# Evaluation Document

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# Lab 2: Asterix and the Microservice Stock Bazaar

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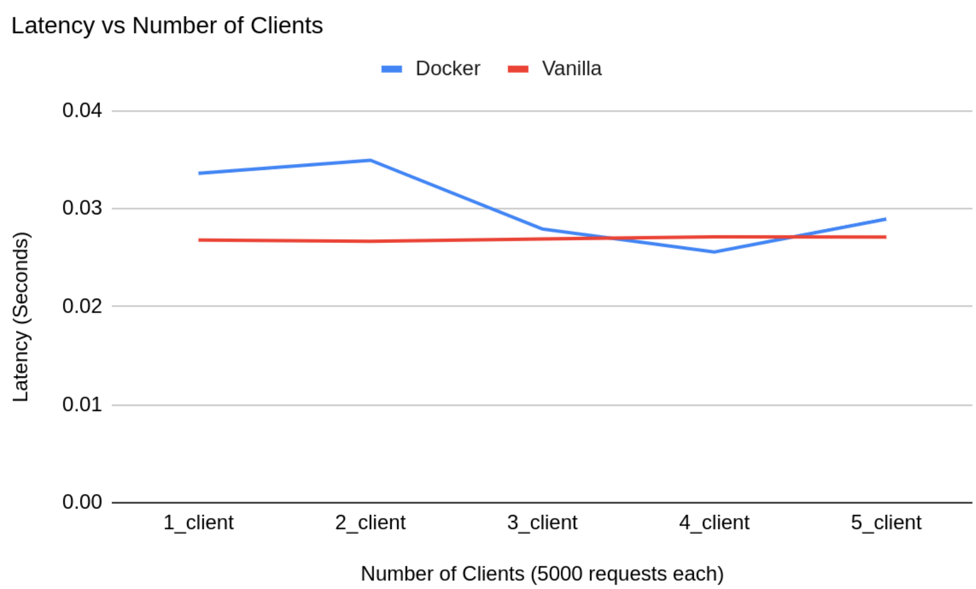
1. Does the latency of the application change with and without Docker containers? Did virtualization add any overheads?

   Yes, after looking at the graph below, we observe that the latency slightly increases with the use of Docker. For different numbers of clients on the x-axis, we can see that this trend is mostly consistent, the average latency with Docker is higher than the vanilla server.

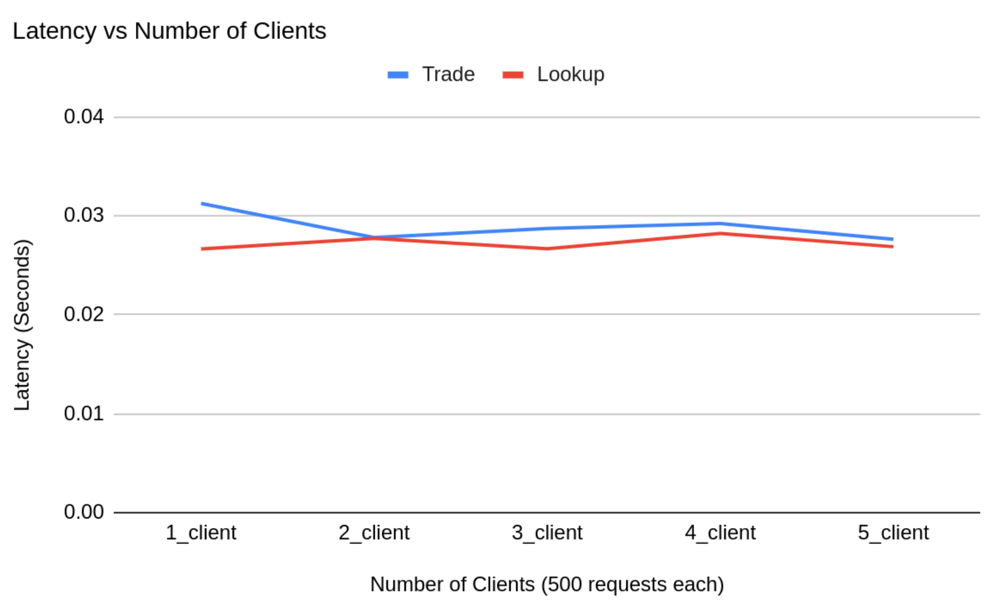
   Docker containers provide a lightweight and portable way to package and deploy applications, but they introduce an additional layer of abstraction between the application and the underlying hardware and operating system. This virtualization can potentially add some latency due to the overhead of containerization and networking between them.



