

Hyperledger Fabric et Cassandra

Comparaison entre NoSQL et Blockchain
en tant que bases de données distribuées



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RÉSULTATS

CONCLUSION



EXPÉRIMENTATIONS

DISCUSSIONS

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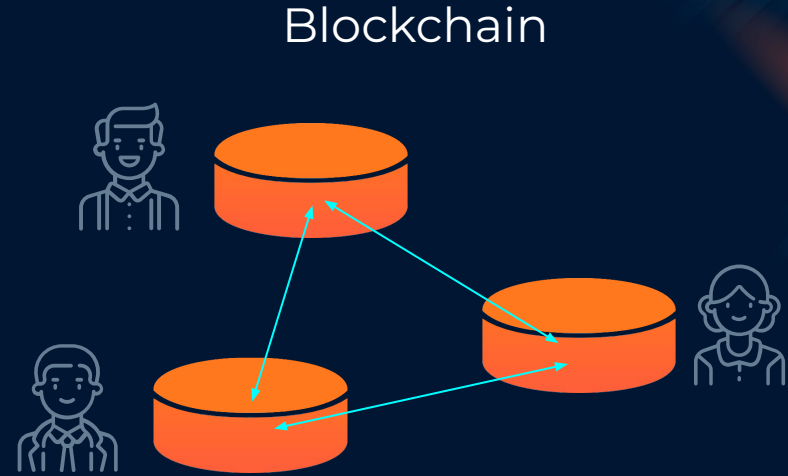
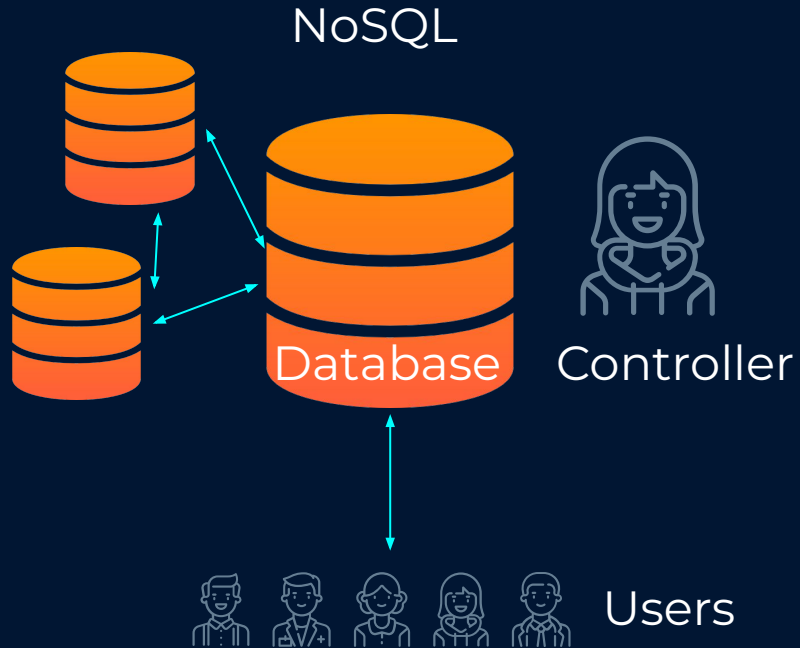


