ACS Programming Assignment 3

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1 Discuss in detail the setup you have created for your experiments.

1. data generation procedures

   We used *java.util.Random* to produce data like price, number of copies and so on. The books' and authors' names consisting with letters and numbers are generated by the instance of the class *NameGenerator* written by us. We generate 1000 books in total with their ISBN from 1 to 1000. The ISBN is random from 1 to 5000 in interactions.

2. hardware employed

   All our experiments were run on a single machine with a 8-core Apple M1 processor clocked at 3.2GHz. The machine has 8GB of DRAM and runs mac OS.

3. measurement procedures

   We vary the number of client threads (from 1 to 10) to measure the throughput and latency values for different number of client threads. And we plot the results in the Figure 1 and Figure 2.

2 Show and explain the plots for throughput and latency that you obtained.

In figure 1, the latency for the RPC calls is higher than the local ones due to HTTP requests and responses. The result fits our expectations.

In figure 2, the throughput for the RPC calls is better than the throughput for the local ones. Besides, the throughput for RPC calls increases with the amount of clients. Using RPC can allow the server to process data in parallel, which can helps us get better metric. The result fits our expectations.

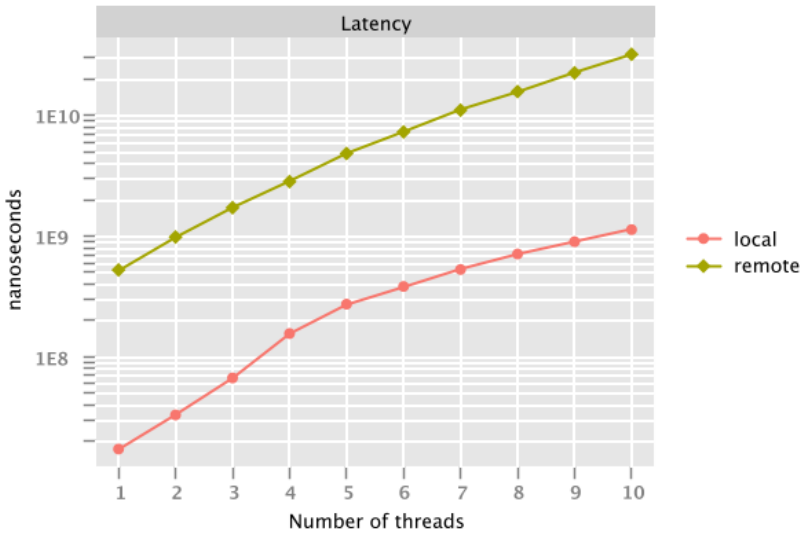

Figure 1: Latency

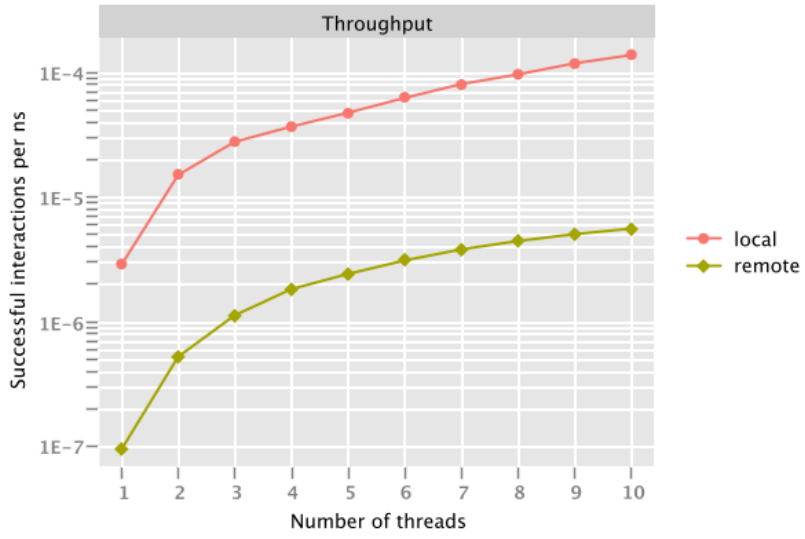

Figure 2: throughput

3 How reliable are the metrics and the workloads for predicting the performance of the bookstore? Are the metrics well chosen? What additional metrics would you choose to demonstrate the performance of the bookstore?

The experiments show the performance of the bookstore is reliable to a certain extent (when the amount of clients is not very large). Because, we just use a small amount of clients to test our bookstore, which cannot reflect the reliability in the industry.

The metrics we chosen are very good, because they can be used to compare the difference in throughput and latency between local calls and RPC calls. Besides, we can know the trends of these two metrics, as the amount of client changes.

We can use the *Capacity* to measure the performance of the bookstore.