2. How does the latency of the lookup requests compare to trade? Since trade requests involve all these microservices, while lookup requests only involve two microservices, does it impact the observed latency?

   After looking at the graph below, we observe that the latency of the lookup request is less than the trade requests. For different numbers of clients on the x-axis, we can see that this trend is consistent.

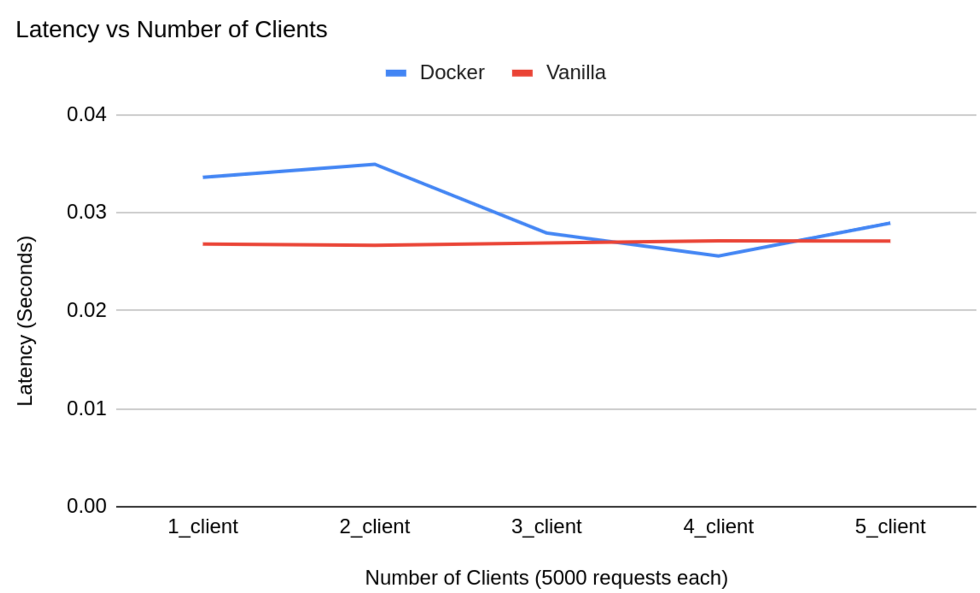
   A lookup request invokes the frontend service, which forwards the request to the catalog service. It involves two interactions. Whereas, a trade request invokes the frontend service, which forwards the request to the order service. Here, first the order service makes a lookup request to the catalog service. If the lookup response is valid, then it makes an update request to the catalog service. Trade request involves all the three microservices and total four interactions overall, which is why it has a higher latency.