EXPÉRIMENTATIONS

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Contexte

NoSQL et Blockchain

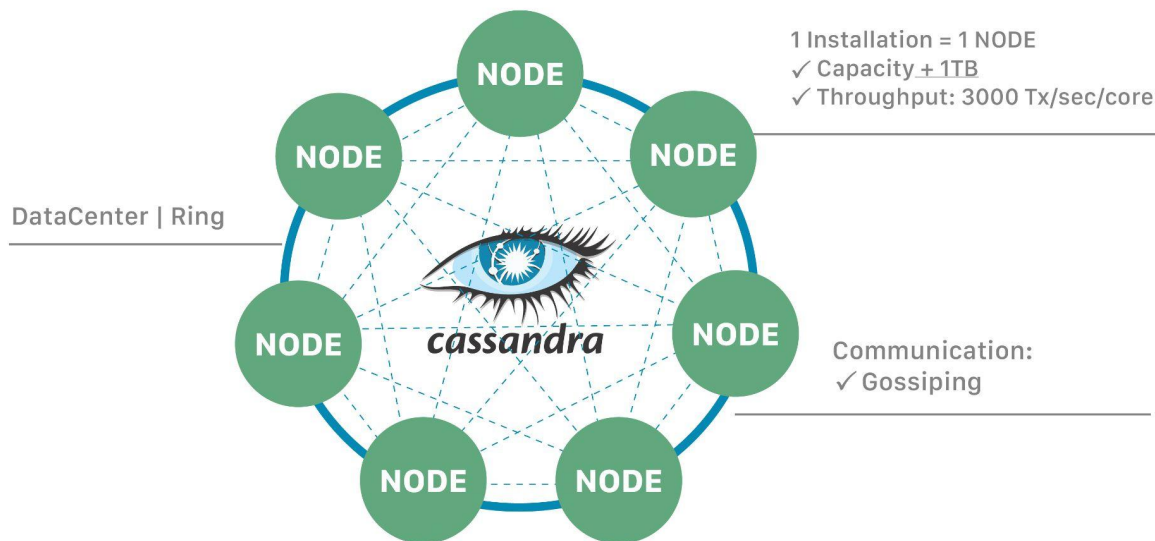


Contexte

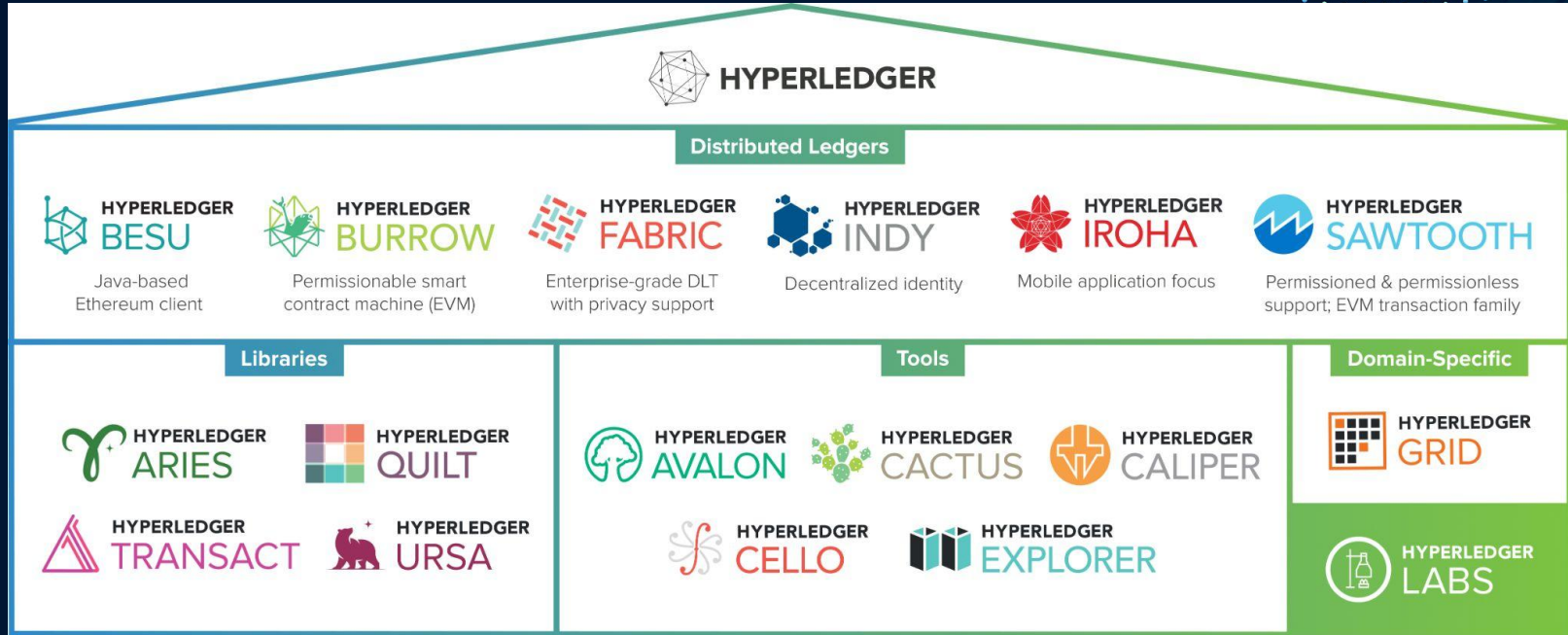
Cassandra

- Structuration en paires clé-valeur orientée colonne

ApacheCassandra™ = NoSQL Distributed Database



