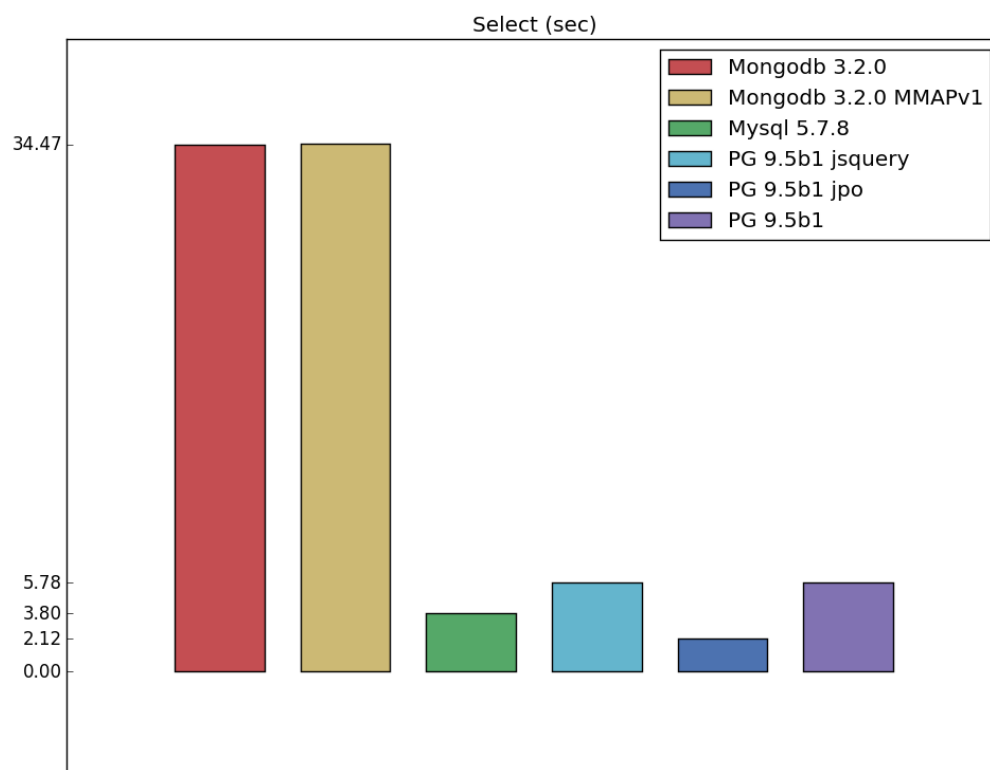
<http://erthalion.info/2015/12/29/json-benchmarks/>

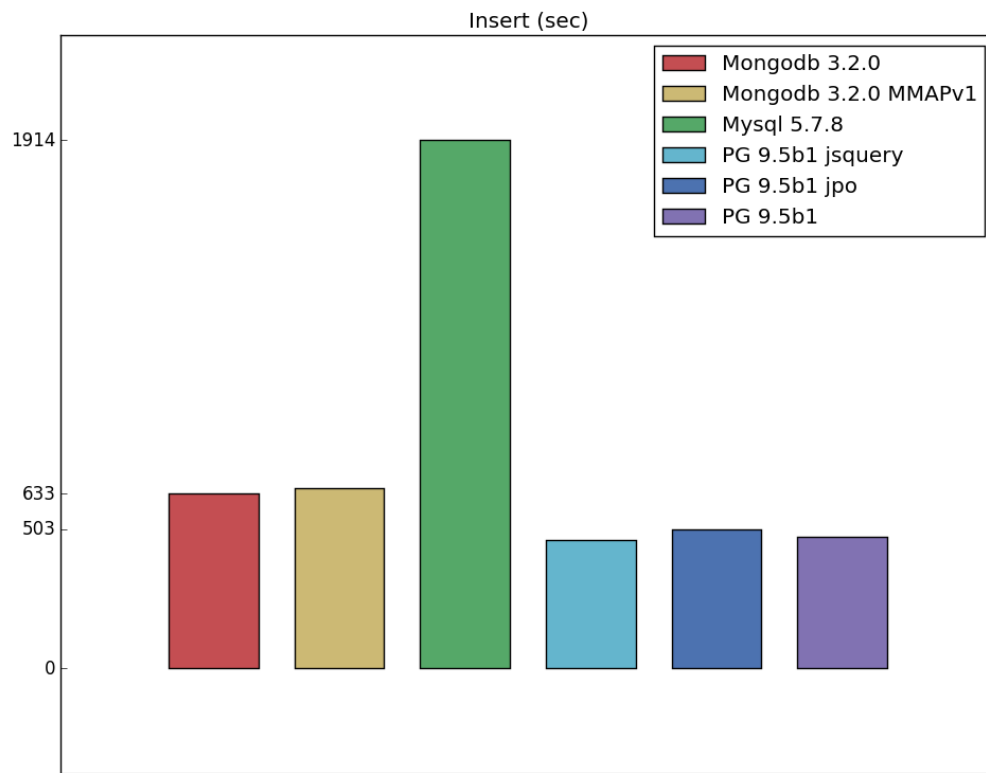
The `pg_nosql_benchmark` is a benchmarking tool developed by EnterpriseDB to benchmark MongoDB and PostgreSQL database using JSON data. However, `pg_nosql_benchmark` doesn't have any functions to work with MySQL, so the author implemented his own benchmark for MySQL similar to PostgreSQL.

