
NO TO SQL
WITH CASSANDRA

In Store

What is NoSQL?

NoSQL Houses

Who is Cassandra?

What does Cassandra offer?

Workshop

Before we start

https://github.com/js-republic/cassandra-nodejs-workshop


What is NoSQL?

What is NoSQL?

It is an **approach** to database design which does not use relational table as the main way of storing data.

NOT ONLY SQL

What is NoSQL's purpose?

Tackle the **Scalability** problem known in **RDBMS** when the data volume to process exceeds a certain threshold.

Horizontal Scaling works beautifully.

Store data structures which are highly dynamic.

Traits of NoSQL DBs

Schema-free/less;

Easy to replicate;

Simple API;

Eventually consistent;

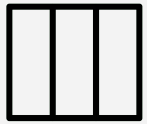
BASE not ACID;

Etc.


NoSQL Houses

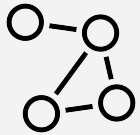
NoSQL Houses

House Key-Value Store



House Column

House Document



House Graph


Who is Cassandra?

Who is Cassandra?

Cassandra is a free distributed NoSQL DB (duh);

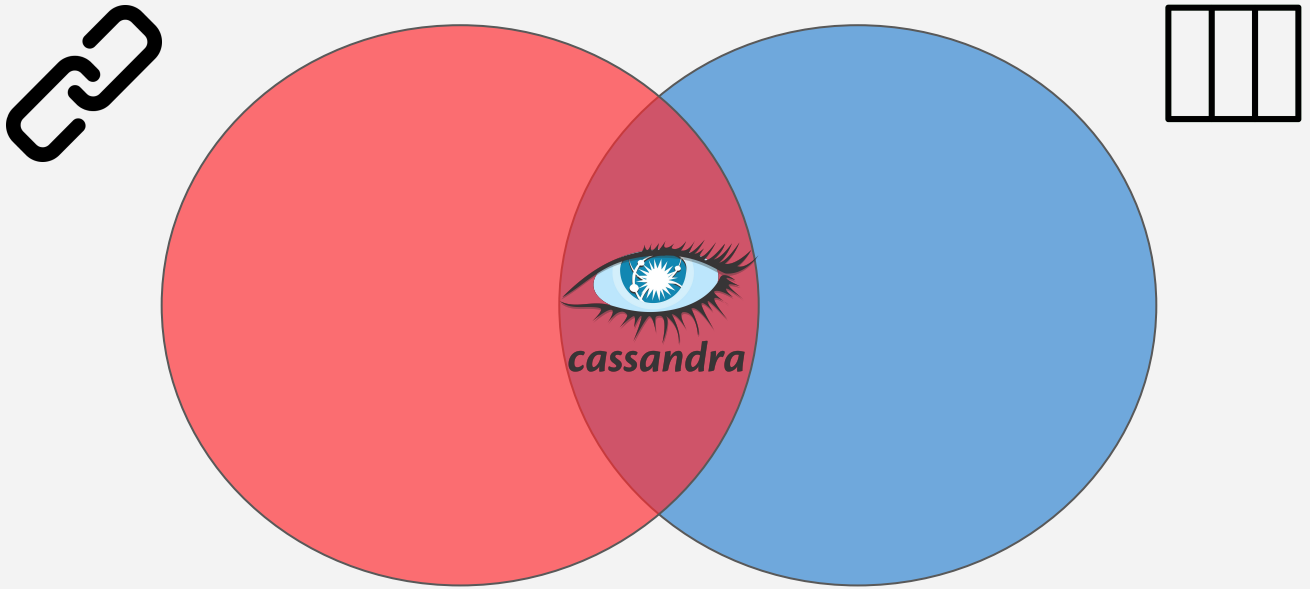
It is an **hybrid** between a **key-value** and **column** oriented database management system.

Who is Cassandra?

It is **highly** scalable with support for **Clusters;**

It has **asynchronous** replication method without a **master**, which allows the client to perform low latency operations.

Cassandra's House




What does Cassandra offer?

What does Cassandra has to offer?

A decentralized DB solution

Support to replication & multi datacenter replication (gossip)

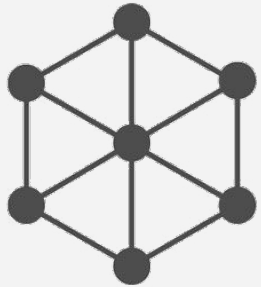
Easy Scalability

Fault tolerance

Tunable Consistency

MapReduce Support (with Hadoop integration)

Cassandra Query Language (CQL)



Where may Cassandra fail?