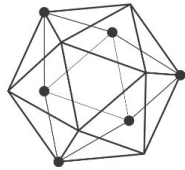
Contexte Hyperledger



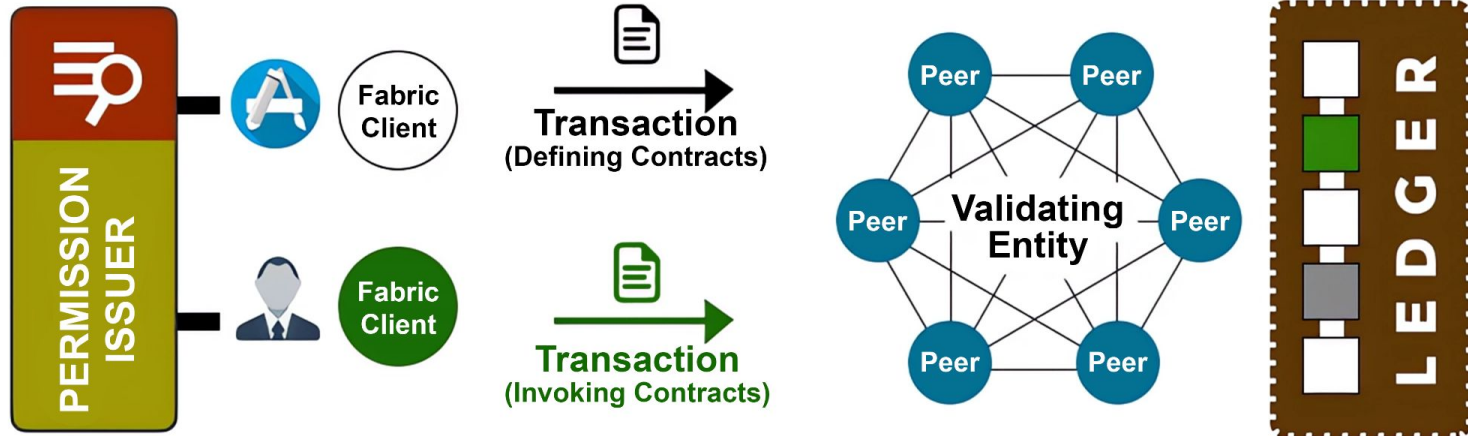
Contexte

Hyperledger Fabric

- Contrats intelligents



HYPERLEDGER FABRIC



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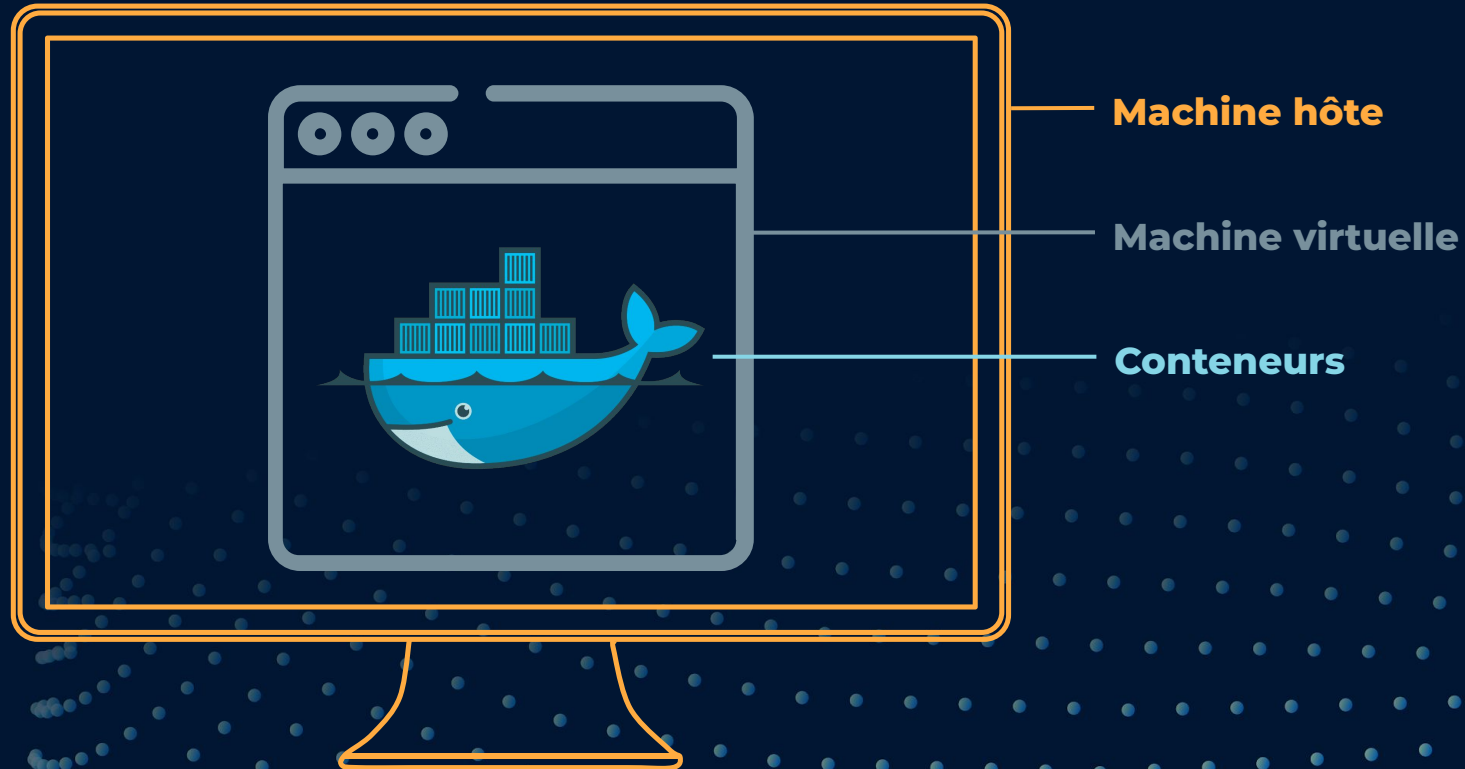


