PRAKTIKUM DATABASE MANAJEMENT SYSTEM

TUNING DATABASE SYSTEM

Dosen Pengampu :
Arief Ichwani S.Kom, M.Cs

Disusun oleh :
Laurensius Joshua Anrico Agustinus
14117141
MBD – RC

PROGRAM STUDI TEKNIK INFORMATIKA
INSTITUT TEKNOLOGI SUMATERA
2019

DAFTAR ISI

BAB I
PENDAHULUAN

1.1 Tuning: Indexing

Index tuning adalah bagian penyetelan basis data untuk memilih dan membuat indeks. Tujuan indeks tuning adalah untuk mengurangi waktu pemrosesan kueri / pencarian. Saat basis data dibuat tanpa menggunakan index, maka kinerja server database dapat menurun secara drastis. Index tuning melibatkan kueri berdasarkan indeks dan indeks dibuat secara otomatis secara *realtime /* saat itu juga. Tidak diperlukan tindakan lebih oleh pengguna basis data untuk penyetelan indeks.

1.2 Tuning: Setting Configuration DBMS

Database Server adalah program komputer yang menyediakan layanan basis data untuk program komputer lain. Database server di devinisikan sebagai client server model. Database management system menyeduiakan fungsi - fungsi database server dan beberapa DBMS (seperti MySQL) sangat eksklusif untuk client-server model database access. Database server menyediakan fleksibilitas untuk konfigurasi database sevice yang kita inginkan. Dengan melakukan pengaturan konfigurasi pada server basis data, maka kita bisa membuat basis data yang lebih cepat dan lebih efisien.

BAB II
HASIL DAN PEMBAHASAN

2.1 Tuning: Indexing

Melakukan indexing pada tabel student pada setiap Data set dan melakukan indexing pada table section pada setiap Data set.

```
MariaDB [(none)]> use dbms1
Database changed
MariaDB [dbms1]> create index student_pk on student(id);
Query OK, 0 rows affected (0.42 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [dbms1]> create index section_pk on section(sec_id);
Query OK, 0 rows affected (0.29 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

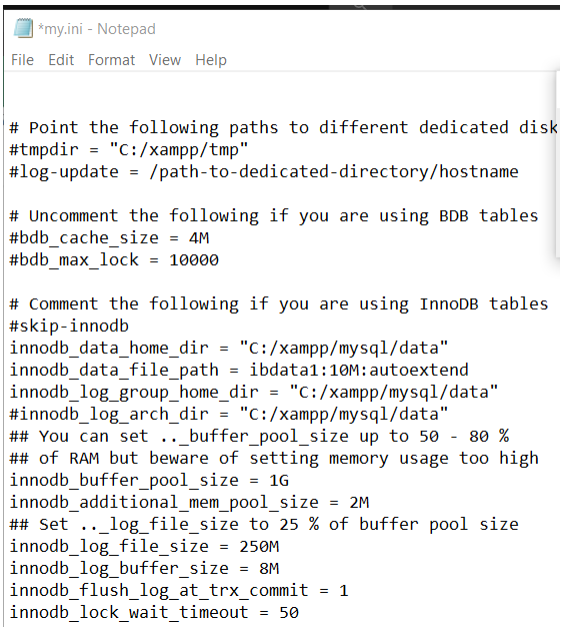
```
MariaDB [(none)]> use dbms4
Database changed
MariaDB [dbms4]> create index student_pk on student(id);
Query OK, 0 rows affected (0.31 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [dbms4]> create index section_pk on section(sec_id);
Query OK, 0 rows affected (1.17 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
MariaDB [(none)]> use dbms3
Database changed
MariaDB [dbms3]> create index student_pk on student(id);
Query OK, 0 rows affected (0.32 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [dbms3]> create index section_pk on section(sec_id);
Query OK, 0 rows affected (0.36 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

