1)

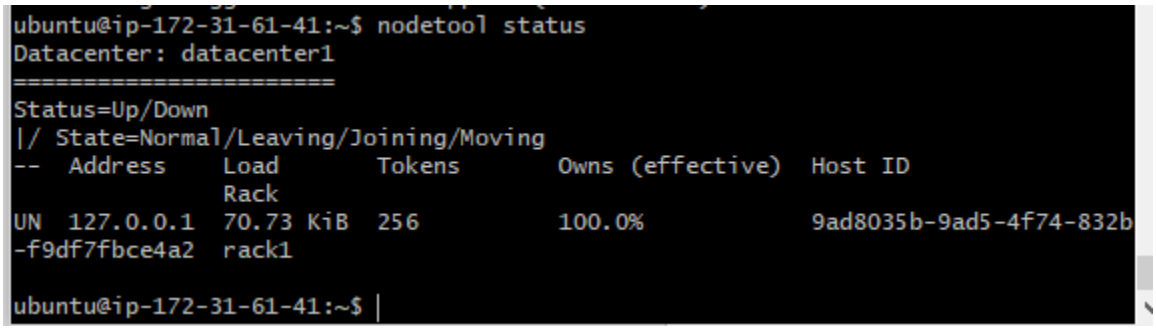
Apache Cassandra is a leading transactional, scalable, and highly-available distributed database.The wide adoption of Cassandra in big data applications is attributed to, among other things,its scalable and fault-tolerant peer-to-peer architecture, versatile and flexible data model that evolved from the BigTable data model declarative and user-friendly Cassandra Query Language (CQL), and very efficient write and read access paths that enable critical big data applications to stay always on, scale to millions of transactions per second, and handle node and even entire data center failures with ease

In RDBMS the primary focus is placed on understanding and organizing data into relations, minimizing data redundancy and avoiding data duplication. In Cassandra starts with application queries to achieve superior write and read performance

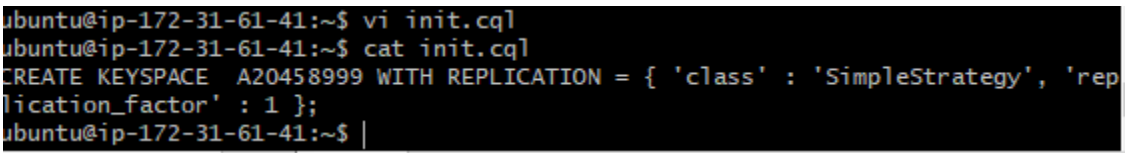
It takes a conceptual data model and maps it to a logical data model based on queries defined in an application workflow. We define the query-driven conceptual-to-logical data model mapping via data modeling principles, mapping rules, and mapping patterns

Data Modeling Principles is divided into 4 parts they are DMP1 (Know Your Data),DMP2 (Know Your Queries),DMP3 (Data Nesting),DMP4 (Data Duplication).Then we define Mapping Rules it is divided into 5 parts MR1 (Entities and Relationships),MR2 (Equality Search Attributes),MR3 (Inequality Search Attributes),MR4 (Ordering Attributes),MR5 (Key Attributes) Based on the above mapping rules, we design mapping patterns that serve as the basis for automating Cassandra database schema design

2a) Installing and starting Cassandra



2c)



2d) 2e)

```
cqlsh> use A20458999
   ...
   ... ;
cqlsh:a20458999>
```

```
ubuntu@ip-172-31-61-41:~$ vi ex2.cql
ubuntu@ip-172-31-61-41:~$ cat ex2.cql
CREATE TABLE Music (
artistName text,
albumName text,
numberSold int,
cost int,
PRIMARY KEY (artistName,albumName));
ubuntu@ip-172-31-61-41:~$
```

```
cqlsh:a20458999> source './ex2.cql'
cqlsh:a20458999> DESCRIBE TABLE Music;

CREATE TABLE a20458999.music (
    artistname text,
    albumname text,
    cost int,
    numbersold int,
    PRIMARY KEY (artistname, albumname)
) WITH CLUSTERING ORDER BY (albumname ASC)
    AND bloom_filter_fp_chance = 0.01
    AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}
    AND comment = ''
    AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCom
pactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}
    AND compression = {'chunk_length_in_kb': '64', 'class': 'org.apache.cassandr
a.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';
```

3a)

```
ubuntu@ip-172-31-61-41:~$ vi ex3.cql
ubuntu@ip-172-31-61-41:~$ cat ex3.cql
INSERT INTO Music (artistName,albumName,numberSold,cost)
 VALUES ('Mozart','Greatest Hits',100000, 10);
INSERT INTO Music (artistName,albumName,numberSold,cost)
 VALUES ('Taylor swift','Fearless',2300000, 15);
INSERT INTO Music (artistName,albumName,numberSold,cost)
 VALUES ('Black sabbath','Paranoid',534000, 12);
INSERT INTO Music (artistName,albumName,numberSold,cost)
 VALUES ('Katy perry','prism',800000, 16);
INSERT INTO Music (artistName,albumName,numberSold,cost)
 VALUES ('Katy perry','Teenage Dream',750000, 14);

ubuntu@ip-172-31-61-41:~$
```

3b)

```
cqlsh:a20458999> source './ex3.cql'
cqlsh:a20458999> SELECT * FROM Music;

 artistname    | albumname     | cost | numbersold
---------------+---------------+------+------------
       Mozart | Greatest Hits |   10 |     100000
  Taylor swift |      Fearless |   15 |    2300000
 Black sabbath |      Paranoid |   12 |     534000
    Katy perry | Teenage Dream |   14 |     750000
    Katy perry |         prism |   16 |     800000

(5 rows)
cqlsh:a20458999>
```

4)

```
ubuntu@ip-172-31-61-41:~$ vi ex4.cql
ubuntu@ip-172-31-61-41:~$ cat ex4.cql
select * from  Music where artistName='Katy perry';
ubuntu@ip-172-31-61-41:~$
```

```
cqlsh:a20458999> source './ex4.cql'

 artistname | albumname     | cost | numbersold
------------+---------------+------+------------
 Katy perry | Teenage Dream |   14 |     750000
 Katy perry |         prism |   16 |     800000

(2 rows)
cqlsh:a20458999>
```

5)

```
ubuntu@ip-172-31-61-41:~$ vi ex5.cql
ubuntu@ip-172-31-61-41:~$ cat ex5.cql
Select * from Music where numberSold>=700000 Allow FILTE
RING;
ubuntu@ip-172-31-61-41:~$
```

```
cqlsh:a20458999> source './ex5.cql'

 artistname   | albumname     | cost | numbersold
--------------+---------------+------+------------
 Taylor swift |      Fearless |   15 |     2300000
   Katy perry | Teenage Dream |   14 |      750000
   Katy perry |         prism |   16 |      800000

(3 rows)
cqlsh:a20458999>
```