Programming Assignment 2

Distributed Hash Table.

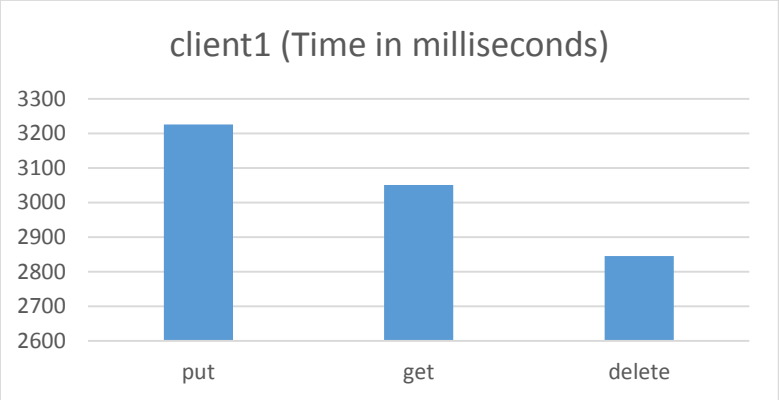
Performance Evaluation : By increasing number of clients for operation Put, Get, Delete.

Number of Clients = 1

- Performance of a system is measured by generating **100,000 (100 Thousand)** sequential **request** from a single client. And then varying the number of clients for concurrent requests.
- First a single client is run to make 100,000 requests for Put, Get, Delete with a particular Key-value pair.
- Then number of clients are increased gradually and their average time for execution of 100,000 requests are noted.
- Following results are observed for multiple clients performing various operations.

operation	client1 (Time in milliseconds)
put	**3226**
get	**3051**
delete	**2845**

- A Bar graph is plotted using the above observations.



X-axis : Different operations.

Y-axis : Average time taken to process 100,000 requests.

- **Observation**:
  - Put operation is taking more time than other two operations.
  - There is no any time difference in processing different operations.

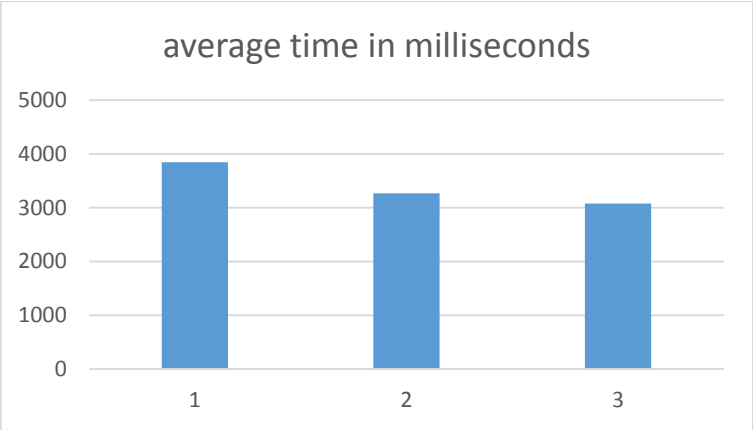
Number of Clients = 2

- Two client are run to make 100,000 requests for Put, Get, Delete with a different Key.

- Following results are observed for 2 clients performing various operations.

operations	client1	client2	average time in milliseconds
put	3687	4004	**3845.5**
get	3292	3239	**3265.5**
delete	3085	3076	**3080.5**

- A bar graph is plotted using the above observations.



X-axis : Different operations 1-Put 2-Get 3- Delete.

Y-axis : Average time taken to process 100000 requests.

- **Observation**:
  - Put operation is taking more time than other two operations.
  - There is less time difference between all three operations near about 1 second.