EXPÉRIMENTATIONS

DISCUSSIONS

Expérimentations

Environnement



Expérimentations

Types de charge

0% Écriture
100% Lecture

C



50% Écriture
50% Lecture

A



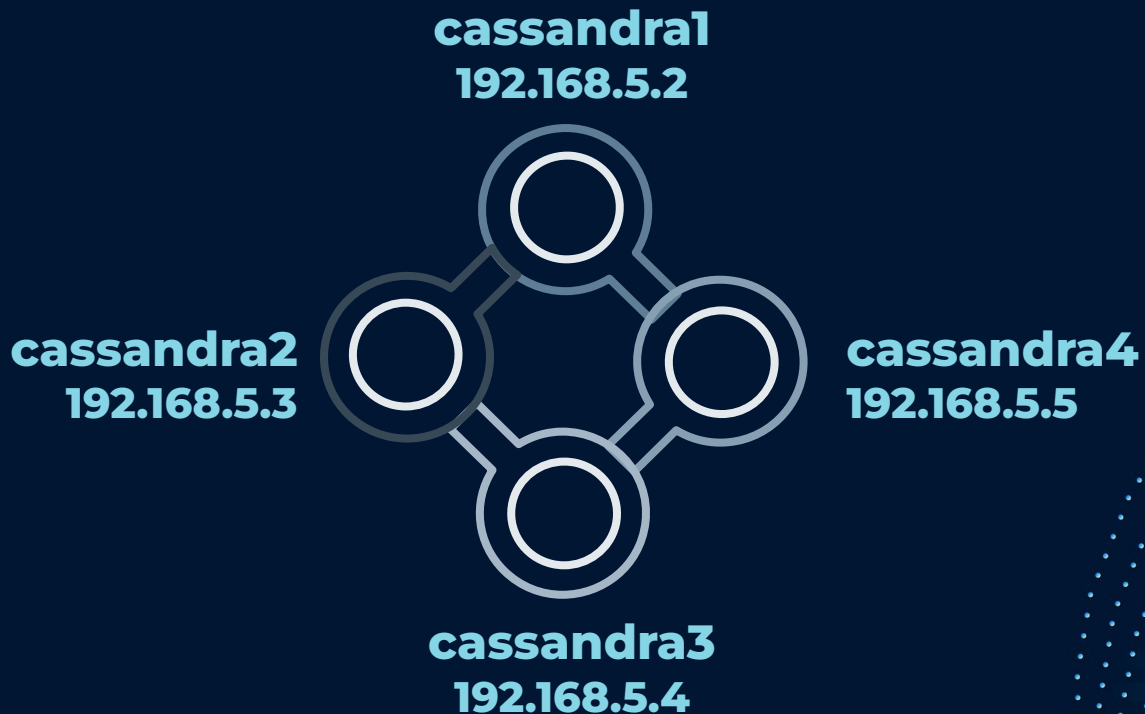
90% Écriture
10% Lecture

G



Expérimentations

Cassandra



Expérimentations

Hyperledger Fabric



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EXPÉRIMENTATIONS

DISCUSSIONS

Variables observées

Hyperledger Fabric VS Cassandra



Latences



Profilage %CPU



Profilage %RAM



Temps d'exécution



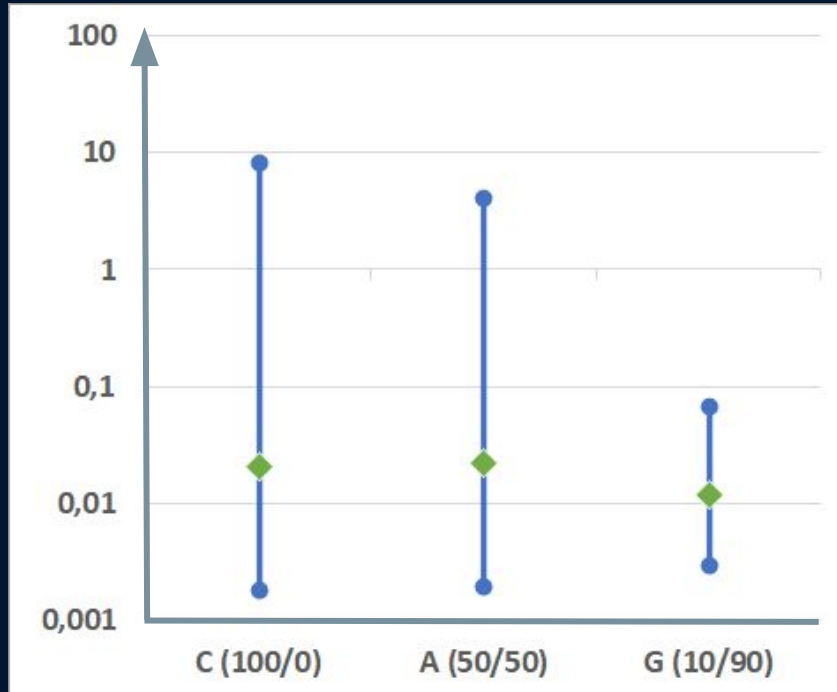
Taux de traitement



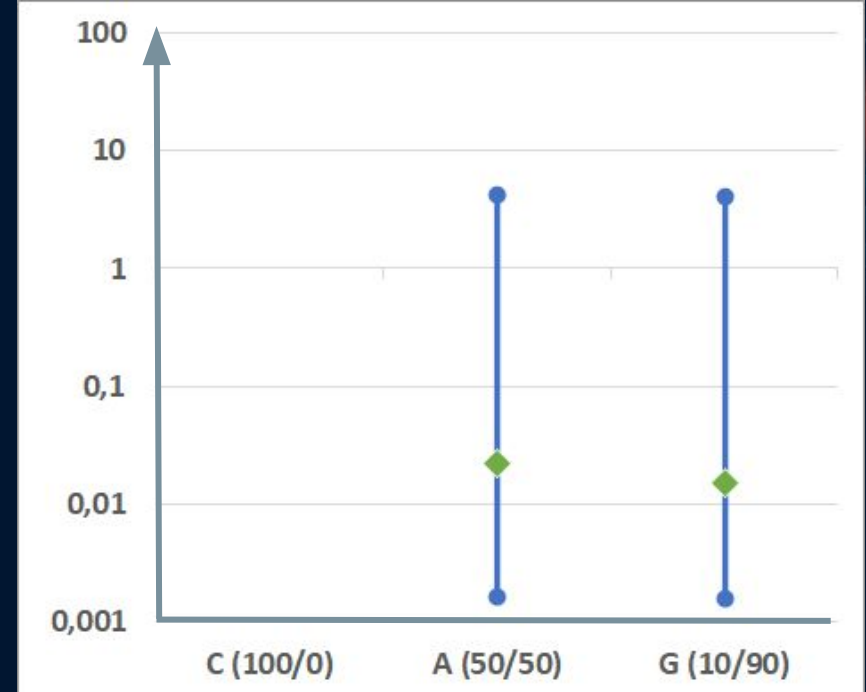
Latences

Cassandra

Lecture



Écriture



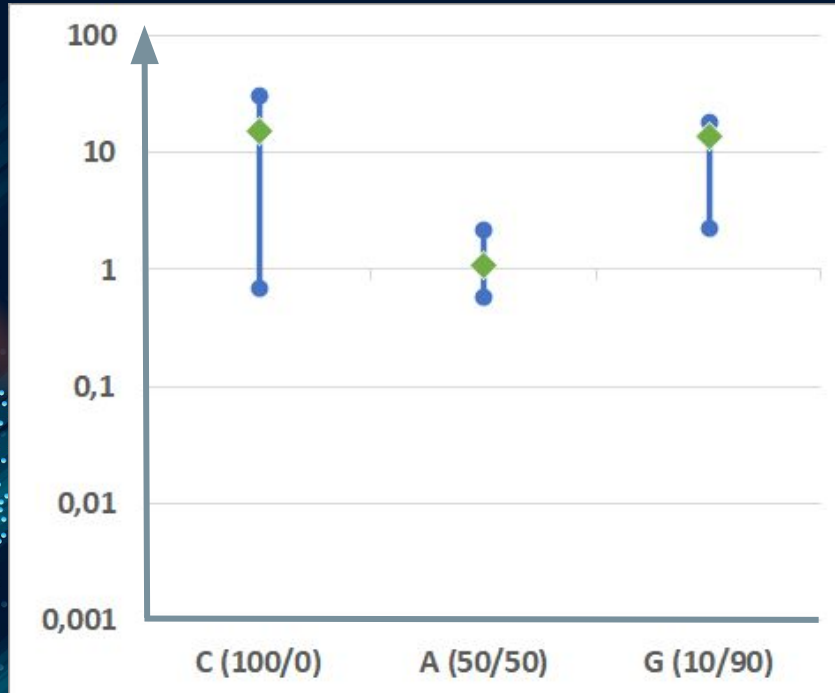
[secondes]



