Tutoriel
sur
Apache Cassandra
13-Fev-2018

Joseph Mansour

https://github.com/ISSAE/cyclec2018

Les didacticiels par les auditeurs

Nom auditeur	compte github	titre	référence projet
Joseph Mansour	@josephmansour	Cassandra	none yet!
Fady Zakaria	@fadyzakharia	Firebase Realtime Database	Firebase Fady
Yousef Kassouf	@Youssef-Kassouf	Firebase Cloud Firestore	Firebase Cloud Firestore Youssef
Hazem Halawi	@HazemHalawi	MangoDB	MangoDB Hazem
Abedelaziz Bilani	@abedelazizbilani	Web Semantique	Web Semantique Abdelaziz
Fahed Dany	@faheddany	Neo4j	https://github.com/faheddany/neo4j-cyclec
Rodney Badran	@RodneyBadran	mangoDB	https://github.com/RodneyBadran/sujet-3
Romy Ephrem	@romyephrem	Juinit	https://github.com/romyephrem/C1projet2018
eliekh1	@eliekh1	CouchDB	https://github.com/eliekh1/Project-C1-2018
Said Eid	@said-eid	Riak DB	https://github.com/said-eid/ProjetC1-2018
rkhawand	@rkhawand	Google Cloud Platform - App Engine	https://github.com/rkhawand/Projet-SMB214-2018
DianaDaher	@DianaDaher	Grizzly	https://github.com/DianaDaher/PROJETC1-2018
@ralphsa95	ralphsa95	Rapport SQL Jasper	https://github.com/ralphsa95/ProjetC12018/blob/maste

