IF4031 Pengembangan Aplikasi Terdistribusi

EKSPLORASI NOSQL CASSANDRA

oleh

Erick Wijaya / 13515057 / K1

PROGRAM STUDI TEKNIK INFORMATIKA

SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA

INSTITUT TEKNOLOGI BANDUNG

BANDUNG

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Daftar Isi

A. Output status server

Perintah: `nodetool status`

Output *status* server dari node `167.205.35.19`

```
Datacenter: datacenter1
=======================
Status=Up/Down
|/ State=Normal/Leaving/Joining/Moving
--  Address         Load       Tokens       Owns    Host ID
Rack
UN  167.205.35.21  4.77 MiB   256          ?       4ec1ca1d-9b8a-4936-996f-aae9f8228397
rack1
UN  167.205.35.22  5.11 MiB   256          ?       d05af7e6-3fac-4a19-9da1-11464081676b
rack1
UN  167.205.35.19  4.44 MiB   256          ?       4b1288f8-c3c2-4633-a48d-e1ad44203592
rack1
```

B. Percobaan dengan table users

No	1
Deskripsi	Membuat table users, lalu describe table

Query	`CREATE TABLE users (`
	`  user_id int PRIMARY KEY,`
	`  fname text,`
	`  lname text`
	`);`
	`DESCRIBE users;`

Output	`CREATE TABLE wijayaerick.users (`
	`  user_id int PRIMARY KEY,`
	`  fname text,`
	`  lname text`
	`) WITH bloom_filter_fp_chance = 0.01`
	`  AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}`
	`  AND comment = ''`
	`  AND compaction = {'class':`
	`'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy',`
	`'max_threshold': '32', 'min_threshold': '4'}`
	`  AND compression = {'chunk_length_in_kb': '64', 'class':`
	`'org.apache.cassandra.io.compress.LZ4Compressor'}`
	`  AND crc_check_chance = 1.0`
	`  AND dclocal_read_repair_chance = 0.1`
	`  AND default_time_to_live = 0`
	`  AND gc_grace_seconds = 864000`
	`  AND max_index_interval = 2048`
	`  AND memtable_flush_period_in_ms = 0`
	`  AND min_index_interval = 128`
	`  AND read_repair_chance = 0.0`
	`  AND speculative_retry = '99PERCENTILE';`

No	2
Deskripsi	Insert data ke table users, lalu tampilkan isi tabel

Query	`INSERT INTO users (user_id, fname, lname) VALUES (1745, 'john', 'smith');`
	`INSERT INTO users (user_id, fname, lname) VALUES (1744, 'john', 'doe');`
	`INSERT INTO users (user_id, fname, lname) VALUES (1746, 'john', 'smith');`
	`SELECT * FROM users;`

Output	` user_id | fname | lname`
	`---------+-------+-------`
	`  1745 |  john | smith`
	`  1744 |  john |  doe`
	`  1746 |  john | smith`

No	3
Deskripsi	Buat indeks baru, lalu describe table
Query	`CREATE INDEX ON users (lname);` `DESCRIBE users;`

Output	`CREATE TABLE wijayaerick.users (`
	`  user_id int PRIMARY KEY,`
	`  fname text,`
	`  lname text`
	`) WITH bloom_filter_fp_chance = 0.01`
	`  AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}`
	`  AND comment = ''`
	`  AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}`
	`  AND compression = {'chunk_length_in_kb': '64', 'class': 'org.apache.cassandra.io.compress.LZ4Compressor'}`
	`  AND crc_check_chance = 1.0`
	`  AND dclocal_read_repair_chance = 0.1`
	`  AND default_time_to_live = 0`
	`  AND gc_grace_seconds = 864000`
	`  AND max_index_interval = 2048`
	`  AND memtable_flush_period_in_ms = 0`
	`  AND min_index_interval = 128`
	`  AND read_repair_chance = 0.0`
	`  AND speculative_retry = '99PERCENTILE';`
	`CREATE INDEX users_lname_idx ON wijayaerick.users (lname);`