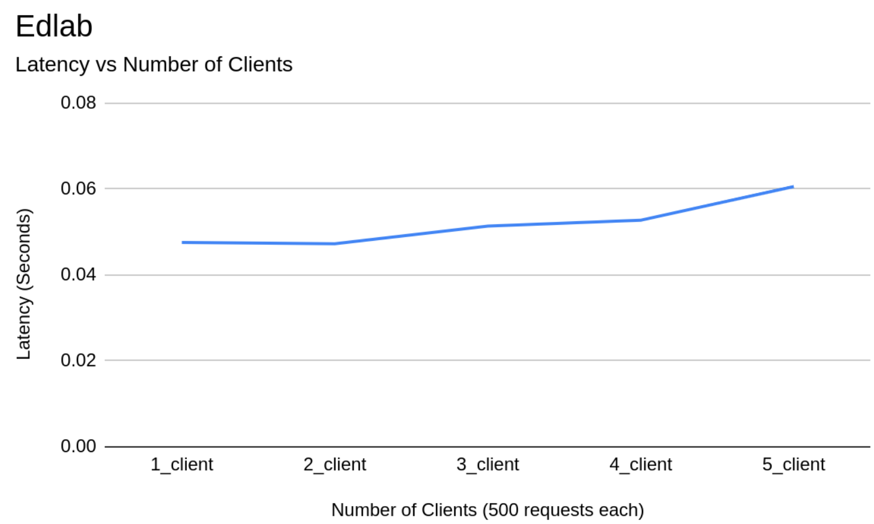
3. How does the latency change as the number of clients change? Does it change for different types of requests?

   Case 1: From the graph below we can see that, for the vanilla server (without Docker), we can observe a very consistent trend. The latency is almost the same even as the number of clients increases.

   Case 2: For the case of the server running with Docker, the latency slightly decreases. We can see that the latency is maximum when we have 1-2 clients, but decreased slightly when it increased to 5. We ran this experiment multiple times to confirm our results.

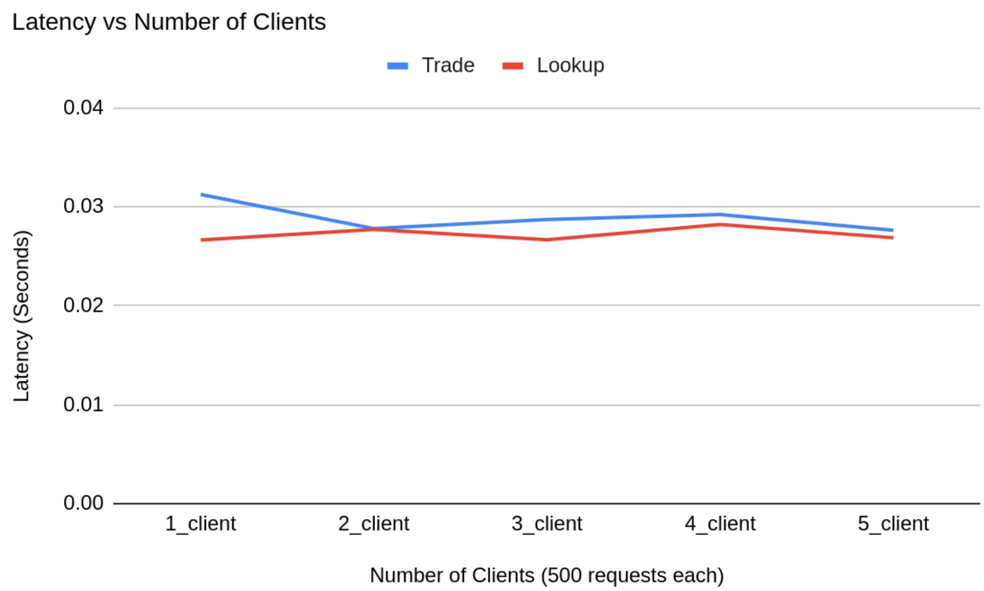



   Case 3: Server running on Edlab and Client is running on local machine. The latency is slightly increasing as the number of clients are increasing. This is due to the fact that between different machines we have network latency with increases the overall latency




Different types of requests

We can observe from the graph below, that even for different types of requests, the latency does not vary much with change in number of clients.




In all the three cases, we believe the latency stays almost the same because of concurrency within every microservice, and each microservice is running parallel to each other.

For case 2 with Docker containerization, we believe the decrease in latency with an increase in the number of clients sending requests can be attributed to various factors, including load balancing, resource allocation and caching.