https://github.com/ISSAE/ValeurC/tree/master/Auditeurs

SMB214 année 2015 2016

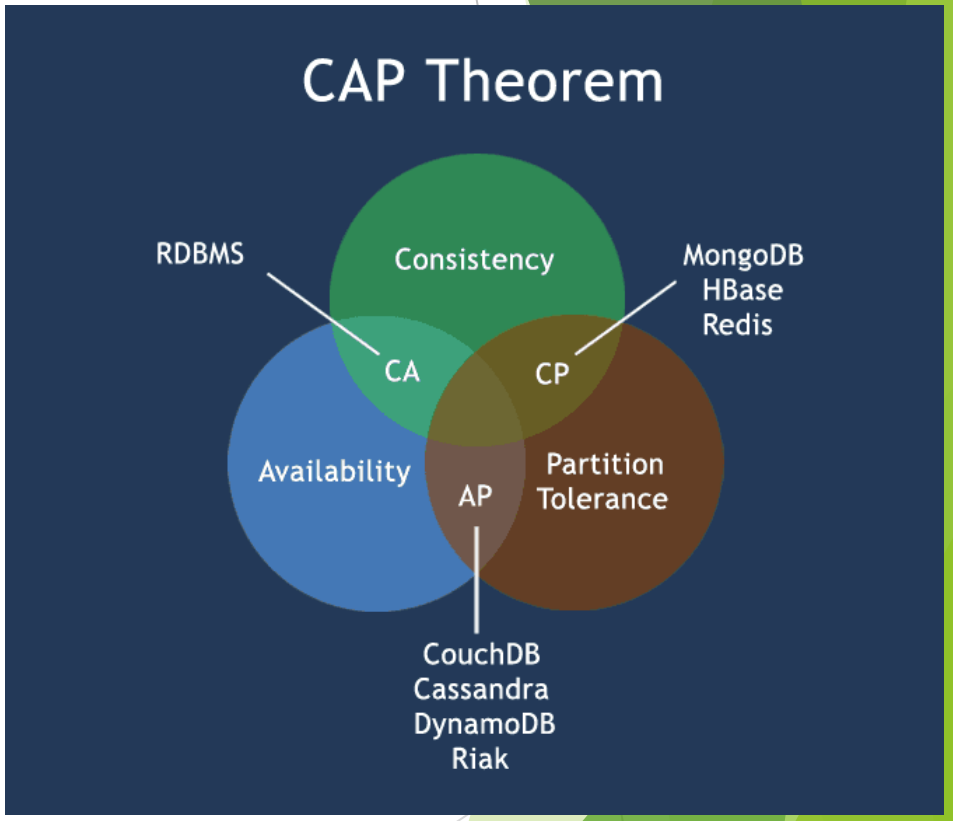
Lien vers les traveaux des auditeurs

- Majd Abou Akar
- Elias Maroun Sfeir
- Mohammad MAWAKI
- DAGHER Chady
- Ihab Hachem BERRO
- Mohamad-Houssein MONZER
- Ali Ahmad Jaafar
- hassan kassem itani
- Malak Ali KAYS
- NAJI DAGHER DAGHER
- Khalil Georges Bsaibes
- Elias Pierre Bou Hanna
- Elie Sarkis
- Majed Abou Hamd
- Tahani Abdallah Karroum
- Ahmad Tout
- Tarek Ahmad Adra
- Alaa Walid DAIRY
- Hussein Hassan El Arab : 2850f
- Ali Ammar
- hamza omar hamia

ID_Sujet	Titre	Nom Auditeur	Compte Github	Référence Projet	Année Universitaire
ANDR	Android	Mohammad MAWAKI	mmawaki	https://github.com/mmawaki/Android	2015-2016
ANDR	Android	Ihab Hachem BERRO	iberro	https://github.com/iberro/SMB214-Android	2015-2016
AZUR	Azure Table Storage	Ephrem Beaino	EphremBeainoCNAM	https://github.com/EphremBeainoCNAM/ProjetC1-2018	2017-2018
BRKL	Berkeley	Elias Pierre Bou Hanna	ebouhanna	https://github.com/ebouhanna/SMB214-2016-Oracle-Berkeley-DB-JE	2015-2016
CADB	Apache Cassandra	Joseph Mansour	josephmansour	https://github.com/josephmansour/cassandra	2017-2018
CADB	Apache Cassandra	Khalil Georges Bsaibes	khalilbsaibes	https://github.com/khalilbsaibes/cassandra	2015-2016
CDI	Context And Dependency Injection	Elias Maroun Sfeir	esfeir	https://github.com/esfeir/cdi	2015-2016
CODB	CouchDB	eliekh1	eliekh1	https://github.com/eliekh1/Project-C1-2018	2017-2018
DOCK	Docker	Mohamad Sabra	mohamadsabra	https://github.com/mohamadsabra/GLG203	2017-2018
FCF	Firebase Cloud Firestore	Yousef Kassouf	Youssef-Kassouf	https://github.com/Youssef-Kassouf/CNAM-ProjetC1-2018	2017-2018
FRD	Firebase Realtime Database	Fady Zakaria	fadyzakharia	https://github.com/fadyzakharia/projetC1	2017-2018
GCCE	Google Cloud Compute Engine	Ayman kouzayha	ayman-kouzayha	https://github.com/ayman-kouzayha/Google_Cloud_Compute_Engine	2017-2018
GCPA	Google Cloud Platform - App Engine	rkhawand	rkhawand	https://github.com/rkhawand/Projet-SMB214-2018	2017-2018
GRI	Grizzly	Diana Daher	DianaDaher	https://github.com/DianaDaher/PROJETC1-2018	2017-2018