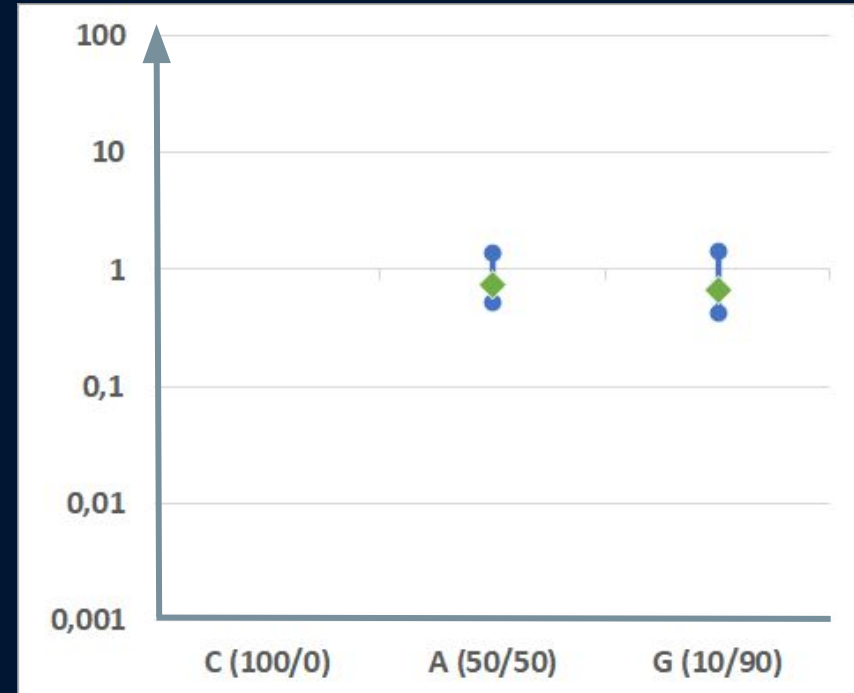
Latences

Hyperledger Fabric

Lecture



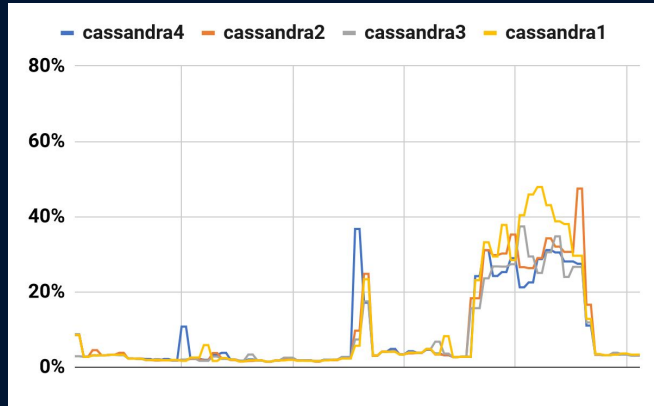
Écriture



[secondes]

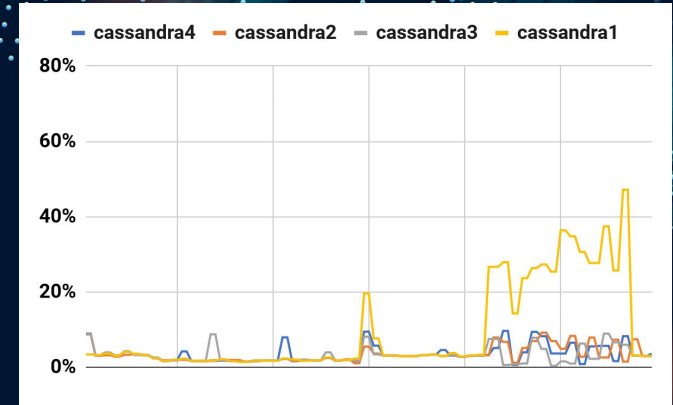


Profilage %CPU Cassandra

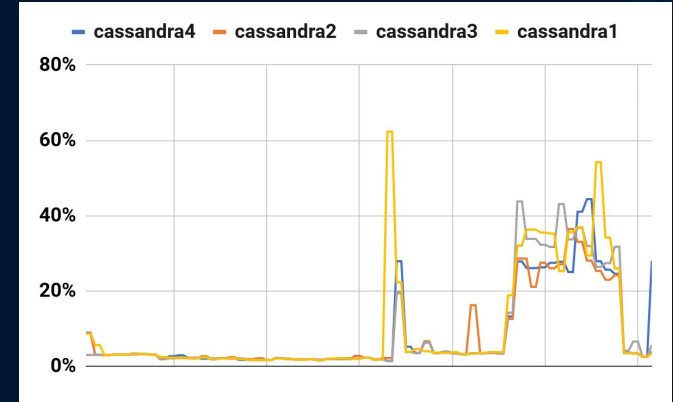


C (10/90)

A (50/50)

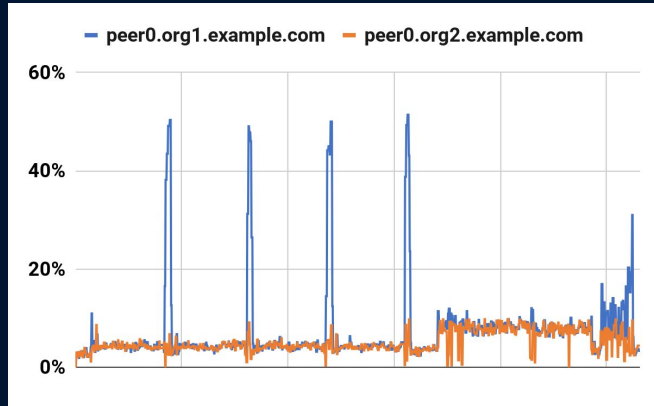


C (100/0)



