

## Practical – 7

### Aim: Working with NoSQL Databases.(Cassandra)

#### 1. Install Cassandra on your operating system.

##### a. Install jdk 8 or above.

##### b. Go to Apache Cassandra Download Page. And Download the latest version. The latest version at that time is cassandra-3.11.4

- Unzip it and place all files inside sub folder into "C:\ProgramFiles\apache-cassandra-3.11.8".
- Edit Cassandra.bat and add JAVA\_HOME path.
- Save the cassandra.bat then run "cassandra.bat -f" with CMD Run as Administrator. Don't close this window.

```
C:\WINDOWS\system32>cd ../..
C:\>cd Program Files\apache-cassandra-3.11.8\bin
C:\Program Files\apache-cassandra-3.11.8\bin>cassandra.bat -f
WARNING! Powershell script execution unavailable.
Please use 'powershell Set-ExecutionPolicy Unrestricted'
on this user-account to run cassandra with fully featured
functionality on this platform.
Starting with legacy startup options
Starting Cassandra Server
INFO [main] 2020-09-29 15:52:09.467 Yam|ConfigurationLoader.java:89 - Configuration location: file:/C:/Program%20Files/apache-cassandra-3.11.8/conf/cass
INFO [main] 2020-09-29 15:52:12.689 Config.java:536 - Node configuration:[allocate_tokens_for_keyspace=null; authenticator=AllowAllAuthenticator; autho
led=false; back_pressure_strategy=org.apache.cassandra.net.RateBasedBackPressure(high_ratio=0.9, factor=5, flow=FAST); batch_size_fail_threshold_in_kb=50;
address=null; broadcast_rpc_address=null; buffer_pool_use_heap_if_exhausted=true; cas_contention_timeout_in_ms=1000; cdc_enabled=false; cdc_free_space_ch
icate_rows_during_compaction=true; check_for_duplicate_rows_during_reads=true; client_encryption_options=(REDACED); cluster_name=test Cluster; column_in
itlog_compression=null; commitlog_directory=null; commitlog_max_compression_buffers_in_pool=3; commitlog_periodic_queue_size=-1; commitlog_segment_size_in
ync_period_in_ms=10000; commitlog_total_space_in_mb=null; compaction_large_partition_warning_threshold_mb=100; compaction_throughput_mb_per_sec=16; concu
ites=32; concurrent_reads=32; concurrent_replicates=null; concurrent_writes=32; counter_cache_keys_to_save=2147483647; counter_cache_save_period=7200; cc
ache_max_entries=10000; credentials_update_interval_in_ms=-1; credentials_validity_in_ms=2000; cross_node_timeout=false; data_file_directories=[Ljava.lang
n_estimate_percentile=0.95; disk_optimization_page_cross_chance=0.1; disk_optimization_strategy=ssd; dynamic_snitch=true; dynamic_snitch_badness_threshold
ms=100; enable_materialized_views=true; enable_sasi_index=true; enable_scripted_user_defined_functions=false; enable_user_defined_functions=false; ene
mbleSnitch; file_cache_round_up=null; file_cache_size_in_mb=null; gc_log_threshold_in_ms=200; gc_warn_threshold_in_ms=1000; hinted_handoff_disabled_datac
mpression=null; hints_directory=null; hints_flush_period_in_ms=10000; incremental_backups=false; index_interval=null; index_summary_capacity_in_mb=null;
oughput_outbound_megabits_per_sec=200; inter_dc_tcp_nodelay=false; internode_authenticator=null; internode_compression=dc; internode_recv_buff_size_in_b
ache_save_period=14400; key_cache_size_in_mb=null; listen_address=localhost; listen_interface=null; listen_interface_prefer_ipv6=false; listen_on_broadcast