HBS5	HTML5 offline browsing and storage	Mohamad-Houssein MONZER	mohamadMonzer92	https://github.com/mohamadMonzer92/HTML5-offline-browsing-and-storage	2015-2016
JAC	Java Card	NAJI DAGHER DAGHER	najidagher	https://github.com/najidagher/Java-Card	2015-2016
JAC	Java Card	Elie Sarkis	ElieKassis	https://github.com/ElieKassis/Java-Card	2015-2016
JUT	Juinit	Romy Ephrem	romyephrem	https://github.com/romyephrem/C1projet2018	2017-2018
MGDB	MongoDB	Hazem Halawi	HazemHalawi	https://github.com/HazemHalawi/cyclec-2018	2017-2018
MGDB	MongoDB	Rodney Badran	RodneyBadran	https://github.com/RodneyBadran/sujet-3	2017-2018
MGDB	MongoDB	Ali Ahmad Jaafar	AJaafar86	https://github.com/AJaafar86/MongoDB	2015-2016
NEOJ	Neo4j	Fahed Dany	faheddany	https://github.com/faheddany/neo4j-cyclec	2017-2018
NEOJ	Neo4j	Majed Abou Hamd	majedlb	https://github.com/majedlb/Neo4j	2015-2016
NFC	NFC	Ahmad Tout	ahmadtout	https://github.com/ahmadtout/NFC	2015-2016
OAUT	OAuth2	Dchouba	dchouba	https://github.com/dchouba/oauth2-Cyclec	2017-2018
RAPS	Rapport SQL Jasper	ralphsa95	ralphsa95	https://github.com/ralphsa95/ProjetC12018	2017-2018
REDB	Redis DB	Etienne Eid	etienneeid	https://github.com/etienneeid/CNAM-ProjetC1-2018	2017-2018
REST	REST	Majd Abou Akar	mjdakar	https://github.com/mjdakar/SMB-214/	2015-2016
REST	REST	Malak Ali KAYS	malakKays	https://github.com/malakKays/SMB214-Malak-KAYS	2015-2016
RFID	RFID	DAGHER Chady	chadydagher	https://github.com/chadydagher/PROJET-RFID	2015-2016
RFID	RFID	Alaa Walid DAIRY	adeiry	https://github.com/adeiry/RFID	2015-2016
RIDB	Riak DB	Said Eid	said-eid	https://github.com/said-eid/ProjetC1-2018	2017-2018
SOAP	SOAP	hassan kassem itani	hassanItani	https://github.com/hassanItani/SOAP_SMB214-2016	2015-2016
TOM	Tomcat Server	Roudy Ghosn	roudy-ghosn	https://github.com/roudy-ghosn/ProjetC1	2017-2018
TOME	TomEE	Joelle Tannous	oelleTannous	https://github.com/JoelleTannous/projet-C1-2018	2017-2018
TOME	TomEE	Tarek Ahmad Adra	Tarek-Adra	https://github.com/Tarek-Adra/TomEE	2015-2016
WSEM	Web Semantique	Abedelaziz Bilani	abedelazizbilani	https://github.com/abedelazizbilani/C1-2018	2017-2018
WFLY	WildFly	Tahani Abdallah Karroum	TahaniKarroum	https://github.com/TahaniKarroum/WILDFLY	2015-2016