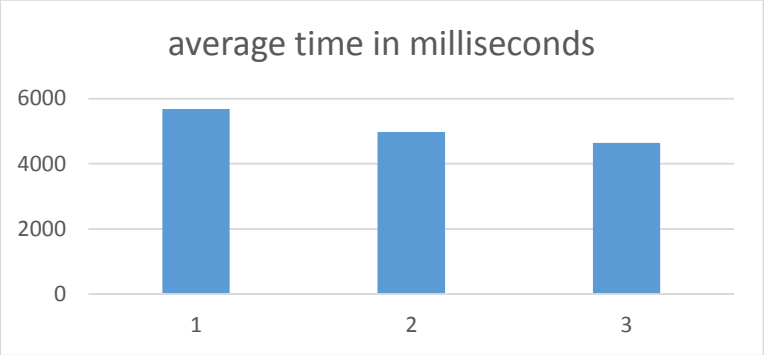
Number of Clients = 4

- Four client are run to make 100000 requests for Put, Get, Delete with a different Key.

- Following results are observed for 2 clients performing various operations.

operations	client1	client2	client3	client4	average time in milliseconds
put	5970	5876	5621	5283	**5687.5**
get	5067	5012	5006	4835	**4980**
del	4376	4791	4773	4639	**4644.75**

- A bar graph is plotted using the above observations.



X-axis : Different operations 1-Put 2-Get 3- Delete.

Y-axis : Average time taken to process 100000 requests.

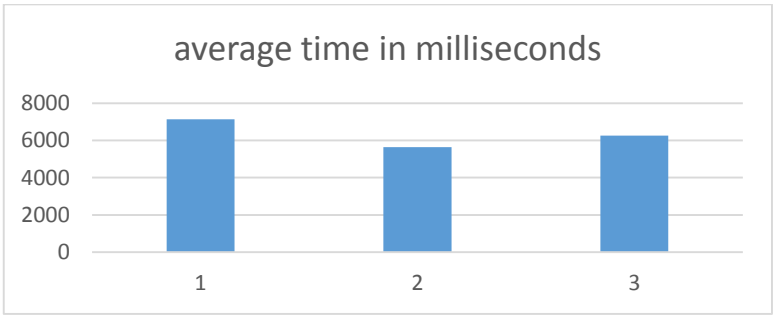
- **Observation**:
  - Put operation is taking more time than other two operations.

Number of Clients = 6

- Six client are run to make 100000 requests for Put, Get, Delete with a different Key.
- Following results are observed for 2 clients performing various operations.

operations	client1	client2	cient3	client4	client5	client6	average time in milliseconds
put	7577	7546	7454	7095	6773	6364	**7134.83**
get	5008	5403	6072	6064	5859	5438	**5640.67**
del	6006	6274	6517	6588	6300	5870	**6259.17**

- A bar graph is plotted using the above observations.



X-axis : Different operations 1-Put 2-Get 3- Delete.

Y-axis : Average time taken to process 100000 requests.

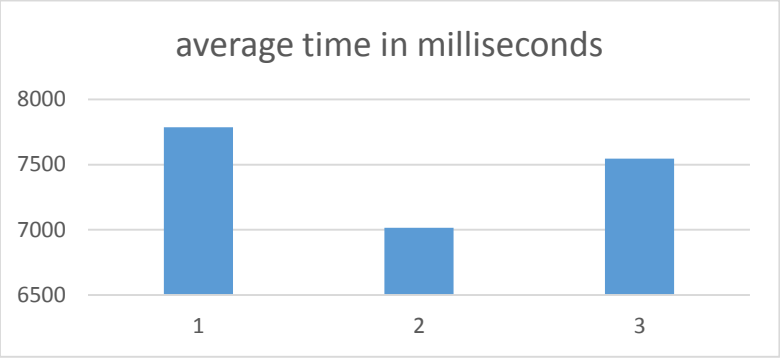
- **Observation**:
  - Put operation is taking more time than other two operations.
  - Here Get operation takes less time than delete operation.

Number of Clients = 8

- Eight client are run to make 100000 requests for Put, Get, Delete with a different Key.
- Following results are observed for 2 clients performing various operations.

operations	client1	client2	cient3	client4	client5	client6	client7	client8	average time in milliseconds
put	6726	8225	8300	8350	8201	7904	7492	7092	**7786.25**
get	6332	6685	7323	7607	7579	7366	6874	6363	**7016.13**
del	7081	7718	7981	8083	8055	7590	7152	6713	**7546.63**

- A bar graph is plotted using the above observations.