hints_file_size_in_mb=128; max_mutation_size_in_kb=null; max_streaming_retries=3; max_value_size_in_mb=256; memtable_allocation_type=heap_buffers; memtat
memtable_of_heap_space_in_mb=null; min_free_space_per_drive_in_mb=50; native_transport_flush_in_batches_legacy=true; native_transport_max_concurrent_cor
_max_concurrent_requests_in_bytes=-1; native_transport_max_concurrent_requests_in_bytes_per_ip=-1; native_transport_max_frame_size_in_mb=256; native_tran
native_transport_port=9042; native_transport_port_ssl=null; num_tokens=256; otc_backlog_expiration_interval_ms=200; otc_coalescing_enough_coalesced_mess
org.apache.cassandra.dht.Murmur3Partitioner; permissions_cache_max_entries=1000; permissions_update_interval_in_ms=-1; permissions_validity_in_ms=2000; r
out_in_ms=10000; read_request_timeout_in_ms=5000; repair_session_max_tree_depth=18; request_scheduler=org.apache.cassandra.scheduler.NoScheduler; request
e_manager=CassandraRoleManager; roles_cache_max_entries=1000; roles_update_interval_in_ms=-1; roles_validity_in_ms=2000; row_cache_class_name=org.apache
d=0; row_cache_size_in_mb=0; rpc_address=localhost; rpc_interface=null; rpc_interface_prefer_ipv6=false; rpc_keepalive=true; rpc_listen_backlog=50; rpc_n
snull; rpc_send_buff_size_in_bytes=null; rpc_server_type=sync; saved_caches_directory=null; seed_provider=org.apache.cassandra.locator.SimpleSeedProvide
ms=300; snapshot_before_compactions=false; snapshot_on_duplicate_row_detection=false; ssl_storage_ports=7001; sstable_preemptive_open_interval_in_mb=50; st
bound_megabits_per_sec=200; streaming_keep_alive_period_in_secs=300; streaming_socket_timeout_in_ms=86400000; thrift_framed_transport_size_in_mb=15; thri
tone_failure_threshold=100000; tombstone_warn_threshold=1000; tracetype_query_ttl=86400; tracetype_repair_ttl=604800; transparent_data_encryption_options
c=false; trickle_fsync_interval_in_kb=10240; truncate_request_timeout_in_ms=60000; unlogged_batch_across_partitions_warn_threshold=10; user_defined_func
policy=die; windows_timer_interval=1; write_request_timeout_in_ms=2000]
INFO [main] 2020-09-29 15:52:12.691 DatabaseDescriptor.java:381 - DiskAccessMode 'auto' determined to be mmap, indexAccessMode is mmap
INFO [main] 2020-09-29 15:52:12.694 DatabaseDescriptor.java:439 - Global memtable on-heap threshold is enabled at 503MB
INFO [main] 2020-09-29 15:52:12.694 DatabaseDescriptor.java:443 - Global memtable off-heap threshold is enabled at 503MB
INFO [main] 2020-09-29 15:52:14.063 RateBasedBackPressure.java:123 - Initialized back-pressure with high ratio: 0.9, factor: 5, flow: FAST, window size:
INFO [main] 2020-09-29 15:52:14.065 DatabaseDescriptor.java:773 - Back-pressure is disabled with strategy org.apache.cassandra.net.RateBasedBackPressure
INFO [main] 2020-09-29 15:52:16.156 JMXServerUtils.java:253 - Configured JMX server at: service:jmx:rmi://127.0.0.1/jndi/rmi://127.0.0.1:7199/jmxrmi
INFO [main] 2020-09-29 15:52:16.250 CassandraDaemon.java:481 - Hostname: LAPTOP-K3SD205A
INFO [main] 2020-09-29 15:52:16.251 CassandraDaemon.java:488 - JVM vendor/version: Java HotSpot(TM) 64-Bit Server VM/1.8.0_101
INFO [main] 2020-09-29 15:52:16.269 CassandraDaemon.java:489 - Heap size: 1.968GiB/1.968GiB
INFO [main] 2020-09-29 15:52:16.271 CassandraDaemon.java:484 - Code Cache Max-Perm-Gen: (init = 25500M(2492K), used = 512724K(501K), committed = 5177K
```