Caractéristiques

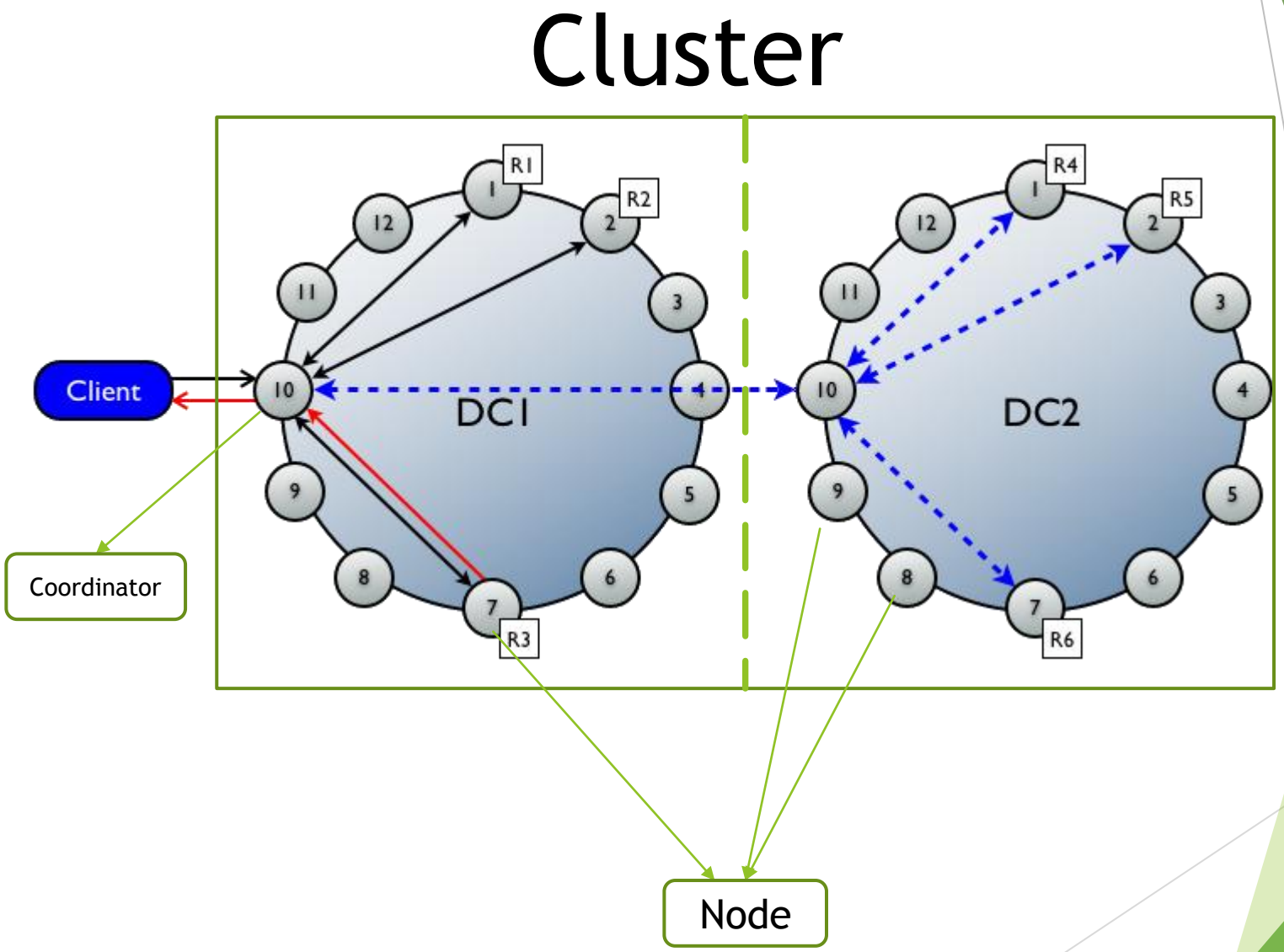
- NoSQL (Not only SQL)
- Projet Apache
- Distribuée
- Haute disponibilité
- Evolutive
- Cohérence (Consistance) éventuelle



