SGBD en 2022 – Actualités et tendances

UMons – 02/3/2022

Alexis Gil Gonzales

Agenda

- 1. Qui suis-je?
- 2. Le métier de DBA
- 3. Les SGBD
- 4. Actualités et Tendances

Qui suis-je?

- Umons 1995
- Développeur
- DBA
- Consultant
- Aleph Technologies



- Responsable des DB: installer, configurer, paramétrer, monitorer, maintenir
- Modes de déploiement: on-prem, cloud, DBaaS
- Automatisation (« devops »)
- Environnements : développement, test, acceptance, pre-production, production...

Le DBA "projet"



Le DBA "production"



Le parcours

- 1-3 ans : « junior »
- +/- 5 ans : « medior »
- +/- 10 ans « senior »

Les aspects principaux

- Sauvegarde et restauration de données
- Haute disponibilité
- Gestion de la performance
- Gestion des accès
- Gestion des options
- Mises à jour

Tâches typiques au sein d'un projet

- Conception/modélisation (OLTP/DWH)
- Prévision
- Configuration et fine-tuning
- Tests de charge
- Conseil
- Aide à l'intégration / mise en production

Tâches typiques au sein d'une équipe de support de production

- Résoudre des incidents (vite)
- Investiguer des problèmes divers (vite)
- Prioriser
- Monitorer
- Restaurer des données / opérations (vite)

Les compétences de base

- SQL
- Linux / Windows
- langages de scripting (bash, powershell,...)
- langages de programmation
- Environnements cloud (AWS, GCP, MS Azure, OCI,...)
- Containers et orchestrateurs (docker, kubernetes)

Les compétences spécifiques

- Spécifiques à chaque SGBD
- Installation et upgrade
- Configuration resources
- Mise en place DR / HA
- Mise en place de monitoring
- Techniques de troubleshooting
- Fine-tuning
- Scalabilité

Les SGBDR les plus populaires











Les SGBD « noSQL » les plus populaires (1/2)

Attributes Database model		NoSQL Databases								
		Document-Stored		Wide-Column Stored				Key-Value Stored		Graph- oriente d
	Features	MongoDB	CouchDB	DynamoBD	HBase	Cassandra	Accumulo	Redis	Riak	Neo4j
	Data storage	Volatile memory File System	Volatile memory File System	SSO	HDFS		Hadoop	Volatile memory File System	Bitcask LevelDB Volatile memory	File System Volatile memory
Features	Query language	Volatile memory File System	JavaScript Memcached- protocol	API calls	API calls REST XML Thrift	API calls CQL Thrift		API calls	HTTP JavaScript REST Erlang	API calls REST SparQL Cypher Tinkerpo p Gremlin
Design & Features	Protocol	Custom, binary (BSON)	HTTP, REST		HTTP/REST Thrift	Thrift & custom binary CQL3	Thrift	Telnet-like	HTTP, REST	HTTP/RES Tembedd ing in Java
	Conditional entry updates	Yes	Yes	Yes	Yes	No	Yes	No	No	
	MapReduce	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
	Unicode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	TTL for Entries	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	100
	Compression	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	-
	Integrity model	BASE	MVCC	ASID	Log Replicati on	BASE	MVCC		BASE	ASID
	Atomicity	Conditional	Yes	Yes	Yes	Yes	Condition al	Yes	No	Yes
≥	Consistency	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Integrity	Isolation	No	Yes	Yes	No	No	(<u>+</u>	Yes	Yes	Yes
Int	Durability (data storage)	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes

Les SGBD « noSQL » les plus populaires (2/2)

	Transactions	No	No	No	Yes	No	Yes	Yes	No	Yes
	Referential	No	No	No	No	No	No	Yes	No	Yes
	integrity									
3.4	Revision control	No	Yes	Yes	Yes	No	Yes	No	Yes	No
	Secondary	Yes	Yes	No	Yes	Yes	Yes		Yes	-
	Indexes									
Indexing	Composite keys	Yes	Yes	Yes	Yes	Yes	Yes		Yes	
	Full text search	No	No	No	No	No	Yes	No	Yes	Yes
=		Yes	No	No	No	No	Yes		-	Yes
	Indexes									
	Graph support	No	No	No	No	No	Yes	No	Yes	Yes
	Horizontal	Yes	Yes	Yes	Yes	Yes	Yes		Yes	No
	scalable									**
_	Replication	Yes	Yes	Yes	Yes	Yes Master-	Yes	Master-	Yes Multi-	Yes
tio	Replication mode	Master- Slave-	Master- Slave		Master- Slave	Slave		Slave		
Distribution	mode	Replica	Replicatio		Replicati	Replicatio		Replicati	master replicati	
istr		Replication	n		on	n		on	on	
0	Sharding	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	Shared nothing	Yes	Yes	Yes	Yes	Yes	-		Yes	_
	architecture				103					W.
	Value size max.	16MB	20MB	64KB	2TB	2GB	1EB		64MB	
	Operating	Cross-	Ubuntu	Cross-	Cross-	Cross-	NIX	Linux	Cross-	Cross-
	system	platform	Red Hat	platform	platform	platform	32	*NIX	platform	platfor
			Windows				entries	Mac OS		m
ε			Mac OS X				Operating	X		
System							system	Window		
S								S		
	Programming	C++	Erlang	Java	Java	Java	Java	С	Erlang	Java
	language		C++					C++		
			C							
			Python							\$4 E

