

An Empirical Evaluation of Distributed Key/Value Storage Systems

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Abstract

Distributed hash table is class for decentralized system that provides lookup services with key-value pairs. This distributed hash table stores key-value pair and any peer node can efficiently retrieve the value depending on the given key. Distributed hash table is responsible for maintaining the mapping from keys to values is distributed among the nodes in such a way that the particular set of key-value pair will always route a particular node only. Such a implementation allows distributed hash table to scale to large numbers of nodes & to handle addition, removals. Such system forms an infrastructure that can be used to build complex services such as peer-to-peer file sharing , cooperative web caching, content distribution systems

Systems under Evaluation

1. MongoDB
2. Redis
3. Couch DB
4. PA2-DHT

Experiment

1. Experiment is done on Amazon EC2.
2. M3.medium instance is used.
3. Total 16 instance for one system is tested with 100K request per instance. 1. MongoDB 2. Redis 3. Couchdb

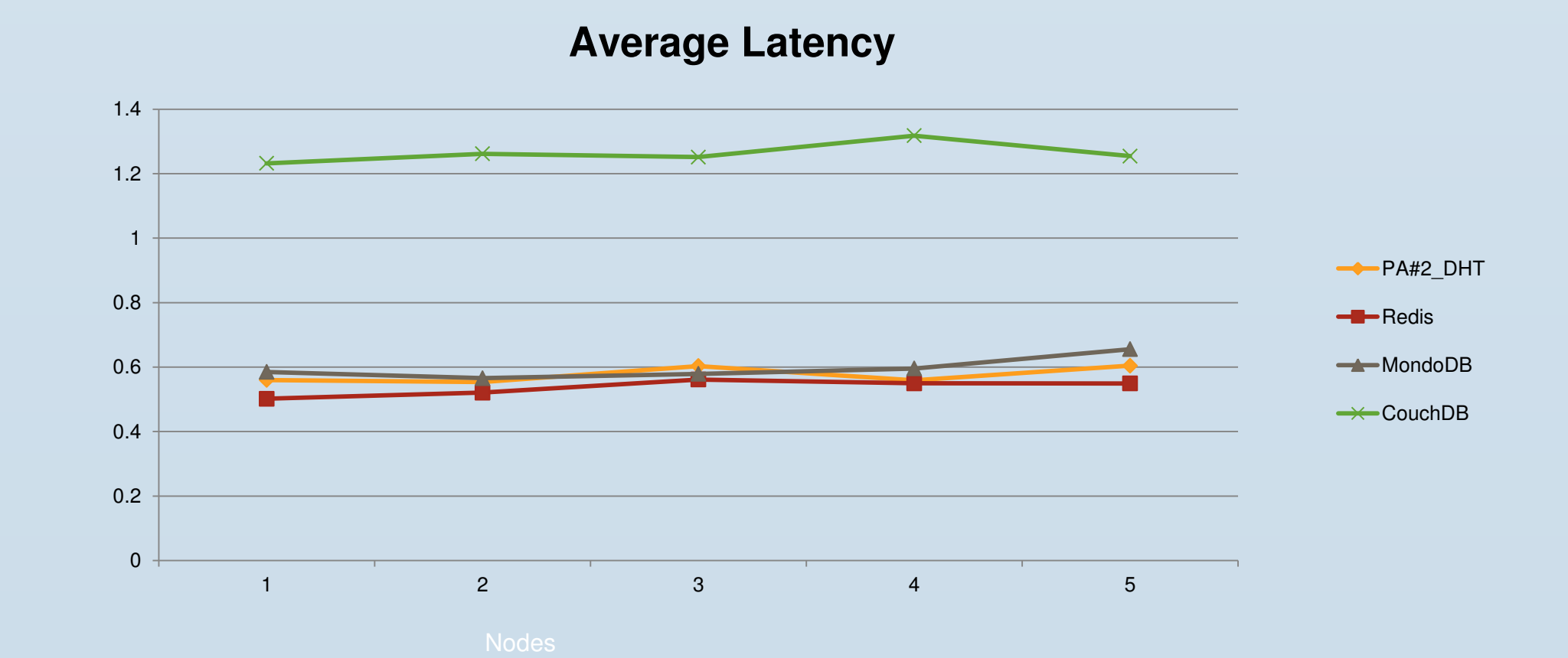