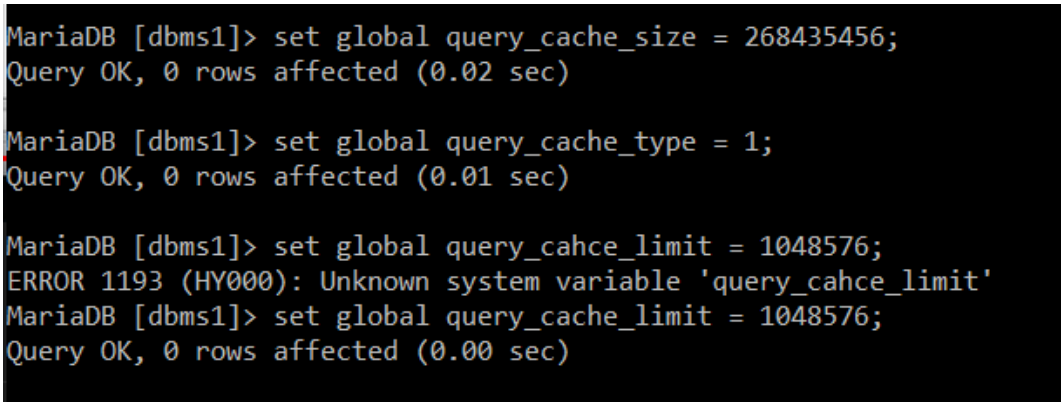
```
MariaDB [(none)]> use dbms2
Database changed
MariaDB [dbms2]> create index student_pk on student(id);
Query OK, 0 rows affected (0.28 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [dbms2]> create index section_pk on section(sec_id);
Query OK, 0 rows affected (0.76 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

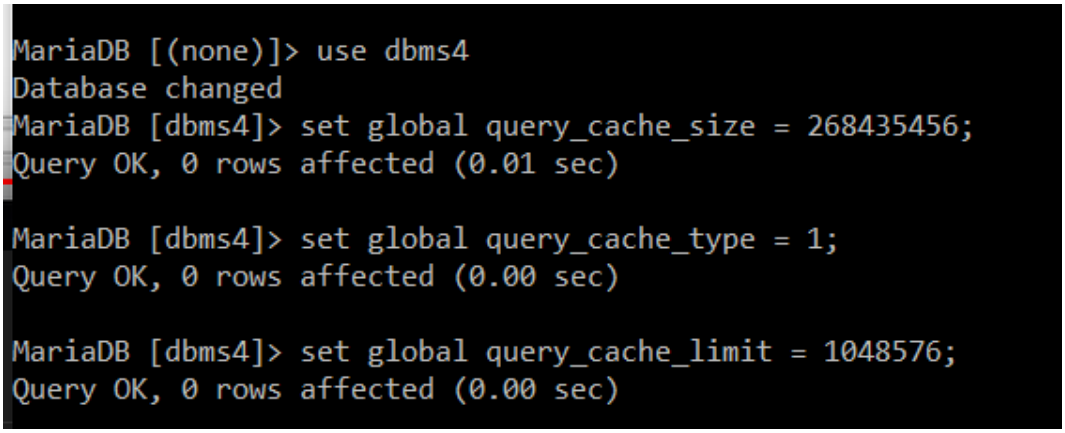
2.2 Tuning: Setting Configuration DBMS

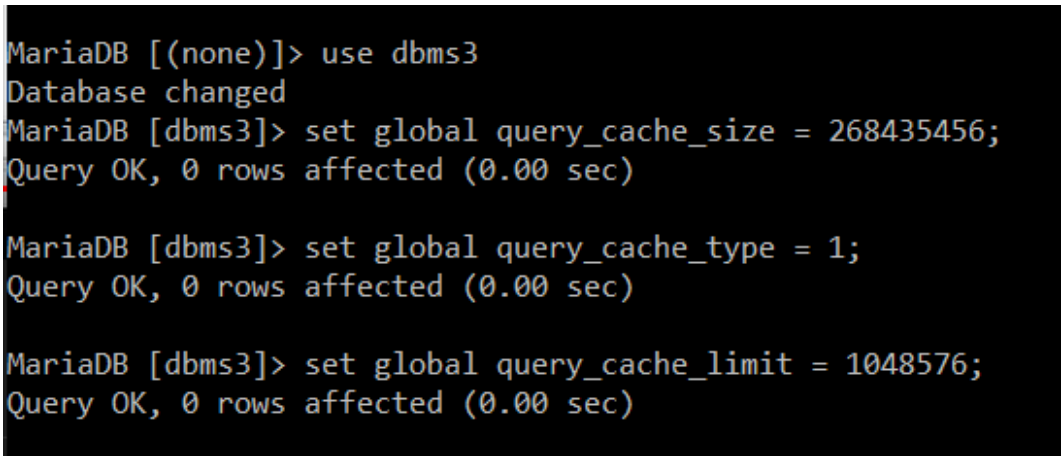
Melakukan perubahan pada file my.ini pada direktori C:\xampp\mysql\bin
Dengan merubah innodb_buffer_pool_size = 16M menjadi innodb_buffer_pool_size = 1G
Dan innodb_log_file_size = 5M menjadi innodb_log_file_size = 250M

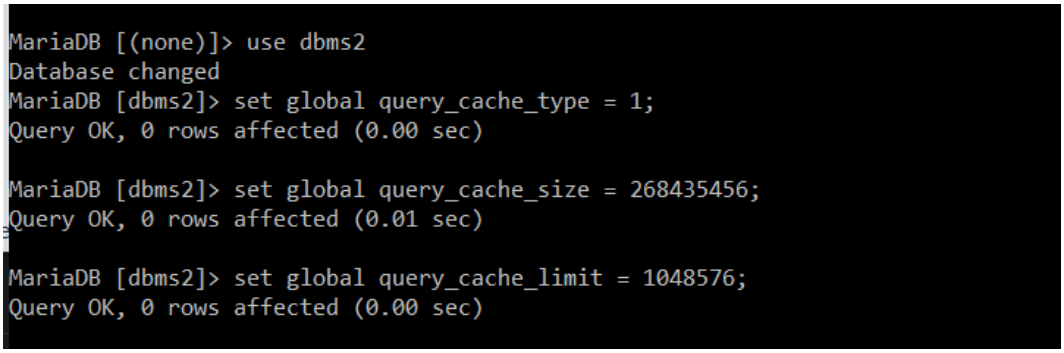


Dan konfigurasi setiap database dengan perintah:
set global query_cache_size = 268435456;
set global query_cache_type = 1;
set global query_cache_limit = 1048576;




MariaDB [(none)]> use dbms4
Database changed
MariaDB [dbms4]> set global query_cache_size = 268435456;
Query OK, 0 rows affected (0.01 sec)
MariaDB [dbms4]> set global query_cache_type = 1;
Query OK, 0 rows affected (0.00 sec)
MariaDB [dbms4]> set global query_cache_limit = 1048576;
Query OK, 0 rows affected (0.00 sec)


MariaDB [(none)]> use dbms3
Database changed
MariaDB [dbms3]> set global query_cache_size = 268435456;
Query OK, 0 rows affected (0.00 sec)