Les SGBD « newSQL »

- Apache Trafodion
- HarperDB
- Altibase
- c-treeACE
- CLustrix DB
- CockroachDB
- MemSQL
- NuoDB
- VoltDB
- Google Spanner
- Fauna
- YugabyteDB

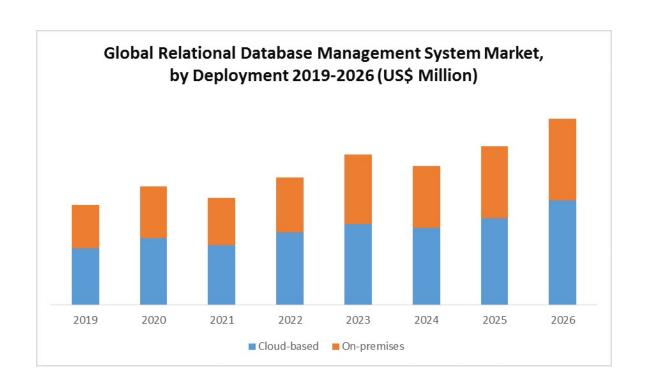
Les services « cloud »

Figure 1: Magic Quadrant for Cloud Database Management Systems

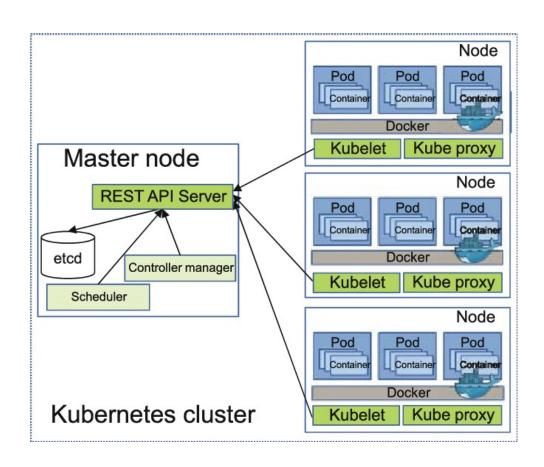


Source: Gartner (December 2021)

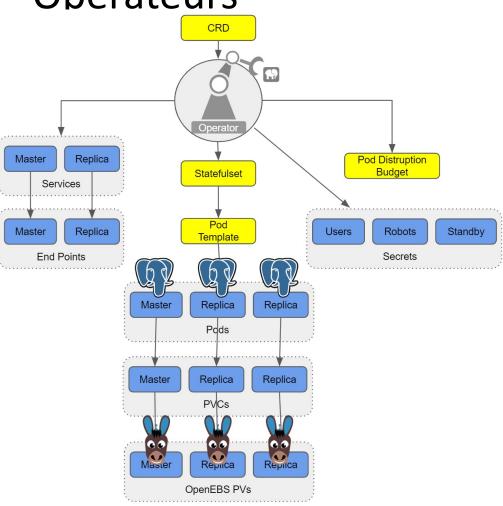
Migration vers le cloud



Containers et Orchestrateurs



Opérateurs

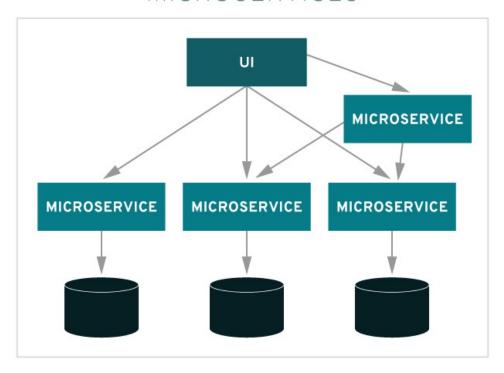


Architecture microservices

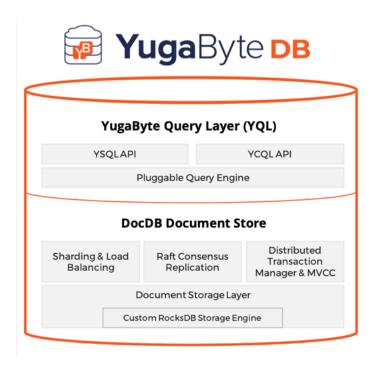
MONOLITHIC

BUSINESS LOGIC DATA ACCESS LAYER

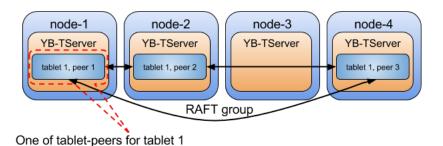
MICROSERVICES



SGBDD exemple



SGBDD exemple



The End

agg@aleph-tech.com