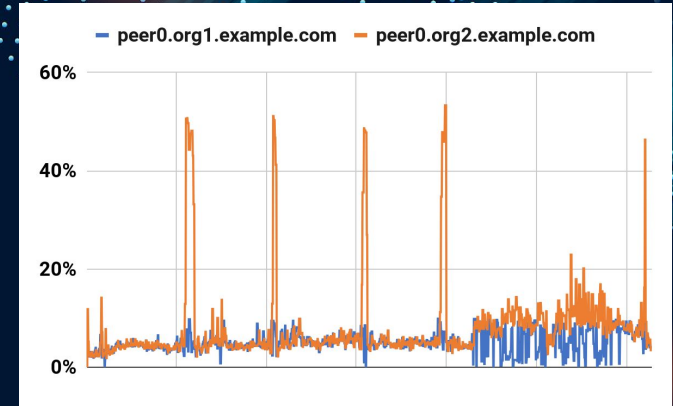


Profilage %CPU Hyperledger Fabric

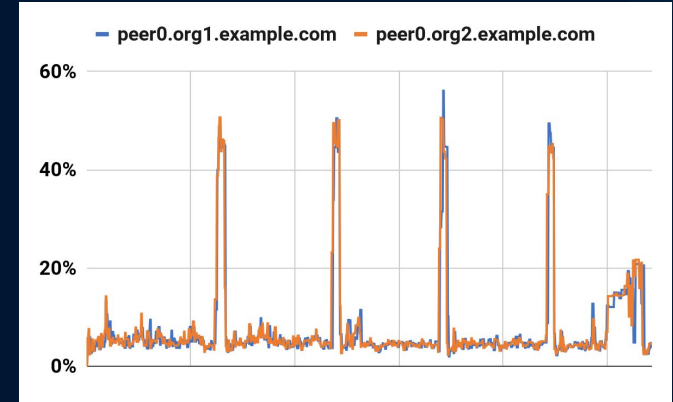


C (10/90)

A (50/50)

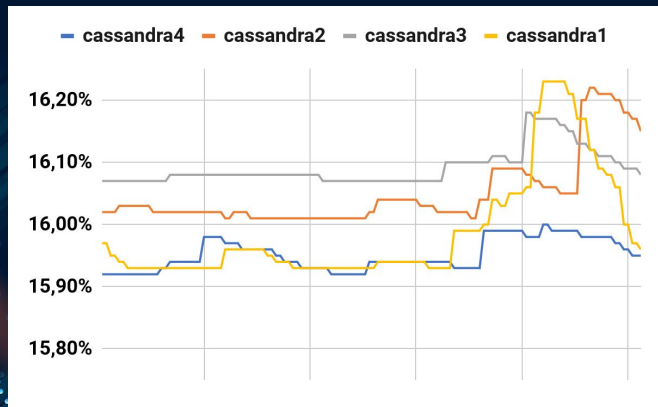


C (100/0)

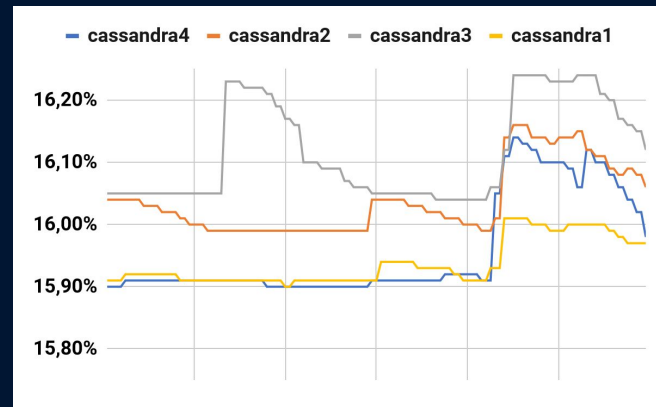




Profilage %RAM Cassandra

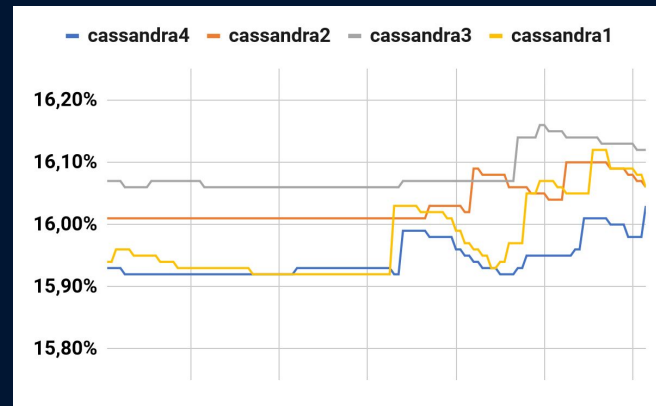


A (50/50)



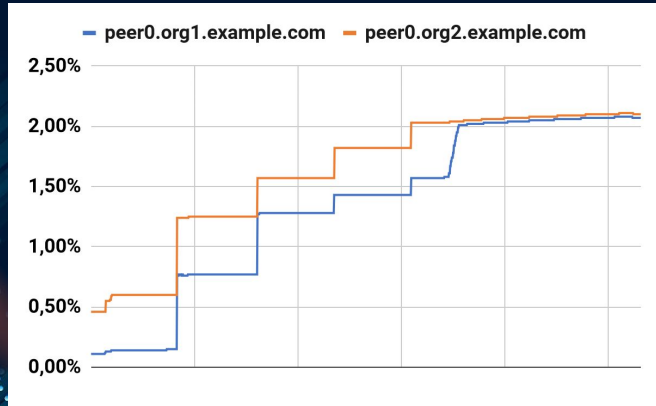
C (10/90)

C (100/0)

