ISEngineering
Wirtschaftsinformatik –
Information Systems Engineering

Technische Universität Berlin

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Your name:_____

Enterprise Computing (WS 2016/17)

Exercise 5 (3 Portfoliopunkte)

Info:

- The solution to this exercise must be handed in by Wednesday, Dez 14th 2016, 12AM.
- Any written solution must be in an accessible PDF. Any source code in a separate ZIP File. All Files are uploaded in the Information System for Instructors and Students in a single ZIP File (https://isis.tu-berlin.de/course/view.php?id=8586).
- Please write your name on the solution sheet.

Task 1 – Transactional Web Benchmarks (20%)

Name four relevant reasons why transactional web benchmarks are not optimal for benchmarking cloud database systems or cloud database services.

Answer:

Task 2 – Performance Benchmarking with YCSB (12+12+12+12+9+8+15=80%)

Install YCSB (version 0.11.0) and the YCSB Cassandra & MongoDB bindings and perform the following tasks against a local Cassandra server (1-node cluster) and a local MongoDB server. For Cassandra only:

- Load the Cassandra table “usertable” in keyspace “ycsb” with 1 million records of default record size (i.e., 10 fields à 100 Bytes = 1 KB).

If you run the performance benchmark, please drop the keyspace “ycsb” and recreate it before you enter the results below (i.e., start with a fresh keyspace).

For Cassandra & MongoDB:

- Run a “transaction” performance benchmark with workload “workloada” (50% read and 50% write operations) with 1 million operations.

a) What are your results of the “transaction” performance benchmark for Cassandra?

YCSB Metric	Results
Average READ Latency [µs]	
Average UPDATE Latency [µs]	
READ MinLatency [µs]	
Throughput [ops/sec]	

b) What are your results of the “transaction” performance benchmark for MongoDB?

YCSB Metric	Results
Average READ Latency [µs]	
Average UPDATE Latency [µs]	
READ MinLatency [µs]	
Throughput [ops/sec]	

c) Use Cassandra’s nodetool utility to collect the following metrics after your benchmark run:

Cassandra Metric	Results
Local read count	
Local read latency	
Local write count	
Local write latency	

d) Explain the read count and write count numbers that you collected in c). Do the numbers make sense?

e) What equivalent command in MongoDB to Cassandra's nodetool utility could you use to collect the following metrics after your benchmark run?

Write down the complete command. Add the metrics to the table.

YCSB Metric	Results
Average Object Size	
Number of all Documents in DB	

f) When switching your MongoDB engine from WiredTiger to MMAPv1 Engine and run your benchmark again, how many "Insert Calls" is YCSB performing?

Use the same tool as in 2 e). Does the number for "Insert Calls" make sense? Explain why.

YCSB Metric	Results
Insert Calls	

g) What are your results of the “transaction” performance benchmark for MongoDB with MMAPv1 activated? Explain the difference between “MMAPv1” and “WiredTiger” results.

YCSB Metric	Results
Average READ Latency [µs]	
Average UPDATE Latency [µs]	
READ MinLatency [µs]	
Throughput [ops/sec]	