An-Najah National University

Faculty of Engineering

Dos Project Report Part2

Students Names
1. Raya Ahmad
2. Sana` Zitawi

In this part of the project we just added some features to our book store to improve the performance of the overall program.

For the front-end server, we added an in-memory cache that caches the results of recent requests to the order and catalog servers, we implemented the in-memory cache as a list of objects.

We replicated the code and the database for the catalog and order servers, we used round-robin as a load balancing algorithm per-request basis. When the front-end server receives a request it checks the cache first before it forwards the request to the catalog server. cashing is useful just for reading requests like info and search. write requests, which are basically orders or update requests, to the catalog must be processed by the order or catalog servers.

To implement the consistency between the cache and the catalog server and its replica they send invalidate requests to the in-memory cache prior to making any writes to their database files. This invalidated request causes the data for that item to be removed from the cache. we put a limit on the max number of items that can be stored in the cache which is 5 elements maximum and we used the LRU replacement policy to replace older items with newer ones. we implemented this policy by defining a counter for each item in the cache the counter will be increased each time the result that stored in the item has been returned to a defined request, the item with the smallest count`s number represents the oldest item in the cache which will be removed when the cache is full and we want to store a new item.

When we write to the database of one replica we also perform this write to the database of the other replica to keep them in sync with one another.

Possible improvements and extensions to our program?
- using a user-friendly graphical user interface.
- using a more secure database instead of using a simple json file to store data.
- putting each functionality in a separate server in order to increase scalability, maintainability and to increase performance.

how do we run our program?
We give each server and each replica a different port number, debug the file of each server then use the Postman program to send requests to the front-end server.

It did not work for us to put each server on a different virtual machine and send requests between them.

End of the Report 😊