MariaDB [dbms3]> set global query_cache_type = 1;
Query OK, 0 rows affected (0.00 sec)
MariaDB [dbms3]> set global query_cache_limit = 1048576;
Query OK, 0 rows affected (0.00 sec)


MariaDB [(none)]> use dbms2
Database changed
MariaDB [dbms2]> set global query_cache_type = 1;
Query OK, 0 rows affected (0.00 sec)
MariaDB [dbms2]> set global query_cache_size = 268435456;
Query OK, 0 rows affected (0.01 sec)
MariaDB [dbms2]> set global query_cache_limit = 1048576;
Query OK, 0 rows affected (0.00 sec)

2.3 Hasil Tuning

Query pada tabel sesuai petunjuk pengerjaan :

- SELECT * FROM student
- SELECT * FROM student WHERE tot_cred > 30;
- SELECT `name`, dept_name FROM student WHERE tot_cred > 30;
- SELECT * FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id
- SELECT student.`name`,student.dept_name,takes.sec_id AS pengambilan,takes.semester,section.room_number,section.building,course.course_id,course.dept_name FROM takes JOIN student ON takes.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN course ON section.course_id = course.course_id

Dengan Data Sebelum Tuning :

Data	Waktu Sebelum Tunning (ms)				
	QUERY 1	QUERY 2	QUERY 3	QUERY 4	QUERY 5
1	0.000418	0.00068	0.000271	0.001408	0.001117
2	0.000431	0.000544	0.000422	0.003065	0.003154
3	0.000654	0.000531	0.001232	0.009807	0.00592
4	0.000804	0.001186	0.000543	2.427651	2.635551