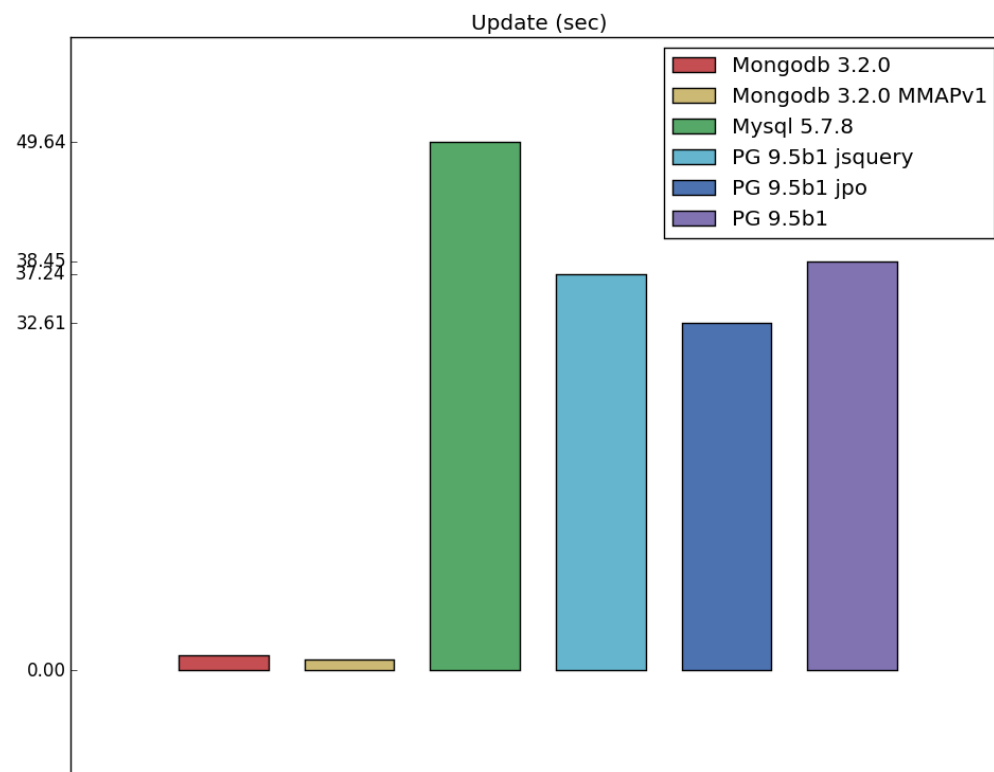
- Mongoddb 3.2.0 storage engine WiredTiger
- Mongoddb 3.2.0 storage engine MMAPv1
- Mysql 5.7.8
- PostgreSQL 9.5 beta1, jsquery
- PostgreSQL 9.5 beta1, jsonb\_path\_ops
- PostgreSQL 9.5 beta1, gin

Each of them was tested on a separate m4.xlarge amazon instance with the ubuntu 14.04 x64 and default configurations, all tests were performed for 1000000 records.

All charts presented in seconds (the time of query execution, the smaller value is better).







For select, MySQL and PostgreSQL have a better performance than MongoDB.  
For insert, MongoDB and PostgreSQL have a better performance than MySQL.  
For update, MongoDB is the obvious leader.