No	4
Deskripsi	Tampilkan semua yang memiliki nama belakang ‘smith’
Query	`SELECT * FROM users WHERE lname = 'smith';`

Output	` user_id | fname | lname`
	`---------+-------+-------`
	`  1745 |  john | smith`
	`  1746 |  john | smith`

C. Percobaan Client API Cassandra (Python)

No	1
Deskripsi	Memulai koneksi ke cluster

Kode program	`from cassandra.cluster import Cluster`
	`from cassandra import ReadTimeout`
	
	`cluster = Cluster(['159.65.140.125', '167.99.67.66', '206.189.40.171', '206.189.47.228'])`
	`session = cluster.connect('wijayaerick')`

No	2
Deskripsi	Mengeksekusi kueri select

Kode program	`rows = session.execute('SELECT user_id, fname, lname FROM users')`
	`for (user_id, fname, lname) in rows:`
	`  print(user_id, fname, lname)`

Output	1745 john smith 1744 john doe 1746 john smith

No	3
Deskripsi	Mengeksekusi kueri insert into

Kode program	`session.execute(`
	`  """`
	`  INSERT INTO users (user_id, fname, lname)`
	`  VALUES (%s, %s, %s)`
	`  """,`
	`  (1234, "dog", "smith")`
	`)`

No	4
Deskripsi	Mengeksekusi kueri select secara async

Kode program	`query = "SELECT * FROM users WHERE lname=%s ALLOW FILTERING"`
	`future = session.execute_async(query, ["smith"])`
	`try:`
	`  rows = future.result()`
	`  for (user_id, fname, lname) in rows:`
	`  print(user_id, fname, lname)`
	`except ReadTimeout:`
	`  log.exception("Query timed out:")`

Output	1745 john smith 1746 john smith 1234 dog smith

Kode program lengkap:

```
# http://datastax.github.io/python-driver/getting_started.html

from cassandra.cluster import Cluster
from cassandra import ReadTimeout

import logging as log

cluster = Cluster(['159.65.140.125', '167.99.67.66',
'206.189.40.171', '206.189.47.228'])
session = cluster.connect('wijayaerick')

rows = session.execute('SELECT user_id, fname, lname FROM users')
for (user_id, fname, lname) in rows:
    print(user_id, fname, lname)

session.execute(
    """
```

```
    INSERT INTO users (user_id, fname, lname)
    VALUES (%s, %s, %s)
    """,
    (1234, "dog", "smith")
)

query = "SELECT * FROM users WHERE lname=%s ALLOW FILTERING"
future = session.execute_async(query, ["smith"])
try:
    rows = future.result()
    for (user_id, fname, lname) in rows:
        print(user_id, fname, lname)
except ReadTimeout:
    log.exception("Query timed out:")
```

D. Rumusan query untuk fitur-fitur

No	1
Deskripsi	Membuat struktur data

Query	`CREATE TABLE users (`
	`  username text PRIMARY KEY,`
	`  password text`
	`);`
	
	`CREATE TABLE friends (`
	`  username text,`
	`  friend text,`
	`  since timestamp,`
	`  PRIMARY KEY (username, friend)`
	`);`
	
	`CREATE TABLE followers (`
	`  username text,`
	`  follower text,`
	`  since timestamp,`
	`  PRIMARY KEY (username, follower)`
	`);`
	
	`CREATE TABLE tweets (`
	`  tweet_id uuid PRIMARY KEY,`
	`  username text,`
	`  body text`
	`);`
	
	`CREATE TABLE userline (`
	`  username text,`
	`  time timeuuid,`
	`  tweet_id uuid,`
	`  PRIMARY KEY (username, time)`
	`) WITH CLUSTERING ORDER BY (time DESC);`
	
	`CREATE TABLE timeline (`
	`  username text,`
	`  time timeuuid,`
	`  tweet_id uuid,`
	`  PRIMARY KEY (username, time)`
	`) WITH CLUSTERING ORDER BY (time DESC);`

