CSE351 PA2 Report

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My code is based on stream socket server demo of https://beej.us/guide/bgnet/

Overview

My proxy server reads data from a client until \r\n\r\n comes.

Parse the request and check whether it is valid or not.

If it is a valid request, then check it is cached.

If it is not cached, then send a request to the server and get data.

Then, sent the data to the client and do caching if possible.

Caching

For Caching, I decided to use cache files.

I use a well-known hash function, djb2.

Later part of request after "http://" including path will be a input of hash function.

And the output of hash function will be a file name.

And at the top of the file. My proxy server write a valid time in Unix time.

Thus, later when a client send a request, using hash function find a cache and check whether it is still valid.

If it is valid, send remaining part of cache file to the client without sending a request to a server.

Synchronization for multiclient

When caching, multiple clients might attempt to write to the same file simultaneously. To handle this, I implemented the following logic using flock:

For write operation, I use exclusive lock(lock_ex) to ensure only one process can write. And I implemented a double-checked locking pattern to handle thundering herd problem. In other words, After a process acquires the lock, it check if another process has already created the cache while it was waiting.

For read operations, I use a shared lock. This allows multiple clients to read the cache file concurrently.

Proxy tester

I checked proxy_tester records 60 points out of 60. But in many cases, it records 55 because of the time is slightly different.

Reference

Thundering herd problem : https://velog.io/@gkdbssla97/Thundering-Herd-Problem%EC%9D%84-%EB%A7%88%EC%A3%BC%EC%B3%A4%EB%8B%A4

Double-checked locking pattern : https://velog.io/@hmcck27/Double-Checked-Locking

flock : https://speardragon.github.io/system/system%20programming/System-Programming-6%EC%9E%A5.-%ED%8C%8C%EC%9D%BC-%EB%B0%8F-%EB%A0%88%EC%BD%94%EB%93%9C-%EC%9E%A0%EA%B8%88/

djb2 : https://zoosso.tistory.com/948