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Distributed Operation Systems - 10636456

Lab #2

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DOS-project PART2

The Used Technologies:

Server Frameworks : PHP-Laravel MVC(Model-View-Controller)

Database : SQLite

Virtualization Technology : Docker

{ Catalog Server => localhost:4000

Catalog replica Server => localhost:4003

Order Server => localhost:4001

Order replica Server=> localhost:4004

Front-end Server with cache => localhost:4002 }

The reason we have used ports instead of IP's in docker
because docker cannot map each container to a different IP
unless docker windows is used

Five services:

1- Catalog server

2- Catalog replica Server

3 - Order Server

4- Order replica Server

5 - Front-end Server with cache

Compute the average response time (query/buy) of your new systems.

What is the response time with and without caching:

query	avg(Without cache)	avg(With cache)
info	138.666666667ms	93.428571429ms

How much does caching help?
The cache helps way more with reading operations than writing operations

Construct a simple experiment that issues orders or catalog updates (i.e., database writes) to invalidate the cache and maintain cache consistency. What are the overhead of cache consistency operations?

The overhead of cache when keep missing data such as writing operations each writing operation deletes the data from the cache and that leads to a cache miss with the next read

What is the latency of a subsequent request that sees a cache miss?
Without cache response time takes around 140ms
With cache response time takes 62ms
The latency is around 77ms

Consistency has been achieved in this part between replicas servers
Cached system is used in the front-end server to make it faster

possible improvements :
PHP-Laravel has been used which is heavy framework
to improve we could use lighter frameworks such as
Python-FLASK since we use microservices arch.better load
balancing in case of heave loading on the servers, utilize
kubernetes to manage the replica and use mysql with replica
instead of sqlite, use a populer cach solution like redis

to run the program:
using the following command in the terminal to
run the containers
`docker-compose up` or `docker compose up`