No	2
Deskripsi	Mendaftar user baru: insert row ke tabel users

Query	`INSERT INTO users (username, password) VALUES ('wijayaerick', '123456');`
	`INSERT INTO users (username, password) VALUES ('micin', '123456');`
	`INSERT INTO users (username, password) VALUES ('msg', '123456');`

Output	`username | password`
	`---+---`
	`wijayaerick | 123456`
	`msg | 123456`
	`micin | 123456`

No	3
Deskripsi	Follow a friend: insert row ke tabel friends dan followers

Query	`INSERT INTO friends (username, friend, since) VALUES ('wijayaerick', 'micin', '2018-10-20 16:20');`
	`INSERT INTO friends (username, friend, since) VALUES ('micin', 'wijayaerick', '2018-10-20 16:20');`
	`INSERT INTO followers (username, follower, since) VALUES ('wijayaerick', 'micin', '2018-10-20 16:20');`
	`INSERT INTO followers (username, follower, since) VALUES ('micin', 'wijayaerick', '2018-10-20 16:20');`
	
	`SELECT * FROM friends;`
	`SELECT * FROM followers;`

Output	`username | friend | since`
	`---+---+---`
	`wijayaerick | micin | 2018-10-20 16:20:00.000000+0000`
	`micin | wijayaerick | 2018-10-20 16:20:00.000000+0000`
	
	`username | follower | since`
	`---+---+---`
	`wijayaerick | micin | 2018-10-20 16:20:00.000000+0000`
	`micin | wijayaerick | 2018-10-20 16:20:00.000000+0000`

No	4
Deskripsi	Tweet: insert row ke tabel tweet, userline, timeline dan timeline semua follower

Query	`INSERT INTO tweets (tweet_id, username, body) VALUES (00000000-0000-0000-0000-000000000001, 'wijayaerick', 'my first tweet');`
	`INSERT INTO userline (username, time, tweet_id) VALUES ('wijayaerick', d2177dd0-eaa2-11de-a572-001b779c76e3, 00000000-0000-0000-0000-000000000001);`
	`INSERT INTO timeline (username, time, tweet_id) VALUES ('wijayaerick', d2177dd0-eaa2-11de-a572-001b779c76e3, 00000000-0000-0000-0000-000000000001);`
	`INSERT INTO timeline (username, time, tweet_id) VALUES ('micin', d2177dd0-eaa2-11de-a572-001b779c76e3, 00000000-0000-0000-0000-000000000001);`
	
	`SELECT * FROM tweets;`
	`SELECT * FROM userline;`
	`SELECT * FROM timeline;`

Output	`tweet_id | body | username`
	`---+---+---`
	`00000000-0000-0000-0000-000000000001 | my first tweet | wijayaerick`

	username | time | tweet_id wijayaerick | d2177dd0-eaa2-11de-a572-001b779c76e3 | 00000000-0000-0000-0000-000000000001 username | time | tweet_id wijayaerick | d2177dd0-eaa2-11de-a572-001b779c76e3 | 00000000-0000-0000-0000-000000000001 micin | d2177dd0-eaa2-11de-a572-001b779c76e3 | 00000000-0000-0000-0000-000000000001

No	5
Deskripsi	Menampilkan tweet per user
Query	`SELECT * FROM tweets WHERE username='wijayaerick';`
Output	tweet_id | body | username 00000000-0000-0000-0000-000000000001 | my first tweet | wijayaerick

No	6
Deskripsi	Menampilkan timeline per user
Query	`SELECT * FROM timeline WHERE username='micin';`
Output	username | time | tweet_id micin | d2177dd0-eaa2-11de-a572-001b779c76e3 | 00000000-0000-0000-0000-000000000001

Referensi

http://cassandra.apache.org/

https://wiki.apache.org/cassandra/ClientOptions

http://datastax.github.io/python-driver/index.html

https://github.com/datastax/python-driver

https://github.com/tugas-itb-erick/cassandra-explore