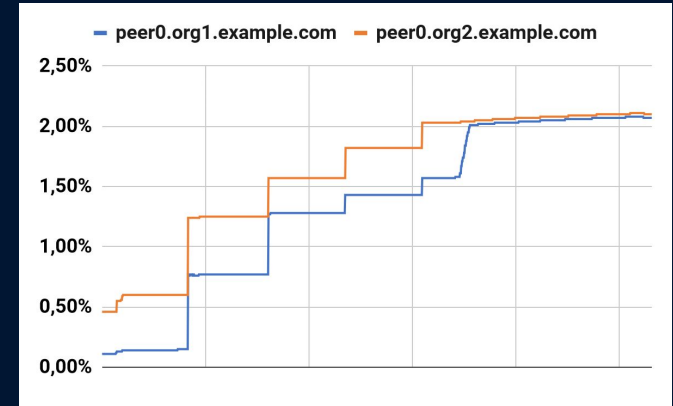




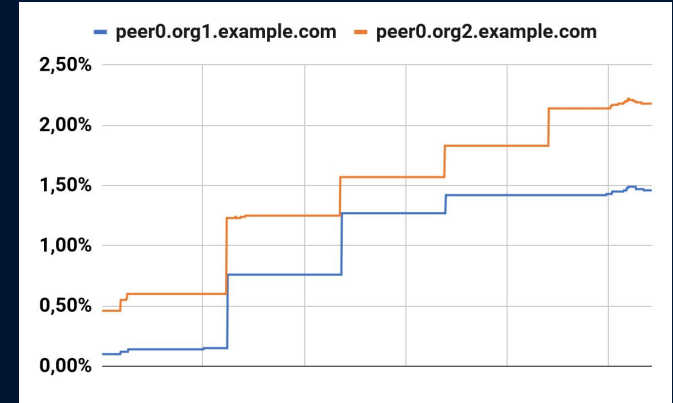
Profilage %RAM Hyperledger Fabric



A (50/50)



G (10/90)



C (100/0)



Profilage %RAM

Hyperledger Fabric

761a510b3efd	ca.org1.example.com	0.00%	9.152MiB / 7.764GiB	0.12%
11bbbc2a6ed7	couchdb.peer0.org1.example.com	2.44%	37.34MiB / 7.764GiB	0.47%
8aa2651f7368	ca.org2.example.com	0.00%	8.438MiB / 7.764GiB	0.11%
3c754cc4ed1c	couchdb.peer0.org2.example.com	0.13%	37.46MiB / 7.764GiB	0.47%
0147a1a8023c	orderer0.example.com	0.27%	14.16MiB / 7.764GiB	0.18%
09afc52095dc	peer0.org1.example.com	4.25%	60.75MiB / 7.764GiB	0.76%
9fe74ad3d999	peer0.org2.example.com	4.70%	99.53MiB / 7.764GiB	1.25%
575624a78b86	dev-peer0.org2.example.com-marbles-v0	0.00%	6.465MiB / 2GiB	0.32%
c91a16ca3d24	dev-peer0.org1.example.com-marbles-v0	0.00%	6.465MiB / 2GiB	0.32%
b8e44fb19f94	peaceful_jennings	63.98%	183.5MiB / 7.764GiB	2.31%
20bb3698724d	laughing_bose	63.46%	178.8MiB / 7.764GiB	2.25%



Profilage %RAM

Hyperledger Fabric

761a510b3efd	ca.org1.example.com	0.00%	9.152MiB / 7.764GiB	0.12%
11bbbc2a6ed7	couchdb.peer0.org1.example.com	2.44%	37.34MiB / 7.764GiB	0.47%
8aa2651f7368	ca.org2.example.com	0.00%	8.438MiB / 7.764GiB	0.11%
3c754cc4ed1c	couchdb.peer0.org2.example.com	0.13%	37.46MiB / 7.764GiB	0.47%
0147a1a8023c	orderer0.example.com	0.27%	14.16MiB / 7.764GiB	0.18%
09afc52095dc	peer0.org1.example.com	4.25%	60.75MiB / 7.764GiB	0.76%
9fe74ad3d999	peer0.org2.example.com	4.70%	99.53MiB / 7.764GiB	1.25%
575624a78b86	dev-peer0.org2.example.com-marbles-v0	0.00%	6.465MiB / 2GiB	0.32%
c91a16ca3d24	dev-peer0.org1.example.com-marbles-v0	0.00%	6.465MiB / 2GiB	0.32%
b8e44fb19f94	peaceful_jennings	63.98%	183.5MiB / 7.764GiB	2.31%
20bb3698724d	laughing_bose	63.46%	178.8MiB / 7.764GiB	2.25%

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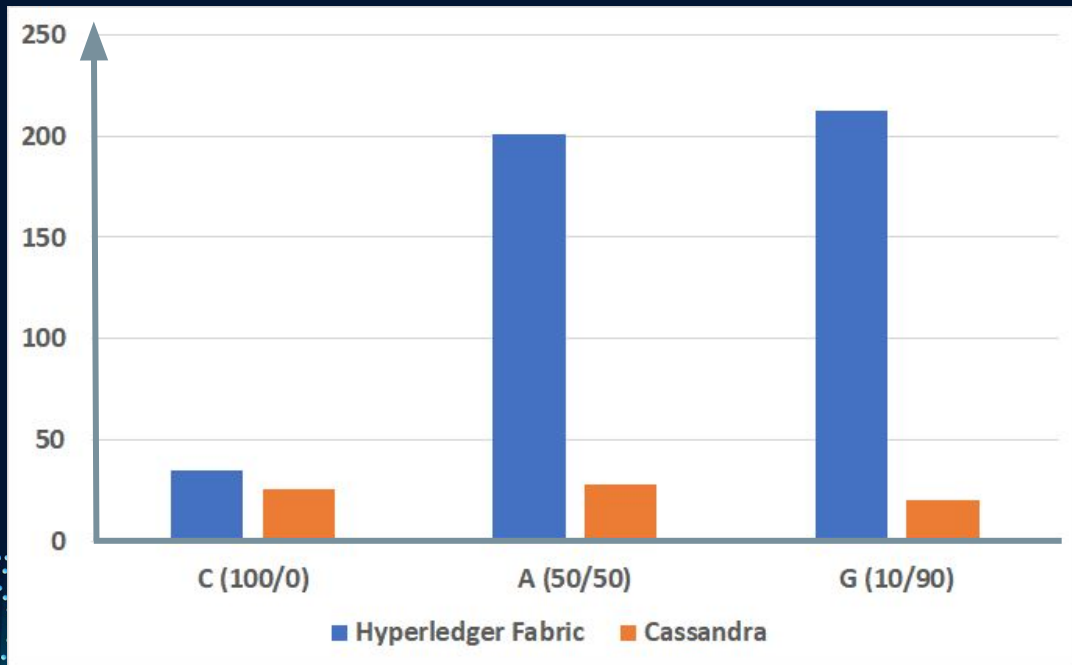
DISCUSSIONS