X-axis : Different operations 1-Put 2-Get 3- Delete.

Y-axis : Average time taken to process 100000 requests.

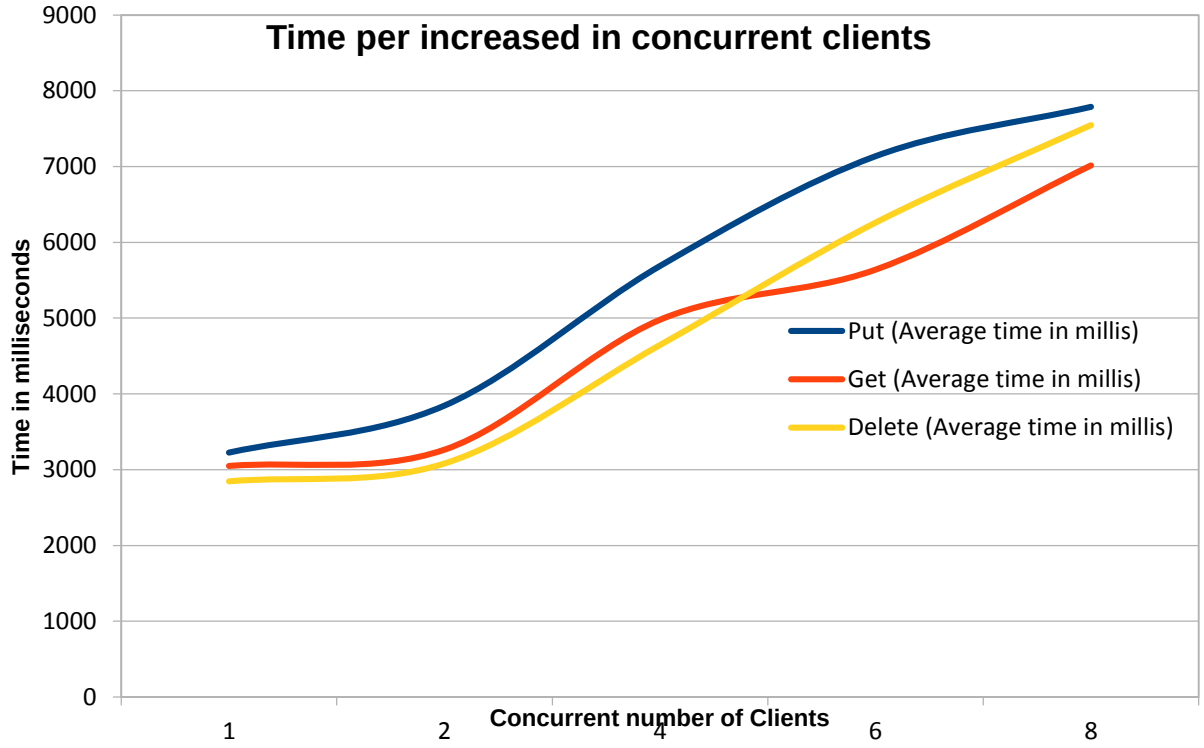
- **Observation**:
  - Put operation is taking more time than other two operations.
  - Here Get operation take near about half second less than delete operation.

Final Result:

Observations for different number of clients:

	100K transaction per function		
Clients	Put (Average time in millis)	Get (Average time in millis)	Delete (Average time in millis)
1	**3226**	**3051**	**2845**
2	**3845.5**	**3265.5**	**3080.5**
4	**5687.5**	**4980**	**4644.75**
6	**7134.83**	**5640.67**	**6259.17**
8	**7786.25**	**7016.13**	**7546.63**

Plotting an overall graph for above observations:



Final Conclusion:

- Time taken by Put operation is always greater than Get and Delete operations.
- Put takes more time because in put operation a long String value is transferred over a network and streams which increase its cost.
- In delete, system first search the given key in hashtable and then delete that entry, thus take more time than get operation.
- As the number of client increases the time for performing each operation increases gradually.
- We have increased number of clients to 8 but time increased only by 5 seconds.