https://www.w3resource.com/mongodb/nosql.php

Apache CASSANDRA™

Architecture Physique



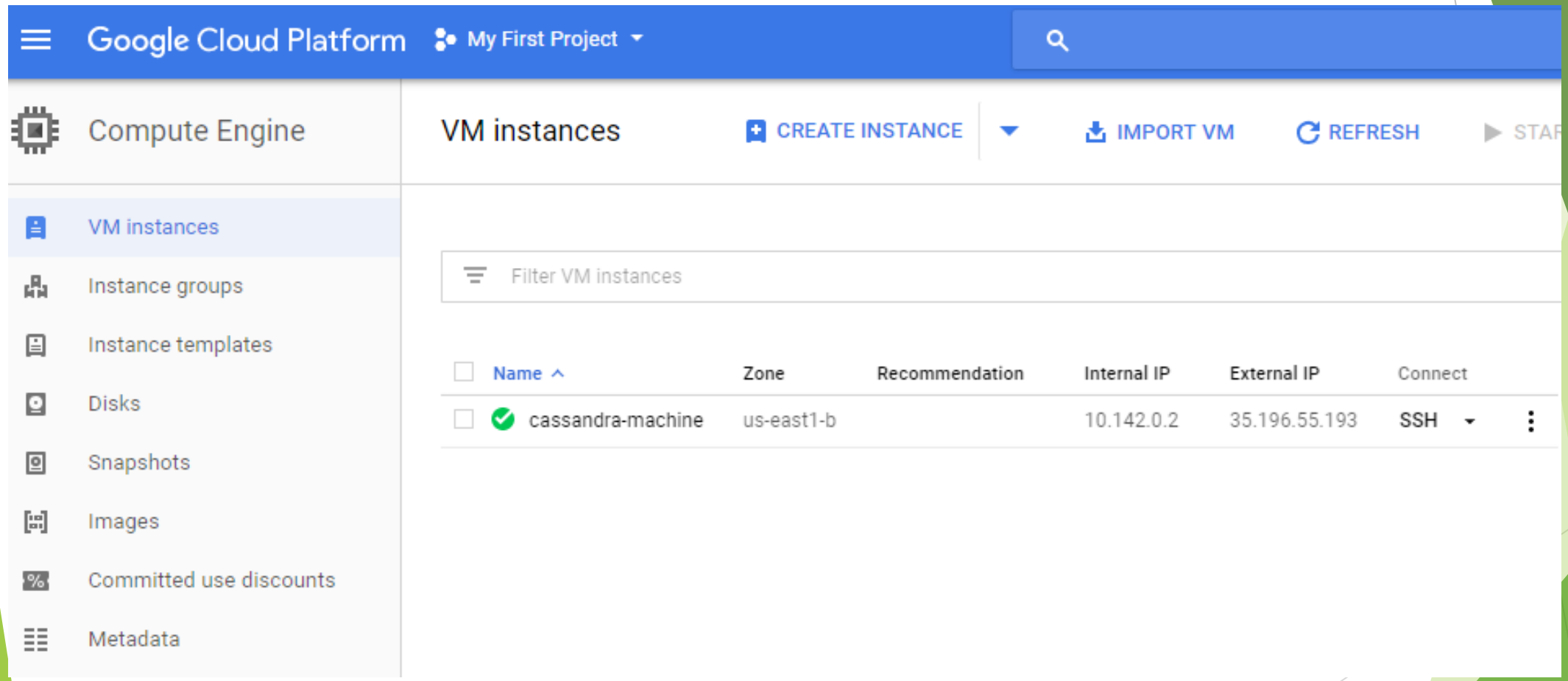
Architecture Logique

- Keyspace ; Stratégie de réplication =Simple (1 DC), Networktopology (>1 DC)
  facteur de réplication /DC
  - Table (Column family) : Clé primaire = (Clé de partition) , [Colonnes de triage]
    - Colonne:
      - Native type (e.g. text, integer, date…)
      - Collection type (e.g set, map, list)
      - User defined type

Mise en place du TP

- Machine Virtuelle sur Google Cloud Platform
- Un cluster “demo_cluster” configuré sur 3 nodes(conteneur docker)
  - cassandra-node1
  - cassandra-node2
  - cassandra-node3
- Keyspace “demo_kspc” ; classe = SimpleStrategy , facteur de replication = 2
- Table “sujets_valc”
  - Colonnes: id_sujet, titre, auditeur, compte_github, ref_projet, annee_universitaire ,remarques
- Language: Cassandra Query Language (CQL)

