Evaluation of Distributed Key-Value Store on Amazon EC2

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♦ Abstract

Distributed hash table (**DHT**) is a class of a decentralized distributed system that provides a lookup service similar to a hash table PA2-DHT is a distributed hash table server which is used for high end computing systems.PA2-DHT aims to provide high throughput and low latency to multiple clients in a threaded environment. PA2-DHT performs insert, search and remove operation using hash function. PA2-DHT internally uses concurrent hash-map to store data and gives good performance for concurrent operations. PA2-DHT is tested on 16 nodes of Amazon EC2 cloud with different kinds of distributed hash table systems.

♦ Objective

To Perform system evaluation for throughput and latency on Amazon EC2 of different key-Value distributed storage.

♦ Test Environment

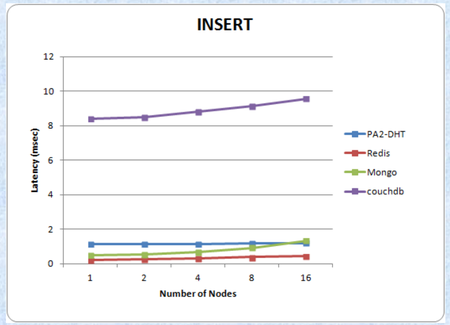
Amazon EC2
Intstance:M3.medium(Spot Request)
Operating System: Ubuntu 14.04 (64-bit)
Number of Max. Nodes:16
Number of Min Nodes: 1
Operations Performed: Insert, Search, Remove
Count per Operation:10K
Impl:Java
Key Size:10 Bytes Value Size:90 Bytes

♦ Systems Tested

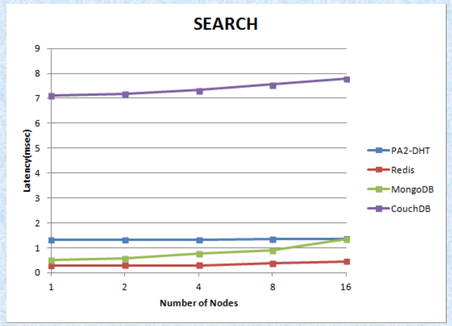
PA2-DHT
Redis
MongoDB
CouchDB

♦ Latency

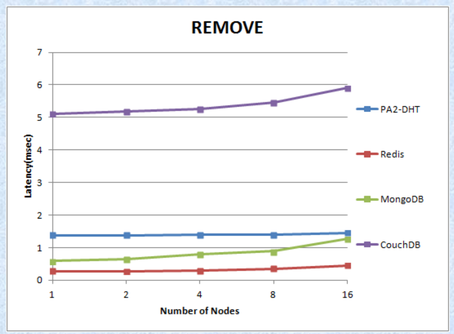
♦ Insert Operations



♦ Search Operations

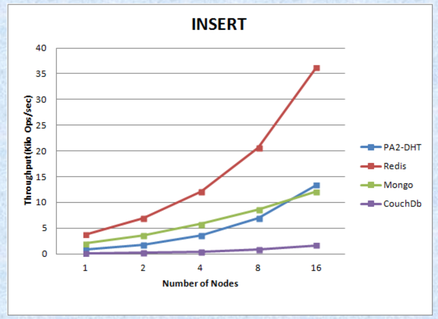


♦ Remove Operations

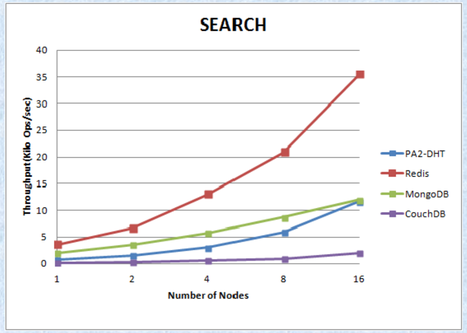


♦ Throughput

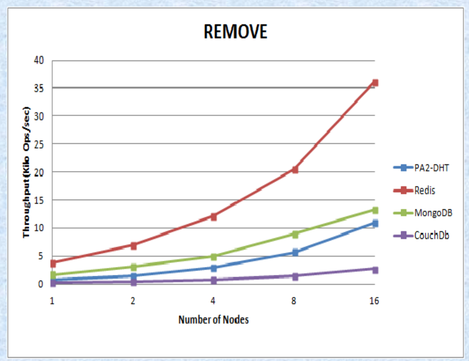
♦ Insert Operations



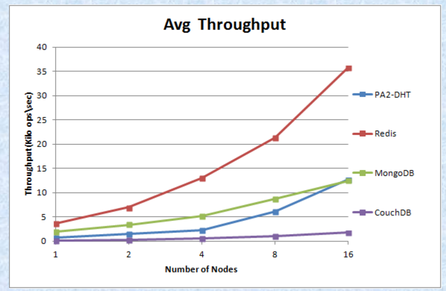
♦ Search Operations



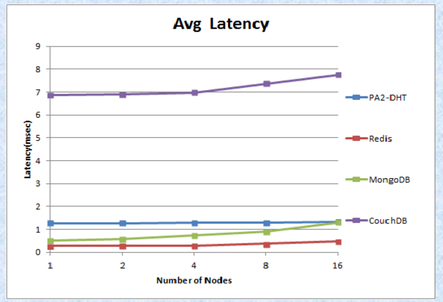
♦ Remove Operations



♦ Average Throughput



♦ Average Latency



♦ Conclusion

On comparing PA2-DHT with other systems it is observed that in smaller nodes the systems shows a good throughput. But if the number of nodes and operations are increased the hash function of PA2-DHT should be replaced with a more improved hash function to show good latency and throughput results.

♦ References

• docs.mongodb.org/getting-started /shell
• redis.io/topics/data-types-intro
•guide.couchdb.org/draft/tour.html
•Tonglin Li, Xiaobing Zhou, Kevin Brandstatter, et al. ZHT: A Light-weight Reliable Persistent Dynamic Scalable Zero-hop Distributed Hash Table, IPDPS, 2013