Traditional transactions are not supported;

Updating/Deleting are costly;

Joins are not supported;

Indexes can become costly if improperly used.


The Workshop

Cassandra Query Language

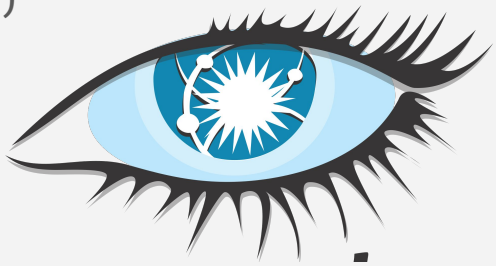
As the name suggests, it is the language used to query on Cassandra.

It is a SQL like language:

INSERT, **DELETE**, **UPDATE**, **BATCH**. (Data Manipulation)

SELECT with **WHERE/ORDERBY**. (Data Recovery)

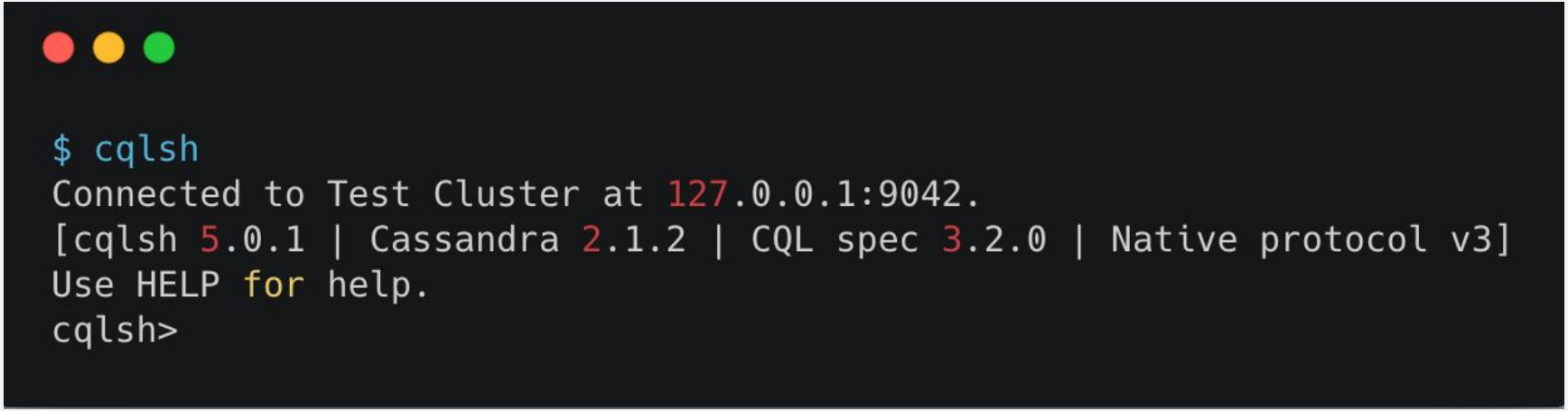
Plus all Cassandra related queries.



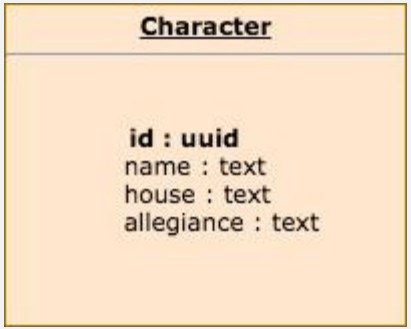
CQLsh

It is the default prompt given by Cassandra;

We can execute any CQL query with it;