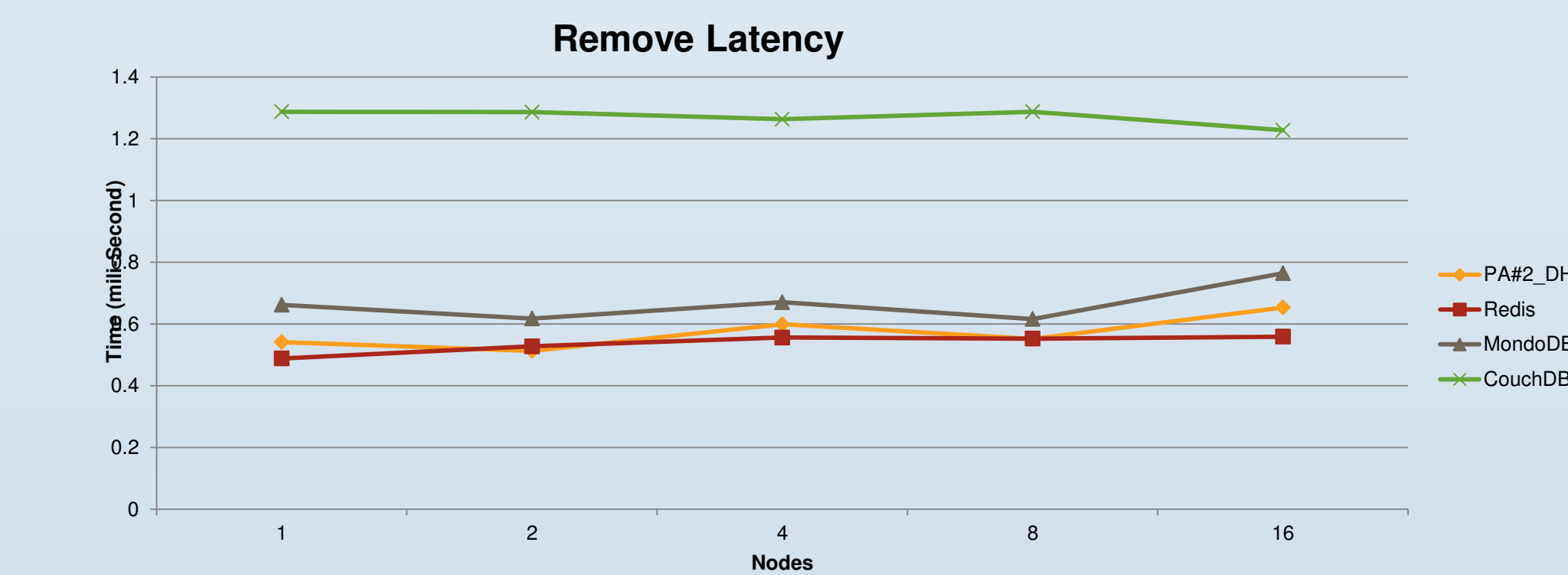
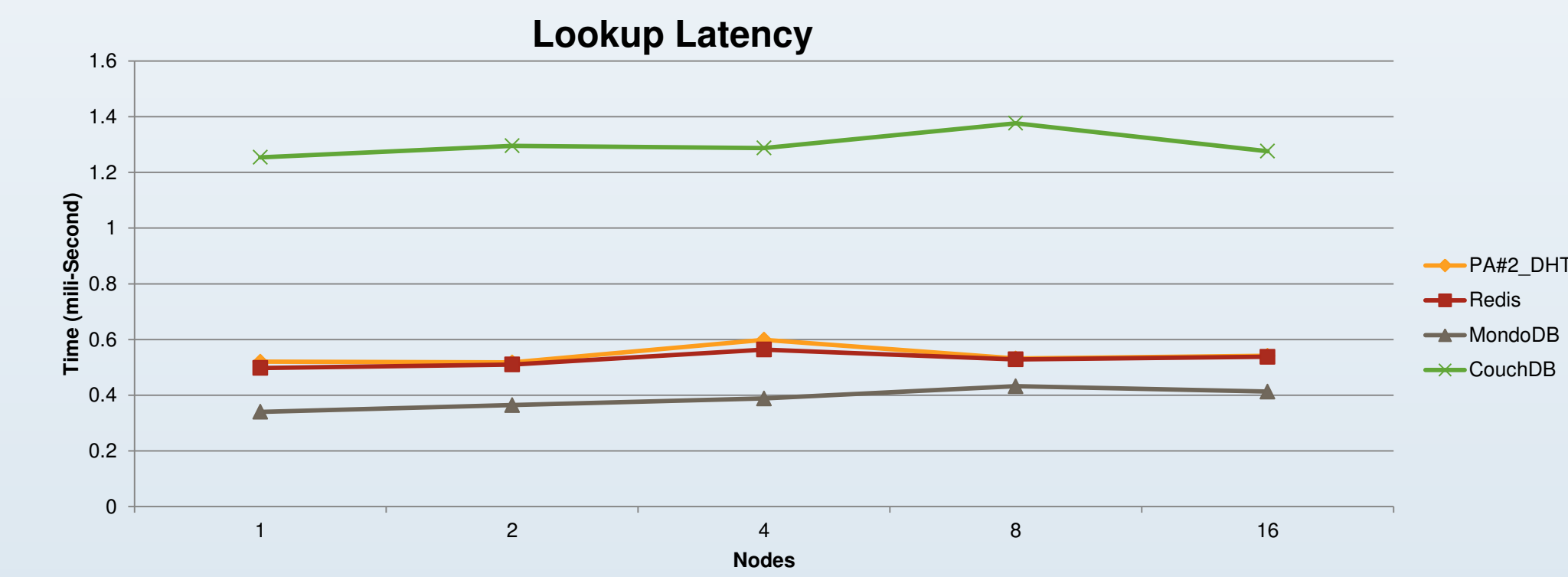
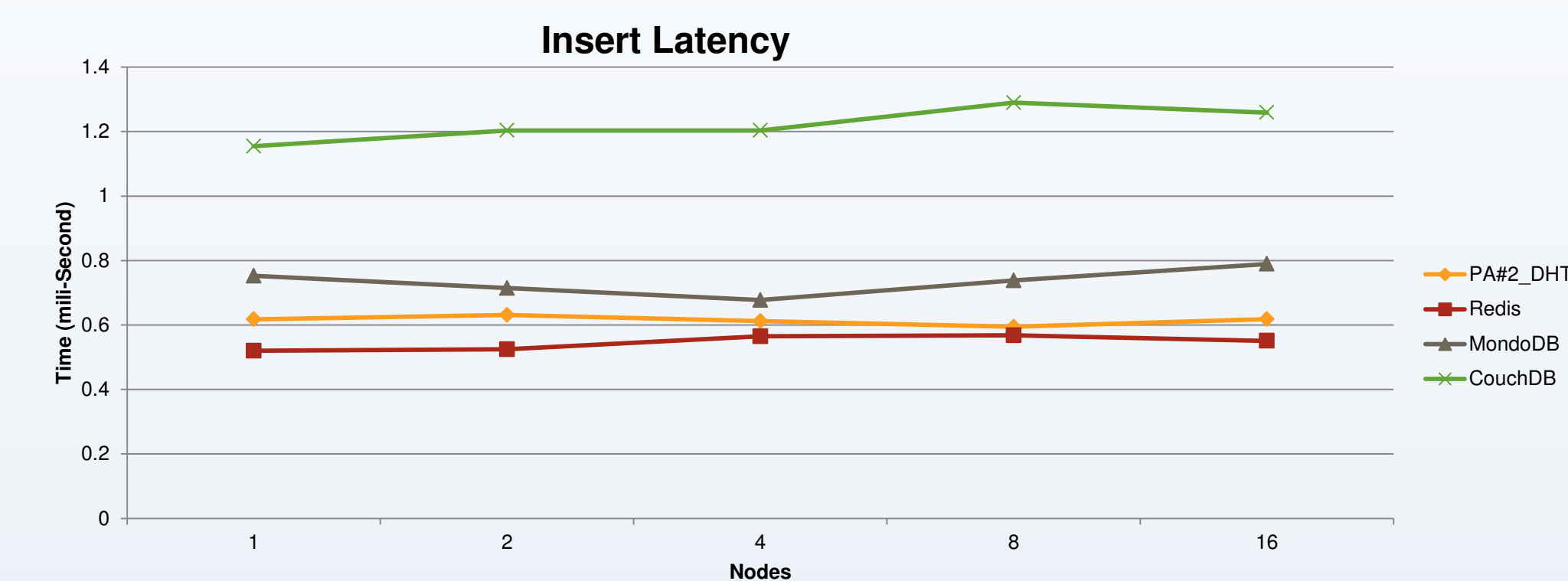
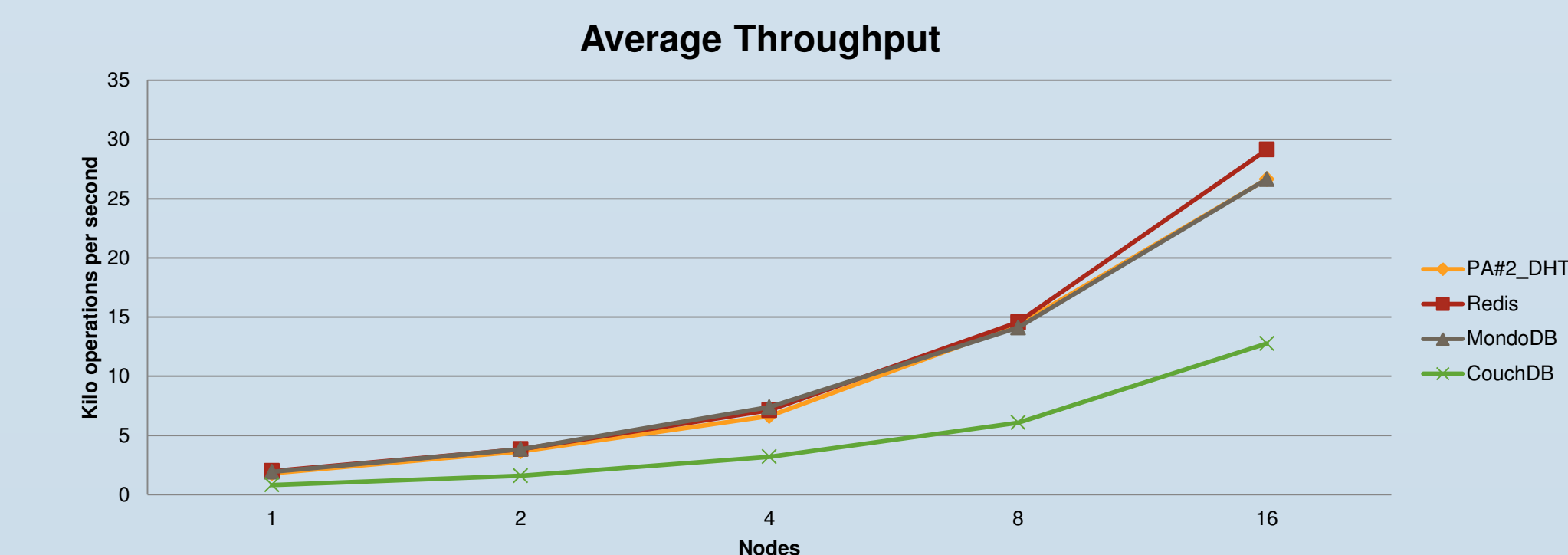
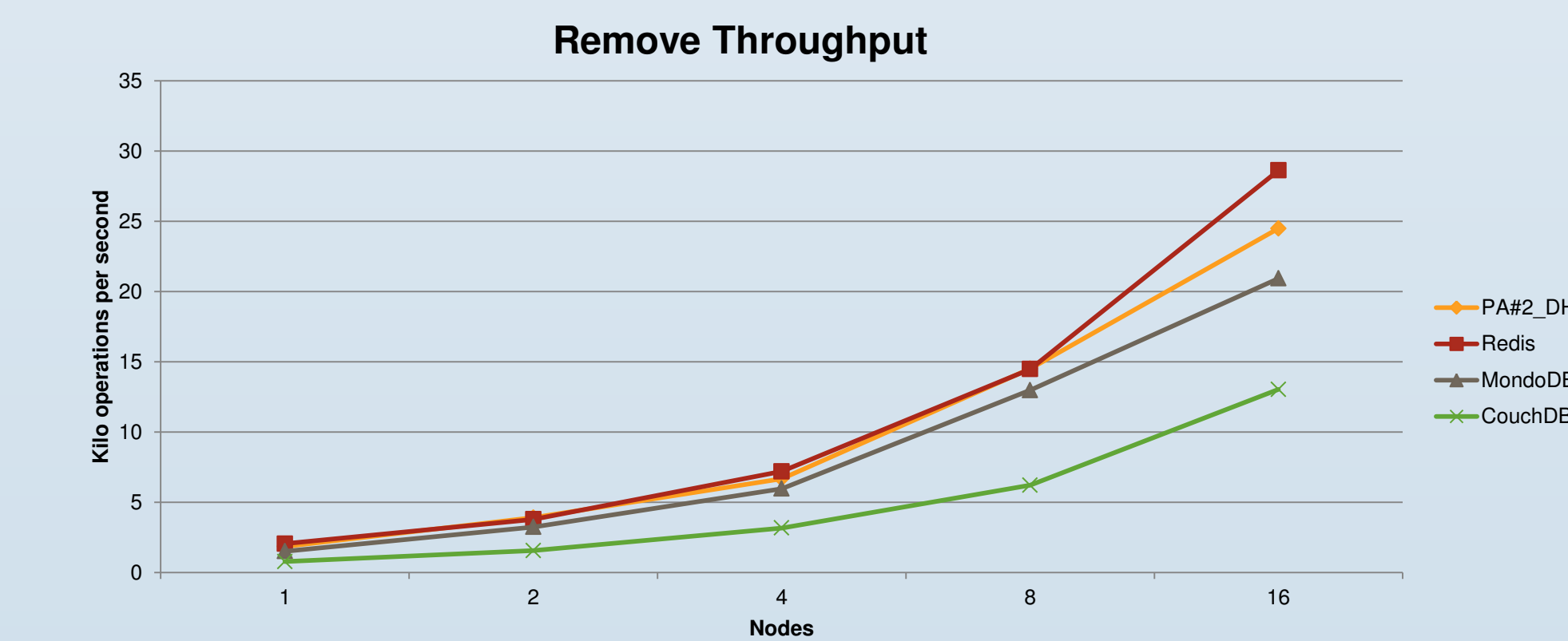
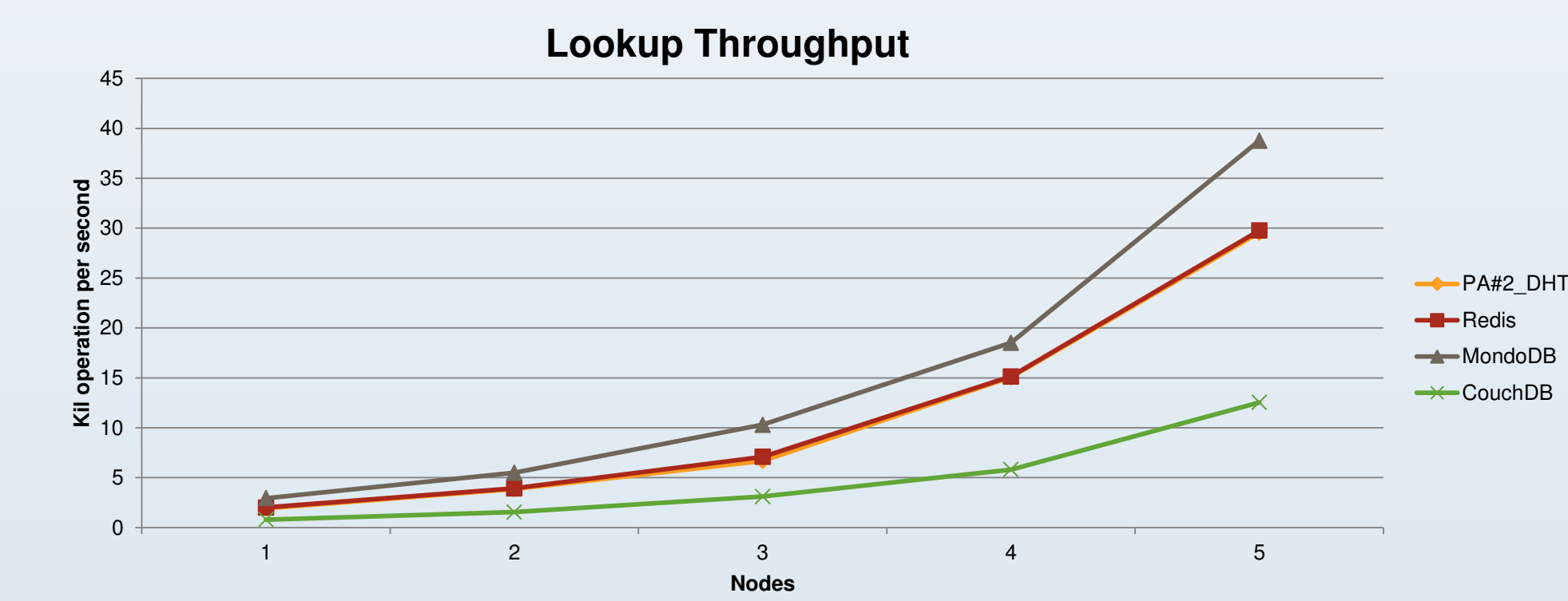
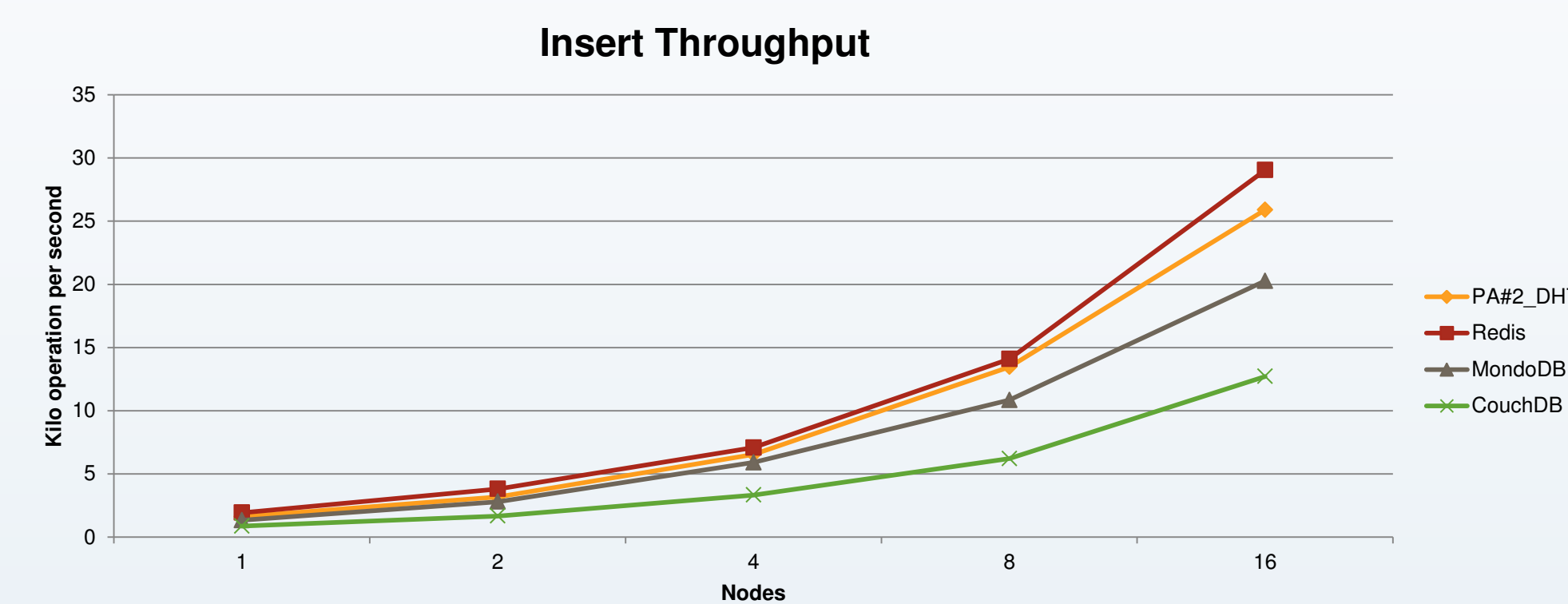
4. PA2-DHT Steps for experiment

1. Installation shell scripts and Evaluation class for each system is copied to the instances.

2. Shell scripts are executed to install c drivers and databases and made database Up.

3. Then 1,2,4,8,16 instances are executed to capture throughput & latency

Results



Conclusion

-Redis is found to be the fastest overall with the low latency and high throughput.

-Redis is fastest due to its nature being in memory key and value store.

-MongoDB showing low latency than redis for lookup operation.

-For Couch Db throughput is low but latency is high, couch db in case of heavy load will not let the system fail.

- The System of choice would be in the order of redis, mongoDB and couchDB.

References

<https://docs.mongodb.org/manual/tutorial/install-mongodb-on-ubuntu/>

<https://scaleyourcode.com/blog/article/3>

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