Machine Virtuelle Ubuntu 2 vCPUs , 3.7 GB RAM



Apache CASSANDRA™

- demo-cluster(docker-compose.yaml)

```
version: '3‘
services:

 cassandra1:
 container_name: cassandra-node1
  image: cassandra:3.11.1
  hostname: cassandra-node1 # IP: 172.21.0.2
  environment:
   - CASSANDRA_CLUSTER_NAME=demo_cluster
   - CASSANDRA_SEEDS=cassandra1,cassandra2,cassandra3
  volumes:
   - /home/user1/cassandra_demo/node1_data:/var/lib/cassandra

cassandra2:
  container_name: cassandra-node2
  image: cassandra:3.11.1
  hostname: cassandra-node2 # IP: 172.21.0.3
  environment:
   - CASSANDRA_CLUSTER_NAME=demo_cluster
   - CASSANDRA_SEEDS=cassandra1,cassandra2,cassandra3
  depends_on:
   - cassandra1
  volumes:
   - /home/user1/cassandra_demo/node2_data:/var/lib/cassandra

 cassandra3:
  container_name: cassandra-node3
  image: cassandra:3.11.1
  hostname: cassandra-node3 # IP: 172.21.0.4
  environment:
   - CASSANDRA_CLUSTER_NAME=demo_cluster
   - CASSANDRA_SEEDS=cassandra1,cassandra2,cassandra3
  depends_on:
   - cassandra1
  volumes:
   - /home/user1/cassandra_demo/node3_data:/var/lib/cassandra
```

demo_keyspace: facteur de replication=2

- Placement final des replicas (endpoints):
  - cassandra-node1, cassandra-node2
  - cassandra-node1, cassandra-node3
  - cassandra-node2, cassandra-node3

Table: sujets_valc
38 records et 29 valeurs distinctes de “id_sujet”

Colonne	Description	Exemple
id_sujet text compte_github text	Clé primaire= id_sujet,compte_github Clé de partition=id_sujet Colonne de triage=compte_github	CADB,josephmansour
titre text static,	Valeur Unique pour chaque valeur de clé de partition	Apache Cassandra
auditeur text		Joseph Mansour
ref_projet text		https://github.com/josephmansour/cassandra/
annee_universitaire text,		2017-2018

Partitionnement/Réplication

ID_Sujet	Token (Murmur3 Hash value)	Token Range (vNode)	Endpoints
CADB	4939911470157447464	start_token:4882882970159341776 end_token:4962595278774223806	cassandra-node1 cassandra-node3
AZUR	8009082485638017925	start_token:7975003526925331079 end_token:8082966863557182818	cassandra-node1 cassandra-node2
CDI	8500075603903148245	start_token:8481136158868325373 end_token:8502323137179534055	cassandra-node2 cassandra-node3

Partitionnement/Réplication

Endpoints	Distributions de clé de partition	No. de partitions
cassandra-node1, cassandra-node2	AZUR, CODB, GCCE, GCPA, GRI, HBS5, JUT, MGDB, NEOJ, NFC, RIDB, SOAP, TOM	13
cassandra-node1, cassandra-node3	ANDR, CADB, DOCK, OAUT, REDB, REST, TOME, WSEM	8
cassandra-node2, cassandra-node3	BRKL, CDI, FCF, FRD, JAC, RAPS, RFID, WFLY	8
	Total	29

CQL Upsert

- update demo_kspc.sujets_valc set titre='Apache Cassandra', auditeur='Jseoph Mansour', annee_universitaire='2017-2018' where id_sujet='CADB' and compte_github='josephmansour' ;

- insert into demo_kspc.sujets_valc(id_sujet, compte_github, auditeur) VALUES ('CADB', 'josephmansour', 'Joseph Mansour');

SQL Insert/Update

- Insert into demo_kspc.valc_sujets(id_sujet, titre, auditeur, compte_github, ref_projet, annee_universitaire) VALUES ('CADB', 'Apache cassandra ', 'Joseph Mansour', 'josephmansour', '2017-2018') IF NOT EXISTS;

- update demo_kspc.sujets_valc set ref_projet='https://github.com/josephmansour/cassandra' where id_sujet='CADB' and compte_github='josephmansour' IF EXISTS;

Exemple de consistance éventuelle

cassandra-node2: coordinator
{"id_sujet": "CADB", "compte_github": "josephmansour“, "ref_projet": null}

Temps	cassandra-node1	cassandra-node3	Valeur de ref_projet
T1	UN	UN	Null
T2	UN	DN	https://github.com/josephmansour/cassandra/
T3	DN	DN	NA
T4	DN	UN	Null
T4+secs	DN	UN	https://github.com/josephmansour/cassandra/