```
MariaDB [dbms1]> show profiles;
+----------+------------+--------------------------------------------------------
---------------------------------------------------------------------------------
| Query_ID | Duration   | Query

+----------+------------+--------------------------------------------------------
---------------------------------------------------------------------------------
|        1 | 0.29259430 | SELECT * FROM student

|        2 | 0.00068030 | SELECT * FROM student WHERE tot_cred > 30

|        3 | 0.00027050 | SELECT dept_name FROM student WHERE tot_cred > 30

|        4 | 0.00140770 | SELECT *  FROM takes JOIN student ON takes.ID = stud

|        5 | 0.00111690 | SELECT student.`name`,student.dept_name,takes.sec_id
s.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN cou
+----------+------------+--------------------------------------------------------
---------------------------------------------------------------------------------
5 rows in set (0.00 sec)
```

```
|        2 | 0.00080380 | SELECT * FROM student
|        3 | 0.00118610 | SELECT * FROM student WHERE tot_cred > 30
|        4 | 0.00054320 | SELECT dept_name FROM student WHERE tot_cred > 30
|        5 | 2.42765080 | SELECT *  FROM takes JOIN student ON takes.ID = st
+----------+------------+--------------------------------------------------------
5 rows in set (0.00 sec)
```

```
|        2 | 0.00065380 | SELECT * FROM student

|        3 | 0.00053060 | SELECT * FROM student WHERE tot_cred > 30

|        4 | 0.00123170 | SELECT dept_name FROM student WHERE tot_cred > 30

|        5 | 0.00980720 | SELECT *  FROM takes JOIN student ON takes.ID = stu

|        6 | 0.00591990 | SELECT student.`name`,student.dept_name,takes.sec_i
s.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN cou
+----------+------------+-----------------------------------------------------
-----------------------------------------------------------------------------
6 rows in set (0.00 sec)
```

```
MariaDB [dbms2]> show profiles;
+----------+------------+-----------------------------------------------------
-----------------------------------------------------------------------------
| Query_ID | Duration   | Query

+----------+------------+-----------------------------------------------------
-----------------------------------------------------------------------------
|        1 | 0.00043120 | SELECT * FROM student

|        2 | 0.00054350 | SELECT * FROM student WHERE tot_cred > 30

|        3 | 0.00042200 | SELECT dept_name FROM student WHERE tot_cred > 30

|        4 | 0.00306480 | SELECT *  FROM takes JOIN student ON takes.ID = st

|        5 | 0.00315420 | SELECT student.`name`,student.dept_name,takes.sec_
s.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN c
+----------+------------+-----------------------------------------------------
-----------------------------------------------------------------------------
5 rows in set (0.00 sec)
```

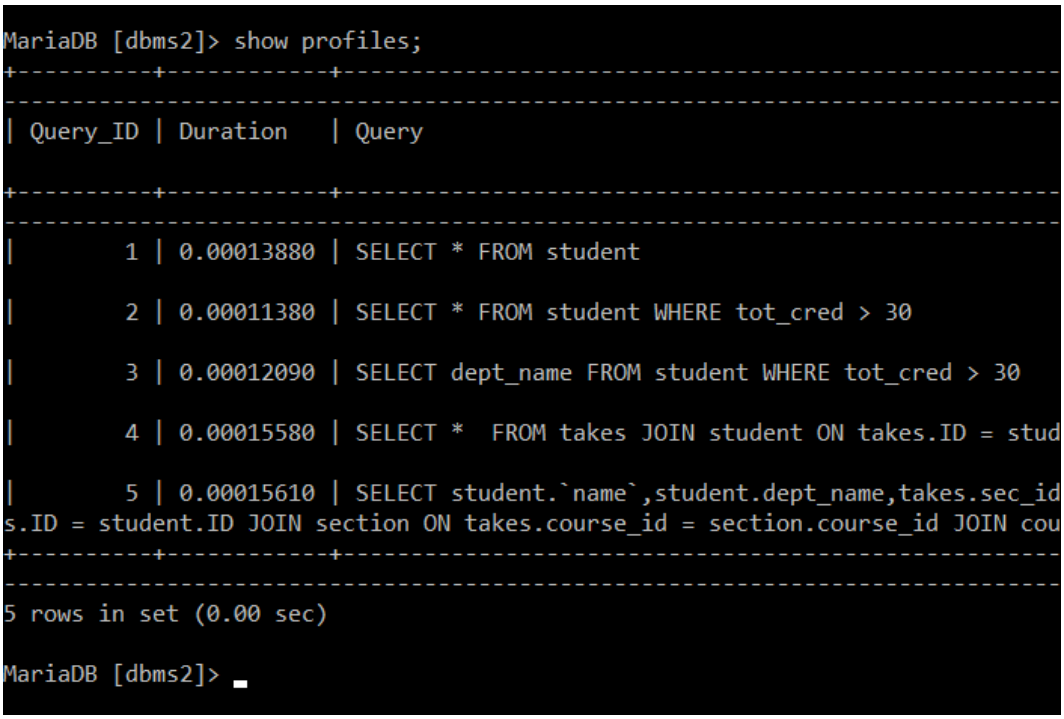
Dan Data Setelah Tuning :

Data	Waktu Sesudah Tuning (ms)				
	QUERY 1	QUERY 2	QUERY 3	QUERY 4	QUERY 5
1	0.0001662	0.0000916	0.0001475	0.000147	0.000124
2	0.0001388	0.0001138	0.0001209	0.000156	0.000156
3	0.0000887	0.0000873	0.0001844	0.000546	0.000263
4	0.0001151	0.0001207	0.0000961		