##### c. Install Python2.7 to run Cassandra Query shell cqlsh .

```
C:\Program Files\apache-cassandra-3.11.8\bin>cqlsh
Connected to Test Cluster at 127.0.0.1:9042.
[cqlsh 5.0.1 | Cassandra 3.11.8 | CQL spec 3.4.4 | Native protocol v4]
Use HELP for help.
WARNING: pyreadline dependency missing. Install to enable tab completion.
cqlsh>
```

## 2. Consider a domain of your choice and create a key space suitable for the given domain.

```
cqlsh> CREATE KEYSPACE employee WITH replication = {'class':'SimpleStrategy', 'replication_factor' : 3};
cqlsh>
```

## 3. For the chosen domain, create two tables suitable for the key space.

```
cqlsh> CREATE TABLE employee.emp(emp_id int PRIMARY KEY,
...     emp_name text,
...     emp_city text,
...     emp_sal varint,
...     emp_phone varint
... );
cqlsh> select * from employee.emp;

emp_id | emp_city | emp_name | emp_phone | emp_sal
-----+-----+-----+-----+-----
(0 rows)
cqlsh>
```

```
cqlsh> CREATE TABLE employee.leave(
... leave_id INT PRIMARY KEY,
... duration VARCHAR, date VARCHAR);
cqlsh>
```

## 4. Demonstrate the basic database operations – create, delete, update, select, delete on the given tables.

- Create data

```
cqlsh> INSERT INTO employee.emp (emp_id, emp_name, emp_city, emp_phone, emp_sal) VALUES(1,'ram', 'Hyderabad', 9848022338, 50000);
cqlsh> INSERT INTO employee.emp (emp_id, emp_name, emp_city, emp_phone, emp_sal) VALUES(2,'robin', 'Hyderabad', 9848022339, 40000);
cqlsh> INSERT INTO employee.emp (emp_id, emp_name, emp_city, emp_phone, emp_sal) VALUES(3,'rahman', 'Chennai', 9848022330, 45000);
cqlsh> select * from employee.emp;
InvalidRequest: Error from server: code=2200 [Invalid query] message="unconfigured table emp"
cqlsh> select * from employee.emp;

emp_id | emp_city | emp_name | emp_phone | emp_sal
-----+-----+-----+-----+-----
1 | Hyderabad | ram | 9848022338 | 50000
2 | Hyderabad | robin | 9848022339 | 40000
3 | Chennai | rahman | 9848022330 | 45000
(3 rows)
cqlsh>
```

- Update

```
(3 rows)
cqlsh> UPDATE employee.emp SET emp_city='Delhi',emp_sal=50000 WHERE emp_id=2;
cqlsh> select * from employee.emp;

emp_id | emp_city | emp_name | emp_phone | emp_sal
-----+-----+-----+-----+-----
1 | Hyderabad | ram | 9848022338 | 50000
2 | Delhi | robin | 9848022339 | 50000
3 | Chennai | rahman | 9848022330 | 45000
(3 rows)
cqlsh>
```

- Delete

```
cqlsh> DELETE emp_sal FROM employee.emp WHERE emp_id=3;
cqlsh> select * from employee.emp;
```

emp_id	emp_city	emp_name	emp_phone	emp_sal
1	Hyderabad	ram	9848022338	50000
2	Delhi	robin	9848022339	50000
3	Chennai	rahman	9848022330	null

(3 rows)

- Select

```
cqlsh> CREATE INDEX ON employee.emp(emp_sal);
cqlsh> SELECT * FROM employee.emp WHERE emp_sal=50000;
```

emp_id	emp_city	emp_name	emp_phone	emp_sal
1	Hyderabad	ram	9848022338	50000
2	Delhi	robin	9848022339	50000

(2 rows)

```
cqlsh> SELECT emp_name, emp_sal from employee.emp;
```

emp_name	emp_sal
ram	50000
robin	50000
rahman	45000

(3 rows)

## 5. Drop the tables and key space created.

- Drop Table

```
cqlsh> drop table employee.emp;
```

```
Keyspace system_traces
-----
events  sessions
```

- Drop Keyspaces

```
cqlsh> drop keyspace employee;
cqlsh> describe keyspaces;
```

keyspace
system_schema
system_auth
system
system_distributed
system_traces