Temps d'exécution

Hyperledger Fabric VS Cassandra

[secondes]

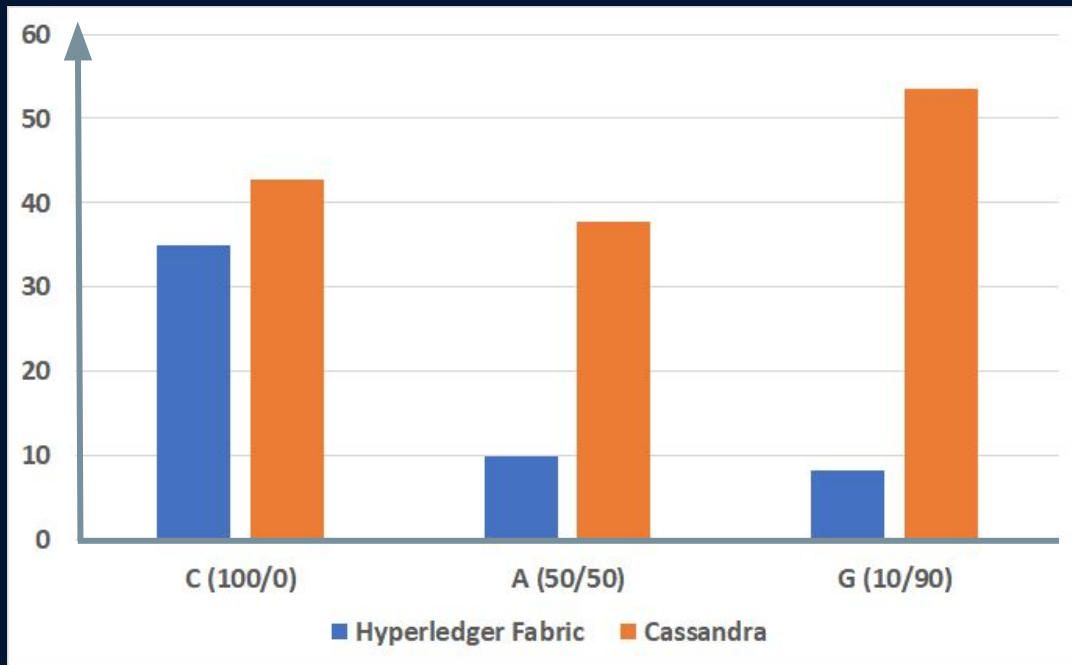




Taux de traitement

Hyperledger Fabric VS Cassandra

[TPS]



Résumé

Hyperledger Fabric



Généralement $>1s$



Pic périodiques à 50%



Très faible ($<2.5\%$)**



Très long en écriture ($>200s$)



Très bas en écriture (<10)

Cassandra

Généralement $<0.1s$

Intensité $>40\%$ vers la fin

Très constant (15% à 16%)

Généralement $<30s$

Entre 35 et 55

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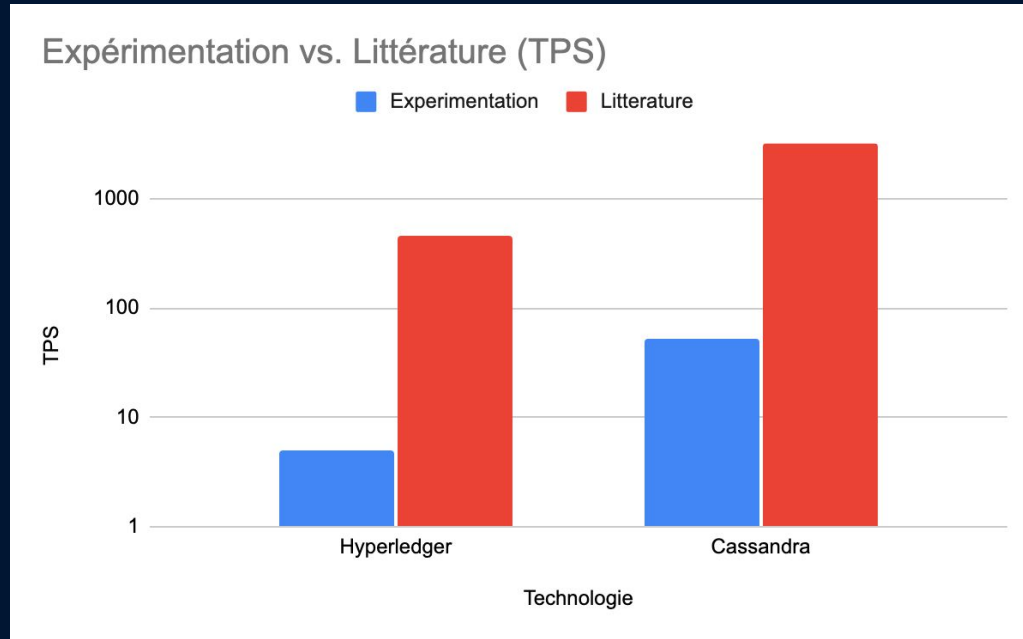


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Comparaison entre la littérature et l'expérimentation



- Effets de la machine virtuelle ?