```
|        3 | 0.00016620 | SELECT * FROM student

|        4 | 0.00009160 | SELECT * FROM student WHERE tot_cred > 30

|        5 | 0.00014750 | SELECT dept_name FROM student WHERE tot_cred >

|        6 | 0.00014720 | SELECT *  FROM takes JOIN student ON takes.ID

|        7 | 0.00012410 | SELECT student.`name`,student.dept_name,takes.
s.ID = student.ID JOIN section ON takes.course_id = section.course_id JO
+----------+------------+-------------------------------------------------
--------------------------------------------------------------------------
7 rows in set (0.00 sec)
```

```
MariaDB [dbms4]> show profiles;
+----------+------------+-------------------------------------------------+
| Query_ID | Duration   | Query                                           |
+----------+------------+-------------------------------------------------+
|        1 | 0.00011510 | SELECT * FROM student                           |
|        2 | 0.00012070 | SELECT * FROM student WHERE tot_cred > 30        |
|        3 | 0.00009610 | SELECT dept_name FROM student WHERE tot_cred > 30 |
+----------+------------+-------------------------------------------------+
3 rows in set (0.00 sec)
```

```
| Johan  | BN        | 2           | Fall     | 958         | G         | 886
+--------+-----------+-------------+----------+-------------+-----------+-----
5981 rows in set (0.00 sec)

MariaDB [dbms3]> show profiles;
+----------+------------+-------------------------------------------------
--------------------------------------------------------------------------
| Query_ID | Duration   | Query

+----------+------------+-------------------------------------------------
--------------------------------------------------------------------------
|        1 | 0.00008870 | SELECT * FROM student

|        2 | 0.00008730 | SELECT * FROM student WHERE tot_cred > 30

|        3 | 0.00018440 | SELECT dept_name FROM student WHERE tot_cred > 30

|        4 | 0.00054600 | SELECT *  FROM takes JOIN student ON takes.ID = stu

|        5 | 0.00026330 | SELECT student.`name`,student.dept_name,takes.sec_i
s.ID = student.ID JOIN section ON takes.course_id = section.course_id JOIN co
+----------+------------+-------------------------------------------------
--------------------------------------------------------------------------
5 rows in set (0.00 sec)

MariaDB [dbms3]>
```



2.4 Pembahasan

Perbedaan tuning konfigurasi lebih efektif dikarenakan kita menggunakan cache jika sudah pernah melakukan query maka query akan disimpan dan tidak harus memroses query yang lama. Tuning indexing tidak selalu menghasilkan database yang lebih cepat, terutama untuk data yang sedikit, data yang lebih banyak akan lebih mundah terlihat perbedaannya. Beberapa kasus memperlihatkan data hasil indexing dan sebelum indexing masih terdapat data yang lebih ‘cepat’ pengaksesannya sebelum di indexing.

BAB III
KESIMPULAN

Tuning basis data yang telah dilakukan menghasilkan kesimpulan bahwa, melakukan indexing dan konfigurasi basis data harus mempunyai komputer yang kuat dan teliti dengan mengonfigurasi basis data, agar basis data dapat menjadi maksimal. Kesalahan yang terjadi juga dapat diakibatkan oleh kekurangan spesifikasi hardware atau keslahan software, karena ketika coba menjalankan data 5, 6, dan 7 memiliki jumlah data yang besar menyebabkan lamanya proses tuning.

DAFTAR PUSTAKA

https://www.careerride.com/DB-index-tuning.aspx
https://www.careerride.com/DB-query-performance.aspx
https://complaan.blogspot.com/2018/04/konfigurasi-database-server.html
https://www.interserver.net/tips/kb/mysql-query-caching/