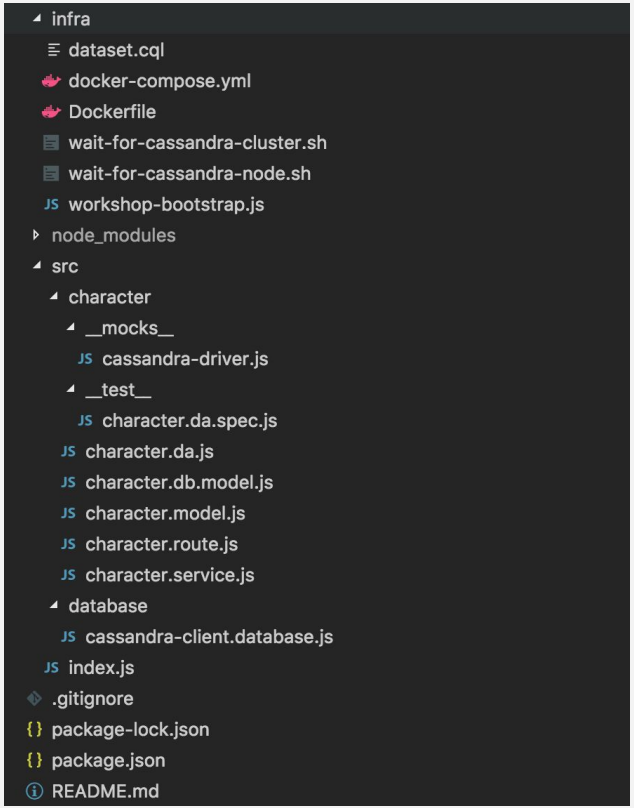


Data Structure




```
TABLE workshop.characters(
    id uuid PRIMARY KEY,
    name text,
    house text,
    allegiance text
);
```

Project Structure



Plan of attack and goals

1- CQL Lands

Read/Write using the CQL Query;

Read using Index using the CQLSh.

2- NodeJS & Cassandra Driver Alliance

CRUD Methods using the Cassandra Driver;

Advanced tasks.

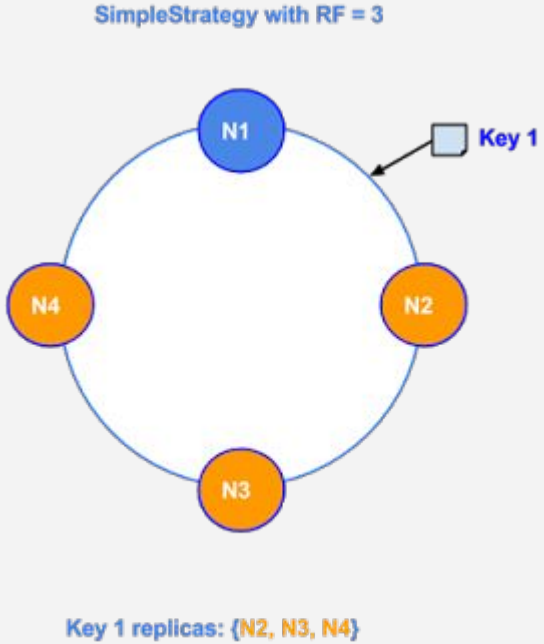

Shall
we
begin?

Replication Strategies

1- Simple Strategy

One Single Datacenter;

In a Ring Topology, nodes are added Clockwise in relation to the coordinator



Replication Strategies

2- Network Topology Strategy

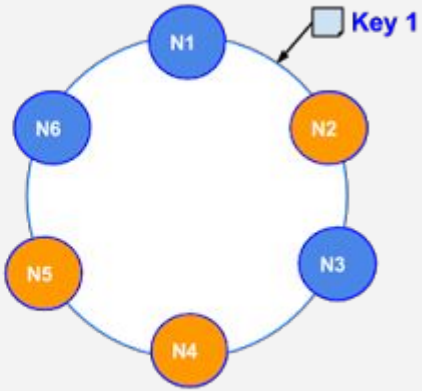
Several Datacenters;

Nodes per Datacenters must be Specified.

Rack aware (fault tolerant)

NetworkTopologyStrategy with Replication factor
{ DC1: 2, DC2: 2 }

Node	DC	RACK
N1	DC1	RACK2
N3	DC1	RACK1
N6	DC1	RACK1
N2	DC2	RACK1
N4	DC2	RACK1
N5	DC2	RACK2



Key 1 Replicas DC1 : {N3, N1} DC2: {N2, N5}

Sources and Interesting Links

https://www.packtpub.com/mapt/book/big_data_and_business_intelligence/9781783989102/2/ch02lvl1sec18/networktopologystrategy
https://www.racksolutions.com/news/data-center-trends/what-is-a-data-center-rack/
http://distributeddatastore.blogspot.fr/2015/08/cassandra-replication.html
https://docs.datastax.com/en/cassandra/2.1/cassandra/architecture/architectureDataDistributeReplication_c.html#architectureDataDistributeReplication_c__nts
https://www.tutorialspoint.com/cassandra/index.htm
https://medium.com/@alexbmeng/cassandra-query-language-cql-vs-sql-7f6ed7706b4c
http://nosql-database.org/